Effective Health Care Program

Comparative Effectiveness Review
Number 70

Surgical Options for Inguinal Hernia: Comparative Effectiveness Review

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Preface

The Agency for Healthcare Research and Quality (AHRQ) conducts the Effective Health Care Program as part of its mission to organize knowledge and make it available to inform decisions about health care. As part of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, Congress directed AHRQ to conduct and support research on the comparative outcomes, clinical effectiveness, and appropriateness of pharmaceuticals, devices, and health care services to meet the needs of Medicare, Medicaid, and the Children's Health Insurance Program (CHIP).

AHRQ has an established network of Evidence-based Practice Centers (EPCs) that produce Evidence Reports/Technology Assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care. The EPCs now lend their expertise to the Effective Health Care Program by conducting Comparative Effectiveness Reviews (CERs) of medications, devices, and other relevant interventions, including strategies for how these items and services can best be organized, managed, and delivered.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews are useful because they define the strengths and limits of the evidence, clarifying whether assertions about the value of the intervention are based on strong evidence from clinical studies. For more information about systematic reviews, see www.effectivehealthcare.ahrq.gov/reference/purpose.cfm.

AHRQ expects that CERs will be helpful to health plans, providers, purchasers, government programs, and the health care system as a whole. In addition, AHRQ is committed to presenting information in different formats so that consumers who make decisions about their own and their family's health can benefit from the evidence.

Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the Web site (www.effectivehealthcare.ahrq.gov) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input. Comparative Effectiveness Reviews will be updated regularly.

We welcome comments on this CER. They may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by email to epc@ahrq.hhs.gov.

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Surgical Options for Inguinal Hernia: Comparative Effectiveness Review

Structured Abstract

Objective. The objective of this study was to comprehensively review the evidence to inform key decisions in the management of inguinal hernia in adults and pediatric patients. These questions include whether to repair a pain-free hernia or "wait and see," and whether to repair a painful hernia using an open or laparoscopic approach. They also include which procedure to use if an open approach is used; which procedure to use if a laparoscopic approach is used; which type of mesh to use; which mesh fixation method (if any) to use; how experience with laparoscopic repair may be related to the risk of hernia recurrence; for pediatric hernia, whether to surgically explore a possible contralateral hernia or "wait and see"; and for pediatric hernia, whether to repair using an open or laparoscopic approach.

Data Sources. MEDLINE®, PreMEDLINE, Embase, Cochrane Library, and reference lists. The last search date was November 17, 2011.

Review Methods. We refined the topic with Key Informants and finalized the protocol with Technical Expert Panel members. We determined the study inclusion criteria as well as the risk-of-bias items a priori. Study information was extracted into tables regarding general information, patient enrollment criteria, baseline characteristics, risk-of-bias items, and data. We performed meta-analysis where appropriate and rated the strength of evidence for major comparisons and outcomes. We discussed applicability by focusing on the population, interventions, and settings of the included studies separately for each clinical question.

Results. We included 223 publications describing 151 unique studies: 123 were randomized controlled trials (RCTs), 2 were registries, and 26 had other designs (included only for the laparoscopic surgical experience question). The evidence came from international sources; only 10 percent of the studies were conducted exclusively in the United States. The risk of bias was moderate for most outcomes in the RCTs but high in the registries. For painless hernia, evidence was mostly insufficient to permit conclusions, but quality of life at 1 year was better after surgery than watchful waiting. For painful primary hernias in adults, the risk of recurrence was lower after open surgery than after laparoscopy, whereas for recurrent hernia, this risk was lower after laparoscopic repair. Other outcomes, including short-term recovery and long-term pain, favored laparoscopic repair over open repair. Different open repair procedures generally yielded similar results, and transabdominal preperitoneal repair had the same or better outcomes compared with other laparoscopic procedures. Different meshes and fixation approaches often showed similar results. Many studies reported that surgical experience lowers the risk of recurrence after laparoscopic repair, but the data were reported unevenly and do not permit any estimate of the length of the learning curve. For pediatric hernia, no studies have compared surgical exploration for a contralateral hernia with watchful waiting, but comparing laparoscopy versus open high ligation, outcomes generally favored laparoscopy.

Conclusions. Patients, families, and providers can use this evidence review to improve decisionmaking about inguinal hernia. The applicability of our findings is limited to the types of

populations, procedures, and settings in the included studies. The typical patient was a middle-aged man of average weight with primary unilateral inguinal hernia.

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Executive Summary

Background

An inguinal hernia is a protrusion of abdominal contents into the inguinal canal through an abdominal wall defect. The lifetime rate of inguinal hernia is 25 percent in males and 2 percent in females.[1] The risk of inguinal hernia increases with age, and the annual incidence is about 50 percent in males by the age of 75 years.[2] Approximately 10 percent of cases are bilateral.[3] In children, the incidence ranges from 0.8 to 4.4 percent.[4] It is 10 times as common in boys as in girls and also more common in infants born before 32 weeks' gestation (13-percent prevalence) and in infants weighing less than 1,000 grams at birth (30-percent prevalence).[4]

Surgical repair of hernias is the most commonly performed general surgical procedure in the United States.[5] In 2003, U.S. surgeons performed an estimated 770,000 surgical repairs[5] of inguinal hernia. (Note, however, that a more recent study, presently in press, estimates the U.S. prevalence at 600,000 and asserts that approximately 42 percent of males will develop an inguinal hernia in their lifetime.[6]) These repairs are typically performed on an outpatient basis (87 percent in 1996).[5] Such a large volume of procedures suggests that even modest improvements in patient outcomes would have a substantial impact on population health.[7]

The primary goals of surgery include preventing strangulation, repairing the hernia, minimizing the chance of recurrence, returning the patient to normal activities quickly, and minimizing postsurgical discomfort and the adverse effects of surgery. The various surgeries include a constellation of benefits and risks, which presents some clinical uncertainty in the choice between approaches. Recurrence occurs in approximately 1 to 5 percent of cases.[8] Balancing all the factors (e.g., recurrence, adverse events, time to return to work [RTW]) is a difficult yet critical process in making the best possible medical decisions.

Surgical procedures for inguinal hernia repair generally fall into three categories: open repair without the use of a mesh implant (i.e., sutured), open repair with a mesh, and laparoscopic repair with a mesh. Within each of these categories, several specific procedures have been employed. Until the 1980s, open suture repair was the standard; however, the resulting tension along the suture line yielded relatively high rates of recurrence and patient discomfort. Nonsutured "tension-free" surgical mesh has gained in popularity, and many specific open procedures are used. One author estimates that in 2003, 93 percent of groin hernia repairs involved the use of a mesh, and of these, about three-fourths involved either a Lichtenstein repair or mesh plug.[5] In the Lichtenstein procedure, surgeons suture the mesh in front of the hernia defect. Mesh plug repair involves a preshaped mesh plug that surgeons introduce into the hernia weakness during open surgery; they then position a piece of flat mesh on top of the hernia defect. The near-universal adoption of mesh means that the most important questions about hernia repair involve various mesh procedures.

In terms of setting, most hernia surgeries are performed not in specialized hernia centers but by general surgeons who also perform many other types of surgeries.[9] The laparoscopic surgical repair of inguinal hernia is generally recognized as a highly specialized skill, and patients receiving care from more experienced surgeons may fare better than patients receiving care from less experienced surgeons. This review specifically examines evidence on the association between laparoscopic surgical experience and hernia recurrence (See Key Questions below). The most commonly performed laparoscopic repair procedures are transabdominal preperitoneal (TAPP) repair and totally extraperitoneal (TEP) repair. During TAPP repair, surgeons enter the

peritoneal cavity to place a mesh through an incision over the hernia site. With TEP surgery, surgeons do not enter the peritoneal cavity but use a mesh to cover the hernia from outside the peritoneum.

Given the clinical uncertainty, a systematic review of the existing evidence on comparative effectiveness will help inform important medical decisions about surgical options for inguinal hernia. The findings of the review may affect clinical decisions by patients and surgeons, treatment recommendations by professional societies, purchasing decisions by hospitals, and coverage decisions by payers.

Objectives

We sought to thoroughly summarize the evidence pertaining to nine Key Questions (listed below and presented graphically in Figure A):

Among adults with *pain-free* primary inguinal hernias:

Key Question 1. Does hernia repair differ from watchful waiting in patient-oriented effectiveness outcomes and/or adverse events?

Among adults with painful inguinal hernias without incarceration/strangulation:

Key Question 2. Does open hernia repair with a mesh differ from laparoscopic hernia repair with a mesh in patient-oriented effectiveness outcomes and/or adverse events?

a. For primary hernias?
b. For bilateral hernias?
c. For recurrent hernias?

Key Question 3. Do different open mesh-based repair procedures (e.g., Lichtenstein repair, mesh plug) differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 4. Do different laparoscopic mesh-based repair procedures (e.g., transabdominal preperitoneal repair, totally extraperitoneal repair) differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 5. Do different mesh products differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 6. Do different mesh-fixation methods (e.g., no fixation, sutures, glue) differ in patient-oriented effectiveness outcomes and/or adverse events?

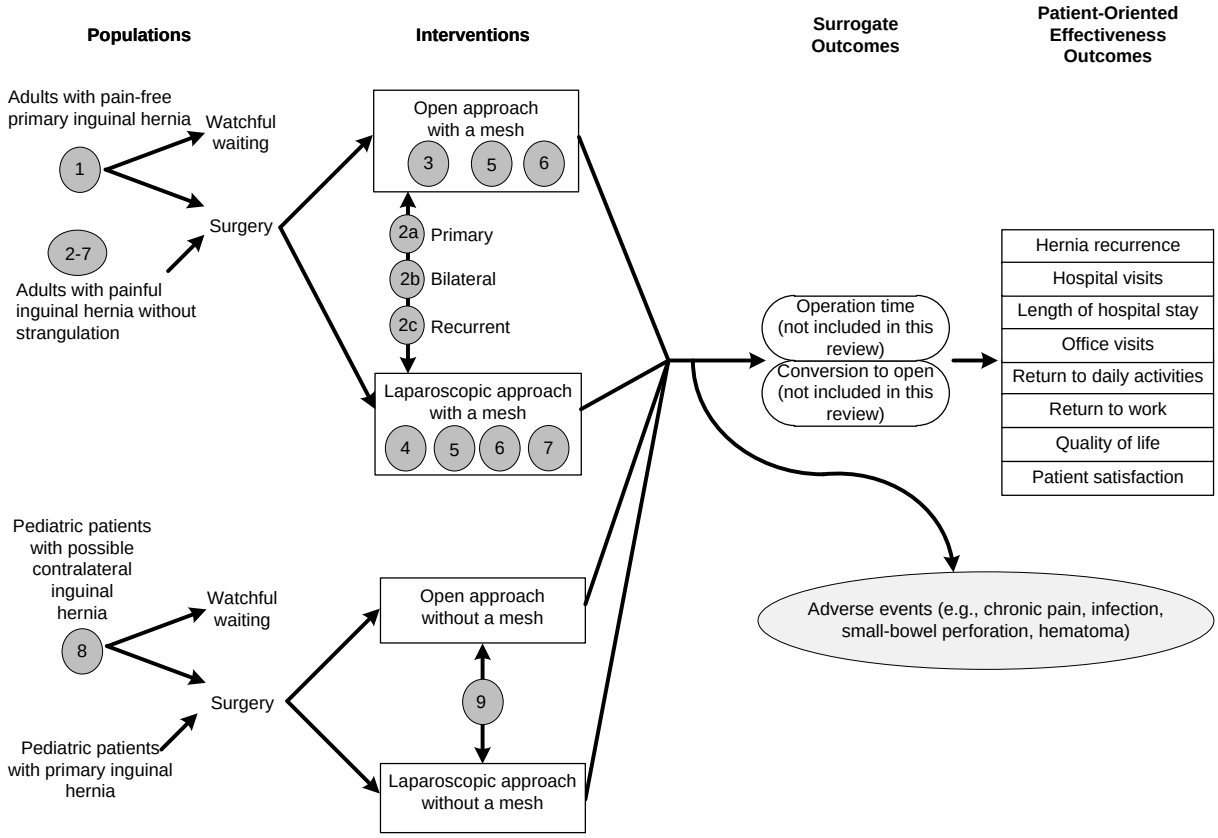
Key Question 7. For each type of laparoscopic mesh repair, what is the association between surgical experience and hernia recurrence?

Among *pediatric* patients (aged 21 years or younger):

Key Question 8. For a possible contralateral hernia, does same-operation repair/exploration differ from watchful waiting in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 9. Does open hernia repair without a mesh differ from laparoscopic hernia repair without a mesh in patient-oriented effectiveness outcomes and/or adverse events?

Figure A. Analytic framework



Note: Circled numbers are Key Questions.

Methods

We developed and refined the topic in late 2010 in collaboration with five Key Informants: two hernia surgeons, two individuals from payer organizations, and one individual from a mesh manufacturer. The Key Questions were posted on the Agency for Healthcare Research and Quality Web site for public comments for 1 month. We finalized the review protocol in spring 2011 based on input from the public comment period and four Technical Experts (three hernia surgeons and a product specialist from a mesh manufacturer).

Information professionals in the Evidence-based Practice Center Information Center performed literature searches and followed established guidelines and procedures as identified by the Director of Health Technology Assessment/Evidence-based Practice Center Information Center. We searched MEDLINE® and PreMEDLINE; Embase; the Cochrane Library, including the Central Register of Controlled Trials, the Cochrane Database of Methodology Reviews, the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effects, and the Health Technology Assessment Database; and the United Kingdom National Health Service Economic Evaluation Database. The searchers applied no limits on language, and search dates were January 1, 1990, to November 17, 2011.

For inclusion in the review, we selected only full articles published in English. For questions comparing interventions (i.e., all Key Questions except Key Question 7, on surgical experience), the study must have either randomly assigned patients to treatments or used an analytic method

to address selection bias, such as intentional baseline matching on multiple characteristics, propensity scoring, or other analytic approach. Studies could be prospective or retrospective, but retrospective studies must have used consecutive enrollment (or enrollment of a random sample of eligible participants). The treatments being compared must have been administered during the same time period, so any observed difference between treatment outcomes were not attributable to differences in other aspects of care during different timeframes. For a study to be included for a given Key Question, at least 85 percent of its patients must have had the condition specified in the Key Question. The study must have reported data on at least one of the included outcomes for at least one of the Key Questions; outcome data must not have relied on retrospective recall; data must have included at least 6 months' followup for hernia recurrence, quality of life (QOL), and patient satisfaction (SFN); and data must have been reported on at least 10 patients with the condition of interest, who represented at least 50 percent of enrolled patients.

From each included study, we extracted all important information. This included author, publication year, country, study design, number of centers, dates of patient enrollment, type of setting, length of followup, funding source, which Key Question(s) the study addressed, all authors' reported patient enrollment criteria, specific procedure, specific mesh (if applicable), fixation method (if applicable), number of surgeons, surgeons' length of experience with the repair procedures performed, surgical setting (i.e., specialized hernia center, general surgery), type of anesthesia, methods of followup for data collection, and all reported baseline characteristics. We also extracted the numerical data needed to compute an effect size (such as an odds ratio [OR] or standardized mean difference) and its standard error for all included outcomes for each study.

We assessed the risk of bias (i.e., internal validity) separately for each outcome and each time point of each study using 15 risk-of-bias items, such as randomization, concealment of allocation, blinding of outcome assessors, and whether the surgeons had similar experience performing the study procedures. Some studies involved one surgeon performing different procedures, whereas other studies assigned surgeons to procedures. Based on these items, each data point from each study was assigned a risk-of-bias category of low, moderate, or high. This assessment was performed in duplicate, with disagreements resolved by consensus.

Within each treatment comparison, we examined all included outcomes from all relevant studies. The outcomes were divided into the following eight categories: hernia recurrence; hospital-related information, including the length of hospital stay and subsequent hospital/office visits; the time to return to daily activities (RTDA); the time to RTW; QOL; patient SFN; pain, including visual analog scale scores and the rates of chronic pain; and other adverse events not involving pain.

We performed meta-analysis if appropriate and possible. This decision depended on the judged clinical homogeneity of the different study populations, cointerventions, and outcomes, as well as whether studies reported the outcome in the same way. In the choice of effect size metrics, for hernia recurrence we used the relative risk (RR) because of its ease of interpretation and because some studies reported only an adjusted RR. Thus, only a relative-risk meta-analysis for hernia recurrence would include all the studies. For all continuous outcomes, we used the weighted mean difference, which is on the same scale as the measured outcome. For adverse events and pain reported dichotomously, we analyzed ORs.

To aid interpretation, for each outcome in the review, we estimated the smallest difference between groups that could still be considered clinically significant (minimum clinically significant difference). For example, for the outcome of hernia recurrence, we defined the

minimum clinically significant difference as 3 percentage points (e.g., 1 percent vs. 4 percent for two separate treatments). This definition aids interpretation in two main ways: (1) determining whether a statistically significant difference is important and (2) determining whether a statistically nonsignificant difference is small enough to exclude the possibility of an important difference. Our estimates were based on published literature, guidance from the U.S. Food and Drug Administration, input from the Technical Expert Panel, and the consensus of the research team.

If meta-analysis was deemed appropriate and possible for a given comparison and a given outcome, we performed DerSimonian and Laird random-effects meta-analysis using comprehensive meta-analysis software (Biostat, Inc., Englewood, NJ). To measure heterogeneity, we used both I^2 and tau. If there was substantial heterogeneity and 10 or more studies of the same patient outcome of the same treatment comparison were available, we conducted meta-regressions using a variety of predictors (e.g., whether the study used concealment of allocation).

For major comparisons and outcomes, we rated the strength of evidence using the Evidence-based Practice Center system described by Owens and colleagues.[10] This system includes four core domains (risk of bias, consistency, precision, and directness) as well as four optional domains (large magnitude of effect, all plausible confounders would reduce the effect, publication bias, and dose-response association). The directness domain does not encompass applicability, which is considered outside the evidence rating system. The various domains were considered together using transparent rules to rate the evidence for the outcome as high, moderate, low, or insufficient. We performed strength-of-evidence rating for all Key Questions except Key Question 7, which did not involve comparing treatments but rather an assessment of the relationship between surgical experience and hernia recurrence.

To assess applicability, we first abstracted data from each included study on factors that may affect the study's applicability. Using the PICOTS (populations, interventions, comparators, outcomes, timing, and setting) approach as a guide, we primarily focused on the three categories most relevant to inguinal hernia repair:

- Population—demographic characteristics, comorbidity or general physical fitness, and types of hernia
- Intervention and comparators—inguinal repair procedure being compared, timeframes of the procedure being performed, cointerventions, and experience of the surgical team
- Setting—geographic and clinical factors

Based on a review of the data abstracted, we narratively summarized any patterns reflected from these factors that might affect the applicability of the evidence. We made no attempt to generate any rating or score for the applicability of the evidence. Our narrative summaries are intended to draw stakeholders' attention to potential applicability issues embedded in the evidence.

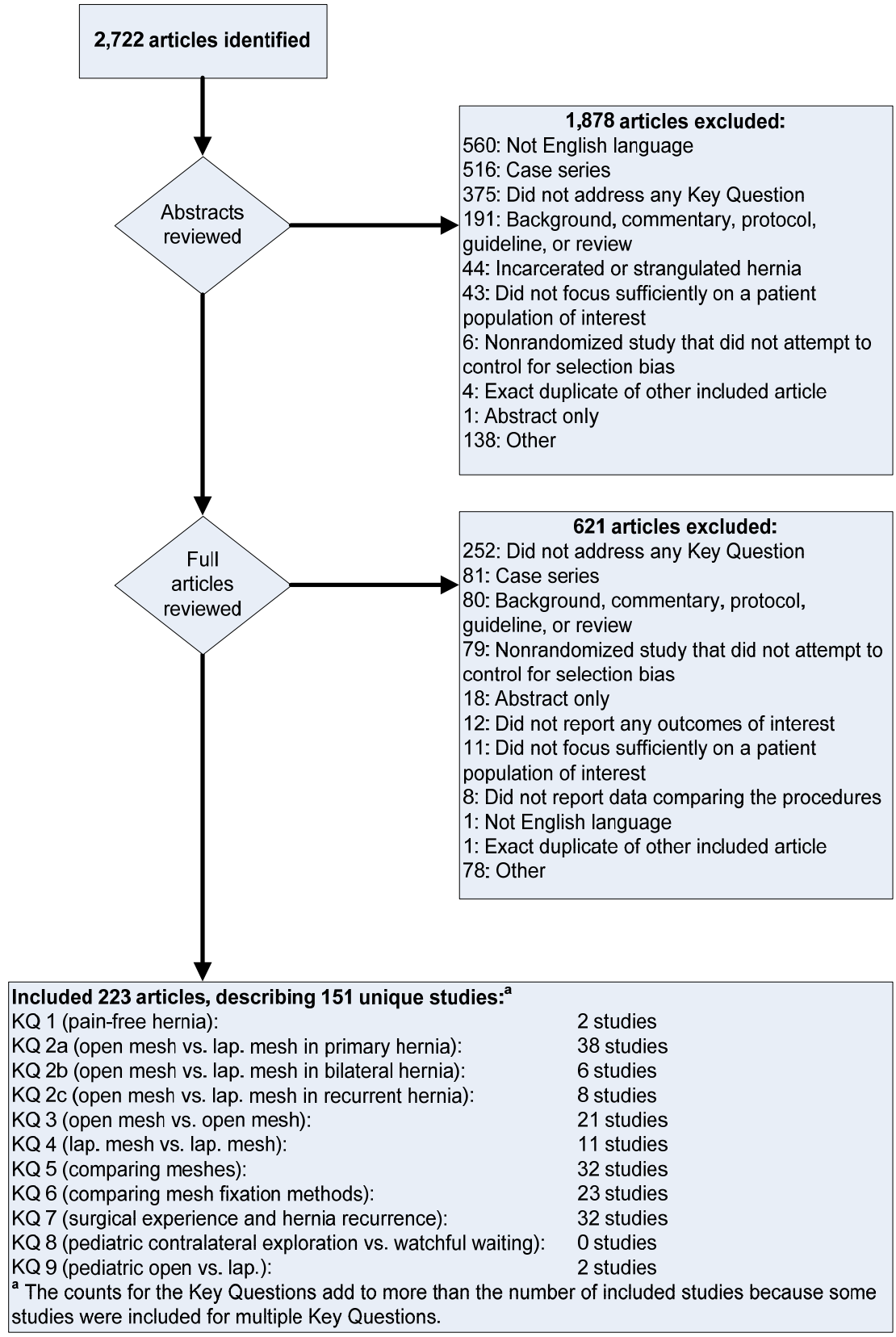
Results

Searches identified 2,722 potentially relevant articles, and we excluded 1,878 of these at the abstract level (Figure B). We excluded another 621 articles at the full-article level, typically because of irrelevance to our Key Questions (252 publications), background/review/ commentary/protocol articles (80 publications), case-series design (81 publications), or nonrandomized designs with no control for selection bias (79 publications). The remaining 223 publications described 151 unique studies that we included in our review. The largest

number of studies addressed Key Question 2a (38 studies), which compared open mesh repair with laparoscopic mesh repair in patients with primary inguinal hernia. We found other large evidence bases for Key Question 3 (comparing different procedures for open mesh repair, 21 studies), Key Question 5 (comparing meshes, 32 studies), Key Question 6 (comparing fixation methods, 23 studies), and Key Question 7 (the association between laparoscopic hernia repair experience and hernia recurrence, 32 studies). We included no studies for Key Question 8 (comparing surgical exploration vs. watchful waiting [WW] for pediatric contralateral inguinal hernia). We included 17 studies for multiple Key Questions (e.g., two studies were each included for four Key Questions) because they included three or more groups or reported subgroup analyses.

Our synthesis of results included quantitative meta-analysis for seven of the Key Questions (2a, 2b, 2c, 3, 4, 5, and 6). We conducted these analyses only where reasonable and appropriate (i.e., similar patients, comparisons, outcomes). Meta-analyses allowed us to extract greater statistical power from the evidence.

Figure B. Literature flow diagram



Key Question 1 (Repair Vs. Watchful Waiting for Pain-Free Hernia)

Two studies met inclusion criteria. One compared WW with Lichtenstein repair, and the other compared WW with "tension-free mesh repair" (which might have been Lichtenstein repair). Both studies were considered to have moderate risk of bias for all outcomes reported.

For this Key Question, we considered the following outcomes to be major: long-term QOL, which was reported as "overall change in health status in previous 12 months"; long-term pain; and acute hernia/strangulation. The evidence was sufficient to permit a conclusion for one outcome: long-term QOL, for which the results favored repair over WW.

Key Question 2a (Open Vs. Laparoscopic Repair, Primary Hernia)

Thirty-eight studies met inclusion criteria. The most commonly compared specific surgical procedures were TAPP repair versus Lichtenstein (14 studies), TEP repair versus Lichtenstein (14 studies), TAPP repair versus mesh plug (3 studies), TEP repair versus mesh plug (3 studies), and TAPP repair/TEP repair versus Lichtenstein (4 studies). All but two studies (which were registry studies) were considered to have moderate risk of bias.

For this Key Question, we considered the following outcomes to be major: hernia recurrence, length of hospital stay, RTDA, RTW, QOL, patient SFN, long-term pain, epigastric vessel injury, small-bowel injury, small-bowel obstruction, urinary retention, hematoma, and wound infection. The evidence was sufficient to permit the following conclusions:

- Results favored laparoscopy for five outcomes (RTDA, RTW, long-term pain, hematoma, and wound infection).
- Results favored open surgery for two outcomes (hernia recurrence and epigastric vessel injury).
- Results indicated approximate equivalence for one outcome (length of stay).

Key Question 2b (Open Vs. Laparoscopic Repair, Bilateral Hernia)

Six studies met inclusion criteria. Three studies compared TEP repair with the Stoppa procedure, two compared TAPP repair with Lichtenstein repair, and a Danish registry compared either TAPP repair or TEP repair with Lichtenstein procedure (authors combined data on TAPP repair and TEP repair procedures). We considered all but one study (which was the registry study) to have moderate risk of bias.

For this Key Question, we considered as major the same outcomes as for Key Question 2a. The only outcome for which evidence was sufficient to permit a conclusion was RTW: patients with bilateral hernias returned to work sooner if they received laparoscopic repair.

Key Question 2c (Open Vs. Laparoscopic Repair, Recurrent Hernia)

Eight studies met our inclusion criteria. The open mesh procedure was the Lichtenstein repair in six studies and the Stoppa procedure in the other two studies. For the laparoscopic mesh procedure, two studies reported results of TAPP repair; two reported on TEP repair; in one other study, investigators performed both and reported data separately; and in the final three, the investigators performed both TAPP repair and TEP repair and combined the data. All but two studies (which were registry studies) were considered to have moderate risk of bias.

For this Key Question, we considered as major the same outcomes as for Key Question 2a. The evidence favored laparoscopic repair over open repair for hernia recurrence (lower rates after laparoscopy), return to daily activities (faster after laparoscopy), and long-term pain (lower rates after laparoscopy).

Key Question 3 (Comparing Different Types of Open Mesh Repair)

Twenty-one studies met inclusion criteria. For this Key Question, we considered the following comparisons to be major: Lichtenstein repair versus mesh plug (seven studies), Lichtenstein versus Prolene™ Hernia System (PHS) (five studies), Lichtenstein versus open preperitoneal mesh (three studies), mesh plug versus PHS (two studies), and Lichtenstein versus Kugel® patch (two studies). Most studies were considered to have moderate risk of bias; a registry study was considered to have high risk of bias.

For each comparison, we considered the following outcomes to be major: hernia recurrence, length of hospital stay, RTDA, return to work, short-term pain, intermediate-term pain, seroma, urinary retention, hematoma, and wound infection. Evidence was sufficient to permit the following conclusions:

- For Lichtenstein repair compared with mesh plug technique, recurrence rates were similar, but Lichtenstein yielded better results for RTW and rates of seroma.
- For Lichtenstein compared with PHS, outcomes for short-term pain were similar.
- For Lichtenstein compared with open preperitoneal mesh, outcomes for short-term pain were similar.
- For mesh plug compared with PHS, outcomes for short-term pain were similar.
- For Lichtenstein versus Kugel mesh, outcomes were similar for both short-term pain and intermediate-term pain.

Key Question 4 (Comparing Different Types of Laparoscopic Mesh Repair)

Eleven studies met inclusion criteria. For this Key Question, we considered only the comparison of TAPP repair versus TEP repair to be major (nine studies). The remaining two studies compared different variant types of TEP repair (one study) or TAPP repair versus intraperitoneal onlay mesh (one study). Most studies were considered to have moderate risk of bias.

For the studies that compared TAPP repair versus TEP repair, we considered the following outcomes to be major: hernia recurrence, length of hospital stay, RTDA, RTW, short-term pain, intermediate-term pain, long-term pain, urinary retention, hematoma, and wound infection. Evidence was sufficient to permit the following conclusions:

- For TAPP repair compared with TEP repair, TAPP resulted in quicker RTW, and data on short-term, intermediate-term, and long-term pain suggested equivalence.

Key Question 5 (Comparing Meshes)

Thirty-two studies met inclusion criteria. For this Key Question, we considered the following seven comparisons to be major: standard polypropylene (PP) versus low-weight PP (6 studies), standard PP versus combination materials (17 studies), standard PP versus coated PP (6 studies), standard PP versus three-dimensional PHS (2 studies), standard PP versus porcine (2 studies), combination materials versus porcine (1 study), and low-weight PP versus combination materials (3 studies). Most evidence was considered to have moderate risk of bias.

For this Key Question, we considered the following seven outcomes to be major: hernia recurrence, QOL, patient SFN, long-term pain, feeling of a foreign body, infection, and bleeding. Standard PP mesh and combination materials had similar rates of recurrence. Three types of meshes (standard PP, low-weight PP, and porcine) had approximately equivalent rates of long-term pain.

Key Question 6 (Comparing Fixation Approaches)

Twenty-three studies met inclusion criteria. For this Key Question, we considered five comparisons to be major: tacks or staples versus no fixation (seven studies), fibrin glue versus staples (three studies), sutures versus tacks (three studies), sutures versus glue (seven studies), and absorbable sutures (short or long term) versus nonabsorbable sutures (one study). Most studies were considered to have moderate risk of bias.

For this Key Question, we considered as major the same outcomes as for Key Question 5. We found approximate equivalence in recurrence rates for tacks or staples versus no fixation and sutures versus glue. Also, for long-term pain, we found approximate equivalence between sutures and glue, but less pain with fibrin glue than staple fixation.

Key Question 7 (Surgical Experience and Hernia Recurrence)

Thirty-two studies met inclusion criteria. Sixteen involved only TEP repair, 12 involved only TAPP repair, 1 reported separate data on TEP repair and TAPP repair, and 3 provided combined data on TAPP repair and TEP repair. Most studies failed to report data that factored out the length of followup; patients treated earlier in the series might have had higher recurrence rates simply because they were followed longer. Some studies reported changing important procedural aspects over time, such as the size of the mesh (which typically involved using larger meshes in later time periods), making it difficult to pinpoint the true impact of expertise.

Among studies comparing an early set with later set(s) of repairs, the size of the early set varied from a low of 10 repairs to a high of 825 repairs. It was unclear how authors chose their cutoff points. The reporting differences mean that one cannot use the data to estimate the length of the learning curve for TEP repair or TAPP repair. Most studies reported results in the expected direction: lower recurrence rates with increased experience. This was also true when examined more specifically for TEP repair (11 of 17 studies) and TAPP repair (11 of 13 studies).

Key Question 8 (Exploration Vs. WW for Pediatric Hernia)

No studies met inclusion criteria.

Key Question 9 (Open Vs. Laparoscopic for Pediatric Hernia)

Two studies met our inclusion criteria. One study enrolled patients aged 4 months to 16 years; the other study enrolled patients aged 3 months to 9 years. Both studies were considered to have moderate risk of bias.

For this Key Question, we considered the following outcomes to be major: hernia recurrence, length of hospital stay, RTDA, and patient/parent SFN. The evidence was sufficient to permit the conclusions that length of stay, long-term patient SFN, and long-term cosmesis favored laparoscopy, and RTDA data suggested equivalence.

Conclusions and Strength of Evidence

Table A lists the conclusions we drew from the evidence. The relevant populations, comparisons, outcomes, conclusions, and summary effect sizes are listed. Any conclusions of a clinically significant difference between treatments are shown in bold in the Conclusion column. The rightmost column contains our strength-of-evidence ratings for each conclusion.

Table A. Conclusions of this review

Population	Comparison	Outcome	Conclusion	Strength of Evidence
Adults with pain-free inguinal hernia	Repair vs. WW	Quality of life at 1 year	Favors repair Estimated difference on a 0-100 scale, 7 points (CI, 0.4 to 14.3)	Low
Adults with painful inguinal hernia, primary	Lap. vs. open	Recurrence	Favors open Relative risk, 1.43 (CI, 1.2 to 1.8)	Low
		Hospital stay	Approximate equivalence	Low
		Time to return to daily activities	Favors lap. 3.9 days earlier (CI, 2.2 to 5.6)	High
		Time to return to work	Favors lap. 4.6 days earlier (CI, 3.1 to 6.1)	High
		Long-term pain	Favors lap. Odds ratio, 0.61 (CI, 0.48 to 0.78)	Mod.
		Epigastric vessel injury	Favors open Odds ratio, 2.1 (CI, 1.1 to 3.9)	Low
		Hematoma	Favors lap. Odds ratio, 0.70 (CI, 0.55 to 0.88)	Low
		Wound infection	Favors lap. Odds ratio, 0.49 (CI, 0.33 to 0.71)	Mod.
Adults with painful inguinal hernia, bilateral	Lap. vs. open	Time to return to work	Favors lap. 14 days earlier (CI not calculable)	Low
Adults with painful inguinal hernia, recurrent	Lap. vs. open	Recurrence	Favors lap. Relative risk, 0.82 (CI, 0.70 to 0.96)	Low
		Time to return to daily activities	Favors lap. 7.4 days earlier (CI, 3.4 to 11.4)	High
		Long-term pain	Favors lap. Odds ratio, 0.24 (CI, 0.08 to 0.74)	Mod.

Table A. Conclusions of this review (continued)

Population	Comparison	Outcome	Conclusion	Strength of Evidence
Adults with painful inguinal hernia	Lichtenstein vs. mesh plug	Recurrence	Approximate equivalence	Mod.
	Lichtenstein vs. mesh plug	Return to work	Favors Lich. 4 days earlier (CI, 1 to 7)	Mod.
	Lichtenstein vs. mesh plug	Seroma	Favors Lich. Odds ratio, 0.39 (CI, 0.16 to 0.94)	Mod.
	Lichtenstein vs. PHS	Short-term pain	Approximate equivalence	Mod.
	Lichtenstein vs. OPM	Short-term pain		Low
	Mesh plug vs. PHS	Short-term pain		Mod.
	Lichtenstein vs. Kugel	Short-term pain		Low
	Lichtenstein vs. Kugel	Intermediate-term pain		Low
	TAPP vs. TEP	Return to work	Favors TAPP 1.4 days earlier (CI, 0.2 to 2.7)	Mod.
		Short-term pain	Approximate equivalence	Mod.
		Intermediate-term pain		Low
		Long-term pain		Low
	PP vs. low-weight PP	Long-term pain (≥6 months)		Low
	PP vs. combination materials	Recurrence		Mod.
	PP vs. porcine	Long-term pain (≥6 months), VAS at rest		Low
		Long-term pain (≥6 months), VAS on movement		Low
	Tacks or staples vs. no fixation	Recurrence		Mod.
	Fibrin glue vs. staples	Long-term pain (≥6 months)	Favors fibrin glue Difference in means, -0.47 (CI, -0.68 to -0.27)	Low
	Sutures vs. glue	Recurrence	Approximate equivalence	Mod.
		Long-term pain (≥6 months)		Low

Table A. Conclusions of this review (continued)

Population	Comparison	Outcome	Conclusion	Strength of Evidence
Pediatric patients with inguinal hernia	Lap. vs. open	Return to daily activities		Low
		Length of stay	Favors lap. 1.1 hours earlier (CI, 0.5 to 1.8)	Mod.
		Long-term patient/parent satisfaction	Favors lap. Difference in satisfaction points, 1.0 (CI, 0.5 to 1.5)	Low
		Long-term cosmesis	Favors lap. Difference in satisfaction points, 0.25 (CI, 0.12 to 0.38)	Low

CI = confidence interval; lap. = laparoscopy; OPM = open preperitoneal mesh; PHS = Prolene™ Hernia System; PP = polypropylene; TAPP = transabdominal preperitoneal repair; TEP = totally extraperitoneal repair; VAS = visual analog scale; WW = watchful waiting.
Note: Conclusions in boldface are those involving a clinically significant difference between treatment options.

Discussion

The typical adult in the included studies was a man in his mid-50s, of average weight, experiencing a primary unilateral hernia. About a quarter of the men worked in physically strenuous jobs; for these men, a durable repair is relatively important to prevent recurrence. Our review can inform numerous treatment decisions faced by these men and their providers, including:

- Whether to undergo surgery or wait
- Whether to choose open surgery or laparoscopic surgery
- Which type of open surgery to choose
- Which type of laparoscopic surgery to choose
- Which type of mesh and fixation approach to choose
- Consideration of expertise with laparoscopic hernia repair

The evidence-based conclusions listed in the previous section are applicable only to the types of patients enrolled in the studies underlying those conclusions. For example, for Key Questions 2 to 7, a large majority of enrolled patients were middle-aged men; therefore, how well the conclusions apply to women or to men of other ages is uncertain. Similarly, for Key Question 9 on pediatric hernia, open versus laparoscopic high ligation, both studies excluded cases less than 3 months old, so it is uncertain whether the conclusions apply to patients younger than 3 months old.

One limitation of this review is that we included only studies published in English. In an attempt to address this issue, we summarized the abstracts from non–English-language literature that might have been included for each Key Question. Another limitation of this review is that for many outcomes, the evidence was inconclusive because of low precision. Generally, the included studies were well conducted but small. We maximized the power of the data by conducting meta-analyses wherever appropriate and possible. Nevertheless, the data often precluded conclusions because they suggested contradictory conclusions (i.e., the evidence could favor option A or B by a clinically significant amount). A third limitation is that no studies met

our inclusion criteria for Key Question 8 on pediatric contralateral hernia: no studies have compared surgical exploration with WW in this population. Therefore, we informally described some of the existing research in this area, such as the percentage of pediatric patients with a unilateral inguinal hernia who have a contralateral patent processus vaginalis (which is a risk factor for inguinal hernia).

Future Research Needs

We identified several gaps in the evidence in the course of conducting this review. We discuss potential areas for future research in greater detail in the full report but highlight some here that we consider particularly important.

For adult inguinal hernia, it would be helpful to know recurrence rates over the *very long term*. The typical patient was middle-aged, presumably with a few decades of life ahead in which a hernia might recur. Studies have generally not reported recurrence rates past 5 to 10 years, but conceivably patients and clinicians would be interested in much longer timeframes (e.g., 30 years). Projection factors have been proposed (e.g., to estimate the 25-year recurrence rates, multiply the 1-year rate by 5); however, they have not been tested empirically. We also encourage greater focus on outcomes that matter most to patients, such as chronic pain, long-term QOL, SFN, and the feeling of a foreign body. These outcomes may be associated with the type of mesh or mesh fixation methods, or size and severity of the hernia, but our evidence review neither revealed nor ruled out potential influencing factors because of low precision.

To characterize the gaps in the overall review, we examined the 87 comparisons and outcomes for which the evidence was insufficient to permit a conclusion and determined the primary reasons for the rating of insufficient. In 31/87 cases (36 percent), the only component preventing a conclusion was imprecision. Thus, quite often, there were simply not enough studies and/or the studies had insufficient patient enrollment. In a further 51/87 cases (60 percent), there was a problem with consistency as well as precision. Problems with consistency involved either the existence of only a single study (and therefore the inability to assess consistency) or conflicting results among multiple studies. In the remaining four cases, precision was sufficient, yet there were problems with both consistency and selective outcome reporting.

Much of the existing literature on inguinal hernia has been conducted outside the United States. The differences in health care systems and practice patterns between the United States and other countries might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. Future U.S. studies could elucidate issues unique to the United States and describe any important differences from other health care settings.

While a surgical registry could be useful for this purpose, existing registries are limited in part because of their voluntary nature. A large registry could address the widespread problem of imprecision, mentioned above. Many randomized trials have investigated important questions, but their modest size limits their ability to detect rare events, such as hernia recurrence, which require much larger sample sizes to permit clear inferences. Registry data require sophisticated analytic techniques, such as propensity scores or instrumental variables, to reduce the impact of confounding resulting from selection bias. The registries that we assessed (e.g., Swedish Hernia Registry) were large (e.g., 143,000 hernias), but authors did not use these techniques, so it was difficult to determine the potential impact of selection bias.

Specific recommendations for future research addressing the Key Questions appear in the full report, but we highlight some of them here. For Key Question 1, there were no studies of laparoscopic repair versus watchful waiting for pain-free hernia. Furthermore, the available

comparative studies in the adult population did not report long-term outcomes that could be useful for decisionmaking, such as the risk of an eventual acute presentation (e.g., strangulation, incarceration) in an unrepaired pain-free hernia, the likelihood of recurrence for a repaired pain-free hernia, or the likelihood of developing pain or impairment in function in the long term with either repair or watchful waiting. In addition, there were no studies comparing surgical repair with watchful waiting in the pediatric population (Key Question 8). In the studies comparing mesh products and fixation methods, several important outcomes were infrequently reported, such as recurrence rates, perception of a foreign body, and long-term pain and infection rates.

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Introduction

An inguinal hernia is a protrusion of abdominal contents into the inguinal canal through an abdominal wall defect. A direct inguinal hernia protrudes through the deep inguinal ring, whereas an indirect inguinal hernia protrudes through the internal inguinal ring and may descend through the inguinal canal. Direct hernias typically develop only in adulthood and are more likely to recur than indirect hernias.[11] If the hernia is severe enough to restrict blood supply to the intestine, it is termed a strangulated hernia, and immediate corrective surgery is necessary. Most inguinal hernias, however, are less dangerous, and elective surgery is often performed to correct the defect. Symptoms include abdominal pain and a lump in the groin area, which is most easily palpable during a cough. Some inguinal hernias, however, are asymptomatic.[12]

The lifetime rate of inguinal hernia is 25 percent in males and 2 percent in females.[1] The risk of inguinal hernia increases with age, and the annual incidence is around 50 percent in men by the age of 75.[2] Approximately two-thirds of inguinal hernias are indirect, and one-third are direct.[1] Approximately 10 percent of cases are bilateral.[3] Recurrence occurs in about 1 percent to 5 percent of cases.[8]

In children, the incidence ranges from 0.8 percent to 4.4 percent.[4] It is 10 times as common in boys as in girls and also more common in infants born before 32 weeks' gestation (13 percent prevalence) and infants weighing less than 1,000 grams at birth (30 percent prevalence).[4] As in adults, about 10 percent of cases involve bilateral hernia.[13]

Numerous classification systems have been proposed for groin hernias.[14] One commonly used system was introduced by Nyhus in 1993.[15] This system employs several clinical factors including direct/indirect, degree of enlargement of the internal inguinal ring, and degree of posterior wall weakness. Specifically, it comprises six types of increasing severity: (1) indirect inguinal hernia with a normal internal ring; (2) indirect inguinal hernia with an enlarged internal ring; (3a) direct inguinal hernia; (3b) indirect inguinal hernia causing posterior wall weakness; (3c) femoral hernia; and (4) recurrent hernia.[15] (This review will not involve femoral hernias because of the different patient populations and pertinent treatments.) Stoppa[16] proposed that aggravating factors such as obesity or abdominal distension should upgrade the patient by one Nyhus level.[16] Higher severity generally means a higher risk of recurrence, and an appropriate classification may support the management approach.

Surgical repair of hernias is the most commonly performed general surgical procedure in the United States.[5] In 2003, an estimated 770,000 surgical repairs of inguinal hernia were performed.[5] These repairs are typically performed on an outpatient basis (87 percent in 1996).[5] This large volume of procedures suggests that even modest improvements in patient outcomes would have a substantial impact on population health.[7] Most inguinal hernia repairs are conducted in an outpatient setting;[5] Rutkow (2003)[5] estimated that 87 percent were outpatient procedures in 1996 and the percentage has probably increased since then.

The primary goals of surgery include repairing the hernia, minimizing the chance of recurrence, returning the patient to normal activities quickly, and minimizing postsurgical discomfort and the adverse effects of surgery. The various surgeries present different constellations of benefits and risks, which presents some clinical uncertainty in the choice among approaches. Balancing these factors is a difficult yet critical process in an effort to make the best possible medical decisions.

Some patients with inguinal hernias may not be in pain or limited in any way by the hernia. For these patients, surgery may not be necessary. One of the Key Questions in the evidence

review will be a comparison between surgical and nonsurgical approaches to the management of pain-free inguinal hernias.

Surgical procedures for inguinal hernia repair generally fall into three categories: open repair without the use of a mesh implant (i.e., sutured), open repair with a mesh, and laparoscopic repair with a mesh. Within each of these categories, several specific procedures have been employed. Until the 1980s, open suture repair was the standard; however, the resulting tension along the suture line yielded relatively high rates of recurrence and patient discomfort. Nonsutured "tension-free" surgical mesh gained in popularity, and many specific open procedures were used. One author estimates that in 2003, 93 percent of groin hernia repairs involved the use of a mesh, and of these, about three-fourths of these repairs involved either a Lichtenstein repair or mesh plug.[5]

In a Lichtenstein repair, surgeons suture the mesh in front of the hernia defect. In a mesh plug repair, surgeons introduce a preshaped mesh plug into the hernia weakness during open surgery and position a piece of flat mesh on top of the hernia defect. Kumar et al. (1999)[17] suggested that Lichtension repair is appropriate for primary inguinal hernia and possibly also for large recurrent hernias. The mesh plug repair may require less dissection, and may reduce patients' postoperative discomfort, thereby quickening the return to "normal activity."[18-20] A possible disadvantage of the mesh plug repair may be related to hardening of the plug, resulting in pain in the groin region.[18]

The near universal adoption of mesh means that the most important questions about hernia repair involve various mesh procedures. A glossary of several other open repair procedures, as well as laparoscopic procedures, appears after the Reference section. Generally, mesh is not recommended for use in pediatric inguinal hernia because of concerns about the risk of inflammatory reactions, damage to the vas deferens and/or testes, and infertility.[4]

More recently, two laparoscopic approaches using a mesh—transabdominal preperitoneal (TAPP) repair and totally extraperitoneal (TEP) repair—have seen increased use.[21] Transabdominal preperitoneal (TAPP) repair involves entering the peritoneal cavity to place a mesh through an incision over likely hernia sites. TEP technique does not involve entering the peritoneal cavity, and surgeons place the mesh used to cover the hernia from the outside of the peritoneum. Laparoscopic approaches have the potential for shortening recovery time and reducing some postoperative morbidities.[22] They also may be associated with longer operation times and a relatively long learning curve. TEP was introduced after TAPP because of concerns about a possible increased risk of internal organ damage within the peritoneum. Laparoscopic repair invariably involves general anesthesia, whereas open mesh repair can involve any type of anesthesia.

Research has shown that the repair of a recurrent inguinal hernia is subject to a greater risk of recurrence.[23] Further, bilateral inguinal hernia is subject to a greater recurrence risk than unilateral inguinal hernia.[24] These increased risks may be due to certain anatomical difficulties that complicate the surgical approach in these types of patients.[25] Some clinicians have suggested that laparoscopic approaches are better suited to recurrent and bilateral hernias, and in Key Question 2 (see below) we delineate separate comparisons for primary, bilateral, and recurrent hernia.

Specific aspects about mesh repair that may influence outcomes are the type of mesh (e.g., polypropylene (PP) or other material), whether mesh fixation is used, and if so, whether fixation is accomplished with sutures or glue. These mesh-specific issues are covered by specific Key Questions (see Key Questions below). The U.S. Food and Drug Administration has received

reports of complications associated with mesh materials. The complications include adverse reactions to the mesh; adhesions (when the loops of the intestines adhere to each other or the mesh); and injuries to nearby organs, nerves or blood vessels. Other complications of hernia repair can occur with or without the mesh, including infection, chronic pain and hernia recurrence. Most of the complications reported to the FDA have been associated with mesh products that have been recalled and are no longer on the market.[26]

FDA recalled the Bard Composix® Kugel® Mesh Patch manufactured before October 2005 and stated "the mesh can break under the stress of placement inside the belly area."[27] Fourteen lot numbers of XenMatrix Surgical Graft were recalled as a result of "elevated endotoxin levels."[28] Lastly, 15 lot numbers of Bard Flat Mesh were recalled because "the material was counterfeit and did not meet the manufacturer's specifications."[29]

Different procedures often require different methods for anesthesia. Some forms of open mesh repair can be performed with local anesthesia, whereas laparoscopic techniques such as TAPP typically require general anesthesia.[9] Two key postsurgical morbidities are surgical site infection[30] and chronic pain.[31] Regarding chronic pain, Nienhuijs and colleagues[31] estimated that pain lasting beyond 3 months postoperatively occurs in 11 percent of patients undergoing mesh repair.

In terms of settings, most hernia surgeries are performed not in specialized hernia centers, but rather by general surgeons who also perform many other types of surgeries.[9] It is generally recognized that the surgical repair of inguinal hernia is a highly specialized skill, and patients receiving care from more-experienced surgeons may fare better than patients receiving care from less-experienced surgeons. The evidence review will specifically examine evidence on the association between surgical experience and hernia recurrence (RC) (see Key Questions below).

Given the clinical uncertainty, a systematic review of the existing evidence on comparative effectiveness will help inform important medical decisions about surgical options for inguinal hernia. The findings of the review may affect clinical decisions by patients and surgeons, treatment recommendations by professional societies, purchasing decisions by hospitals, and coverage decisions by payers.

Methods

Review Team

The evidence review team included expertise in medicine, surgery, systematic review, public health and health services research. Additional content expertise was provided by experienced hernia surgeons who were involved as key informants and/or members of the technical expert panel; these groups provided input on the Key Questions, reviewed the protocol, answered specific questions during the review process, and reviewed the document.

Topic Development and Refinement

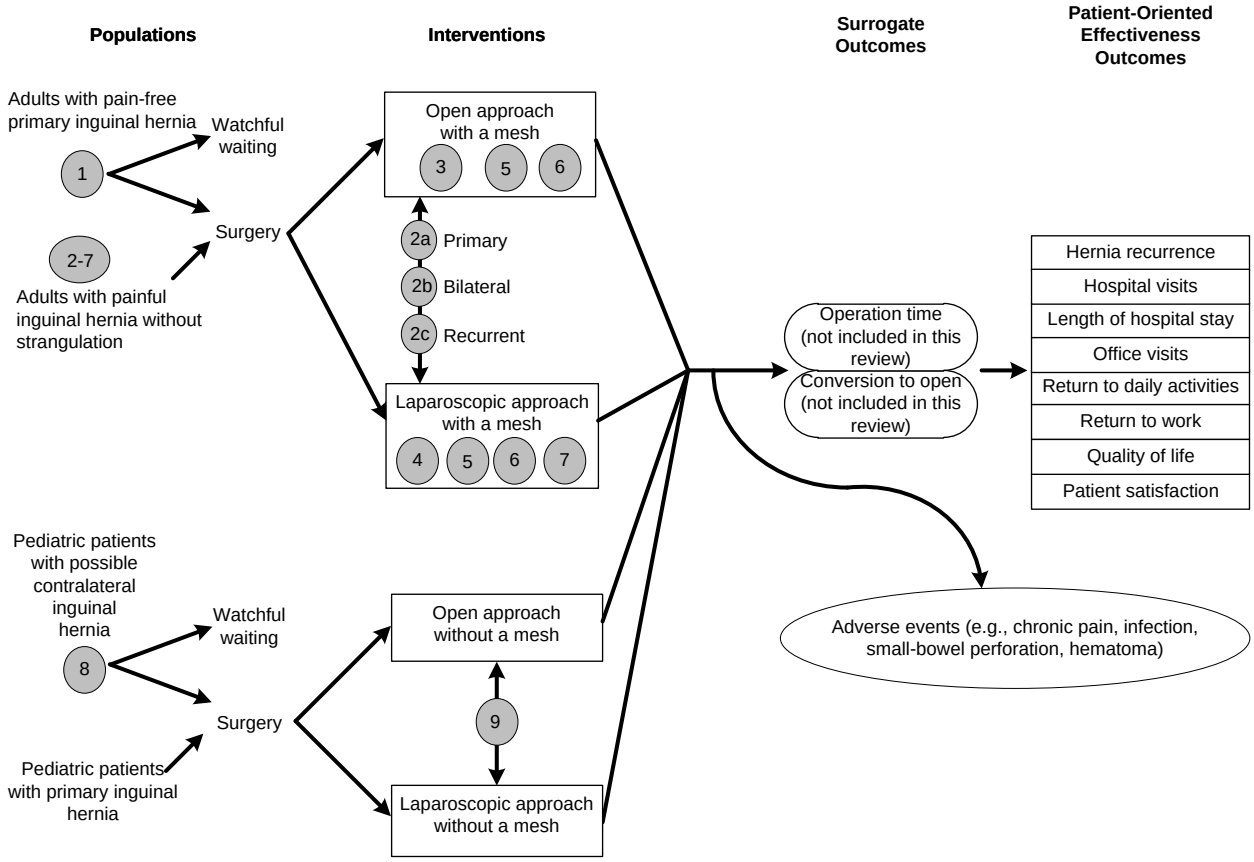
Development and refinement of the topic occurred between June 16, 2010, and October 15, 2010. This process involved reviewing this clinical area, devising an initial analytic framework and list of Key Questions, obtaining the input of five key informants, revising the Key Questions and scope based on feedback received, and posting for public comment. The key informants included one surgeon with expertise in adult hernia surgery, a surgeon with expertise in pediatric hernia surgery, two individuals from payer organizations, and one individual from a mesh manufacturer.

Finalization of the protocol occurred between October 15, 2010, and April 8, 2011. The Key Questions were posted on the AHRQ website for public comments for one month. We also received input from the technical expert panel, which comprised four individuals: a surgeon from the United States with expertise in adult hernia surgery who had also been a key informant; a surgeon from the United Kingdom who also had expertise in adult hernia surgery; a surgeon who had expertise in pediatric hernia surgery and who had not been a key informant; and a product specialist from a mesh manufacturer.

Analytic Framework

Figure 1 is an analytic framework that depicts the events that individuals experience while undergoing treatment for inguinal hernia. Throughout the figure, numbered circles indicate Key Questions addressed in this report. The left side of the framework lists the four patient populations: (1) adults with pain-free primary inguinal hernia, (2) adults with painful inguinal hernia without strangulation, (3) pediatric patients with possible contralateral inguinal hernia, and (4) pediatric patients with inguinal hernia (the last two populations can overlap). To the right of these are the various intervention options, including watchful waiting (WW), as well as several surgical options. The surgical options are categorized based on whether the approach is open or laparoscopic and whether a mesh is used. Postintervention outcomes are divided into three categories: surrogate outcomes (operation time and conversion to open, neither of which were included in this report), patient-oriented effectiveness outcomes (RC, length of hospital stay, hospital visits, office visits, return to daily activities [RTDAs], return to work [RTW], quality of life [QOL], and patient satisfaction [SFN]), and adverse events (including chronic pain, infection, small bowel perforation, and hematoma).

Figure 1. Analytic framework



Note: Circled numbers are Key Questions.

Key Questions

This report addresses nine Key Questions, which are listed below. Most questions refer to "patient-oriented effectiveness outcomes." These include RC, hospital visits, length of hospital stay, office visits, RTDA, return to work, QOL, and patient SFN. We also examined adverse events, including rates of long-term pain.

Among adults with *pain-free* primary inguinal hernias:

Key Question 1. Does hernia repair differ from WW in patient-oriented effectiveness outcomes and/or adverse events?

Among adults with painful inguinal hernias without incarceration/strangulation:

Key Question 2. Does open hernia repair with a mesh differ from laparoscopic hernia repair with a mesh in patient-oriented effectiveness outcomes and/or adverse events?

a. For primary hernias?
b. For bilateral hernias?
c. For recurrent hernias?

Key Question 3. Do different open mesh-based repair procedures (e.g., Lichtenstein repair, mesh plug) differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 4. Do different laparoscopic mesh-based repair procedures (e.g., TAPP repair, TEP repair) differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 5. Do different mesh products differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 6. Do different mesh-fixation methods (e.g., no fixation, sutures, glue) differ in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 7. For each type of laparoscopic mesh repair, what is the association between surgical experience and hernia recurrence?

Among *pediatric* patients (aged 21 years or younger):

Key Question 8. For a possible contralateral hernia, does same-operation repair/exploration differ from WW in patient-oriented effectiveness outcomes and/or adverse events?

Key Question 9. Does open hernia repair without a mesh differ from laparoscopic hernia repair without a mesh in patient-oriented effectiveness outcomes and/or adverse events?

Search Strategy

Information professionals performed literature searches within the Evidence-base Practice Center (EPC) Information Center who followed established guidelines and procedures as identified by the Director of Health Technology Assessment/EPC Information Center. Below is an overview of the search process; specific search strategies are listed in Appendix A.

Consistent with our evidence-based search protocol, for all Key Questions the following databases were searched on the OVID SP platform, utilizing the one search and deduplication features: MEDLINE and PreMEDLINE; Embase; the Cochrane Library, including the Central Register of Controlled Trials, the Cochrane Database of Methodology Reviews, the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effects, and the Health Technology Assessment Database; and the United Kingdom National Health Service Economic Evaluation Database, were also searched for unique reviews, trials, economic analyses, and technology assessments.

Search terms were identified by: (1) reviewing relevant systematic reviews on similar topics that are identified by the research staff, (2) reviewing how other relevant studies are indexed, their subject heading terms, and keywords, and (3) reviewing MeSH and EMTREE indexes for relevant and appropriate terms. After reviewing these, a combination of subject headings and keywords were identified. Search strategies were developed using these terms. Once developed, search strategies were reviewed by senior research analyst(s) and the Director of the Health Technology Assessment/EPC Information Center. No limits on language were applied by the search, and search dates were established as January 1, 1990, to November 17, 2011 (studies published before 1990 likely describe procedures no longer being used commonly or outcomes that are not likely to be predictive of current outcomes). A study design filter was applied to retrieve systematic reviews and clinical trials. We also examined reference lists for possible additional articles. Searches will be updated during the peer-review period, and any additional studies will be incorporated into the final report. Nonjournal publications and conference proceedings from professional organizations, private agencies, and government agencies were also screened. Other mechanisms used to retrieve additional relevant information included review of bibliographies and reference lists from peer-reviewed and gray literature. (Gray literature consists of reports, studies, articles, and monographs produced by federal and local government agencies, private organizations, educational facilities, consulting firms, and corporations. These documents do not appear in the peer-reviewed journal literature.)

Literature search results were initially reviewed by the information professional. Using the Key Questions and inclusion/exclusion criteria identified by senior research analyst(s), the information professional assessed relevancy and retrieved results. Feedback from the senior research analyst(s) and the Director of the Health Technology Assessment/EPC Information

Center—including details regarding gaps in the search strategy, as well as articles (identified by the senior research analysts) not retrieved by the searches—was integrated into the search strategy using key terms and subject headings. The updated strategy was re-run in all identified databases. Additional results were scanned, and relevancy was assessed by the information professional. New results were downloaded and forwarded to senior research analyst(s) for review. Hand searches of reference lists in identified articles were also reviewed for possible inclusion.

To check the accuracy of abstract screening inclusion/exclusion, we randomly selected 10 percent of the articles excluded at the abstract level for rescreening by a second person. None of the articles were subsequently selected for inclusion.

Study Selection

The inclusion criteria are listed below in separate categories pertaining to (1) publication type, (2) study design, (3) patient characteristics, (4) treatment characteristics, and (5) data.

Publication criteria:

1. Publication must have been a full article; abstracts alone were not included because they do not include sufficient details about experimental methods to permit an evaluation of study design and conduct, and they also may contain only a subset of the measured outcomes.[32,33]
2. To capture the most relevant data, we included studies published on or after January 1, 1990. Studies published before 1990 likely describe procedures no longer being used commonly or outcomes that are not likely to be predictive of current outcomes.
3. To avoid double-counting of patients, when several reports of overlapping patients are available, only outcome data from the report with the largest number of patients were included. We included the data when a smaller report provided data on an outcome that was not provided by the largest report. Multiple publications of the same study (e.g., publications reporting subgroups, other outcomes, or longer followup) were identified by examining author affiliations, study designs, enrollment criteria, and enrollment dates.
4. Studies must have been published in English. Moher and colleagues demonstrated that exclusion of non–English-language studies from meta-analyses has little impact on the conclusions drawn.[34] Juni and colleagues found that non-English studies typically were of lower methodological quality and that excluding them had little effect on effect-size estimates in the majority of meta-analyses they examined.[35] Although we recognize that in some situations exclusion of non-English studies could lead to bias, we believe that the few instances in which this may occur do not justify the time and cost typically necessary for translation of studies to identify those of acceptable quality for inclusion in our review.[34,35] Due to the prevalence of non–English-language studies of inguinal hernia repair, however, we examined the English abstracts of these studies in an attempt to assess the degree of bias resulting from their exclusion.

Study design criteria:

5. For questions comparing interventions (i.e., all Key Questions except Key Question 7 on surgical experience), the study must have either randomized patients to treatments or used an analytic method to address selection bias, such as intentional baseline matching on multiple characteristics, propensity scoring, or other analytic approach. Studies with large differences at baseline between groups (regardless of whether they were

randomized), or that entailed confounding by indication, were excluded. Studies comparing meshes or mesh-fixation methods must not have confounded results by differences in surgical procedures for inserting the mesh. For Key Question 7 on surgical experience, a control group was not required; however, the study must have provided data on the relation between surgical experience and outcomes. The definition of surgical experience must have been specific to laparoscopic mesh hernia repair, not simply a measure of general experience such as the surgeon's age.

6. Studies could be prospective or retrospective, but retrospective studies must have used consecutive enrollment (or enrollment of a random sample of eligible participants).
7. The treatments being compared must have been administered during the same time period, so that any observed difference between treatment outcomes were not attributable to differential time frames.

Patient criteria:

8. To be included for a given Key Question, the study must have provided data for which at least 85 percent of the patients had the condition specified in the Key Question. For example, for Key Question 2a, we included only data points for which at least 85 percent of the patients were adults with painful primary inguinal hernia without incarceration/strangulation.
9. We used a flexible definition of "adulthood," defining "adults" as anyone aged 18 years or older, and we defined the "pediatric population" as anyone aged 21 years or younger. This means that studies enrolling those aged 18 to 20 years could have been included as either an adult study or a pediatric study, depending on the average age of those enrolled.

Treatment criteria:

10. The study must have provided sufficient information about the treatments for one to determine that the data addressed one of the Key Questions.
11. The study must not have described a specialized and novel hernia repair that has not been widely practiced by other surgeons. This is to maintain the focus of the report on the most common types of repair.
12. The hernia repair must not have been performed simultaneously with another operation (e.g., prostatectomy). Surgical complications of combined operations make it difficult to isolate aspects of the hernia repair itself.

Data criteria:

13. The study must have reported data on at least one of the included outcomes for at least one of the Key Questions.
14. Outcome data must not have relied on retrospective recall (e.g., in an interview long after the procedure had been performed) because such outcomes may not accurately reflect patients' experiences.
15. For some outcomes in the adult population, we included data points at least 6 months after treatment (RC, QOL, and patient SFN). For all other outcomes (and in the pediatric population), there was no minimum followup.
16. We included data points capturing at least 10 patients with the condition of interest who represented at least 50 percent of eligible enrolled patients.

The principal investigator performed an abstract screen on all abstracts, and a randomly selected 10 percent of the abstracts were rescreened by a second person, with disagreements resolved by consensus. For full-article screening, the first screening was performed by the team member responsible for that Key Question, and we randomly selected 10 percent of the articles

excluded at the full article for rescreening by a second person, with disagreements resolved by consensus. None of the articles were subsequently selected for inclusion.

Data Extraction and Management

We extracted study information into spreadsheets in Microsoft Excel, including the following:

- **General study characteristics.** Author, publication year, country, study design, number of centers, dates of patient enrollment, type of setting, length of followup, funding source, and which Key Question(s) the study addressed
- **Patient enrollment criteria.** All authors' reported patient enrollment criteria
- **Treatment characteristics.** Specific procedure, specific mesh (if applicable), fixation method (if applicable), number of surgeons, surgeons' prior experience with the repair procedures performed, surgical setting (i.e., specialized hernia center or general surgery), type of anesthesia, and methods of followup for data collection
- **Baseline characteristics.** Number of enrolled patients, age, sex, comorbidities, hernia type(s), presurgical pain level, presurgical quality-of-life scores, presurgical functional activity scores, unilateral/bilateral, primary/recurrent, and any other reported important patient characteristics at baseline
- **Risk-of-bias items.** See the next section.
- **Data.** We extracted the numerical data necessary for us to compute an effect size (such as an odds ratio (OR) or standardized mean difference) and its standard error for all included outcomes for each study. These may include means, standard deviations (SDs), counts, proportions, results of authors' statistical tests, or other statistical details, depending on what was reported. If the study did not report sufficient information to permit computation of an effect size, we extracted what was reported.

The data points were first extracted by the team member(s) responsible for that Key Question, and a 10 percent randomly selected subset of the data points were checked by a second person, with disagreements resolved by consensus.

Individual Study Risk-of-Bias Assessment

We assessed the risk of bias (i.e., internal validity) separately for each outcome and each time point of each study. The reason for outcome specificity is that some subjective outcomes are more susceptible to bias than other outcomes. The reason for time-point specificity is that longer followup often results in attrition or right-censoring, which may yield patients who are somewhat different from the full set of enrolled patients and also may introduce a systematic difference between the groups being compared.

For all studies with control groups (regardless of whether patients were randomly assigned to groups), we assessed risk of bias using the items below. All but one of these items were selected from a pool of items typically used by this EPC for technology assessments. The seventh item was devised specifically for this project because of the importance of length of surgical experience in hernia repair. Each of these items was answered as "Yes," "No," or "Not reported."

1. Were patients randomly assigned to the study's groups?
2. Was there concealment of group allocation?

3. For nonrandomized trials, did the study employ any other methods to enhance group comparability?
4. Was the process of assigning patients to groups made independently from physician and patient preference?
5. Was the comparison of interest prospectively planned?
6. Were the two groups treated concurrently?
7. For questions comparing two procedures, did the two groups' surgeons have similar numbers of prior operations performing the procedure they performed in the study? (This is not relevant to Key Question 1 because it does not involve comparing procedures.)
8. If patients received ancillary treatment(s), was there a ≤5 percent difference between groups in the proportion of patients receiving each specific ancillary treatment?
9. Did patients in different study groups have similar levels of performance on the outcome of interest at the time they were assigned to groups?
10. Were the study groups comparable for all other important factors at the time they were assigned to groups?
11. Were those who assessed the patient's outcomes blinded to the group to which the patients were assigned?
12. Was the outcome measure of interest objective and was it objectively measured?
13. Was there ≤15 percent difference in the length of followup for the two groups?
14. Did ≥85 percent of enrolled patients provide data at the time point of interest?
15. Was there a ≤15 percent difference between groups in the percentage of patients provided data at the time point of interest?

We categorized the risk of bias for each outcome/time point in each study as "Low," "Medium," or "High" risk of bias using the following method:

- In order to be considered Low risk of bias, the study must meet the following conditions:
    - Randomized (item 1).
    - Concealment of allocation (item 2) OR blinded outcome assessors (item 11) OR both.
    - Good baseline comparability for both outcome (item 9) and other patient characteristics (item 10).
    - Good baseline comparability on surgeons' number of prior operations performing the compared procedures (item 7).
    - If NOT blinded outcome assessors (item 11) (or NR blinded outcome assessors), then the outcome was objective (item 12).
    - ≤15 percent difference in length of followup between groups (item 13).
    - ≥85 percent of enrolled patients provided data to this time point (item 14).
    - ≤15 percent difference in data provision rates to this time point (item 15).
- In order to be considered High risk of bias, the study must meet AT LEAST TWO of the following conditions:
    - Process of assigning patients to groups NOT made independently from physician and patient preference (item 4)
    - Not good baseline comparability for either the outcome (item 9) or other patient characteristics (item 10)
    - Retrospective (item 5)
    - Difference in ancillary treatments ≥5 percent (item 8)
    - Not a blinded outcome assessor (item 11) AND a subjective outcome (item 12)

- In order to be considered Medium risk of bias, the study neither met the conditions for Low risk of bias nor the conditions for High risk of bias.

All risk-of-bias category assignments (as Low, Moderate, or High) were performed by the principal investigator and a second review team member independently, with disagreements resolved by consensus.

Data Synthesis

For each Key Question, we determined the specific treatment comparisons that were made by the included studies. A study with more than two groups would contribute to more than two comparisons and possibly more than one Key Question. We considered each treatment comparison separately. When choosing among multiple comparisons within a study to be entered into an overall analysis, we prioritized the more common procedures (e.g., Lichtenstein, TEP).

Within each treatment comparison, we examined all of the included outcomes from all of the relevant studies. The outcomes were divided into eight categories: RC, hospital-related, including the length of hospital stay and subsequent hospital/office visits, the time to RTDA, the time to return to work (RTW), QOL, patient SFN, pain including visual analog scale (VAS) scores and the rates of chronic pain (PAIN), and other adverse events not involving pain (ADV). QOL was measured using the Short Form (SF)-36 health survey by most of the studies included in this report. The Short Form 36 (SF-36) quality of life instrument covers eight health concepts and is a measure of health status. The SF-36 is comprised of eight scaled scores and a single item score that provides an indication of perceived change in health. Other outcomes such as RTDA, RTW, and long-term pain were reported separately from QOL by these studies.

Within each category, the data were reported in different ways. For example, some studies reported the hazard ratio for hernia recurrence (with its 95 percent confidence interval [CI]) across the entire followup period, others reported the two groups' recurrence rates at a specific time point (e.g., *x* percent and *y* percent recurrence rates at 1 year after surgery), and other reported the two groups' recurrence rates at median followup (e.g., *x* percent and *y* percent recurrence rates with a median followup of 17 months and a range of followup from 8 months to 35 months). Within each category, we judged which studies could be combined based on the specific outcomes and methods of reporting.

Regarding time points, we used three categories: short-term (defined as ≤1 month after surgery), intermediate-term (defined as between 1 month and 6 months after surgery), and long-term (defined as ≥6 months after surgery). When a study reported multiple time points of the same outcome within the category, and we had to decide which time point to include in a meta-analysis with other studies, we chose the latest time point within that category.

We performed meta-analysis wherever appropriate and possible. This decision depended on the judged clinical homogeneity of the different study populations, co-interventions, and outcomes, as well as what is reported by those studies. For some outcomes (length of stay, RTDA, return to work, and pain (measured in VAS) score), many studies did not report SDs or other measures of dispersion that could be used to calculate SDs. To enable inclusion of these studies in meta-analysis we estimated the SDs by pooling the SDs of studies that did report them for these outcomes. Forest plots for all meta-analyses appear in the Figures section.

In the choice of effect size metrics, for hernia recurrence we used the relative risk (RR), because of its ease of interpretation and also because some studies only reported an adjusted RR, thus only an RR meta-analysis could include all of the studies. For all continuous outcomes,

we used the weighted mean difference, which is on the same scale as the measured outcome. For adverse events and pain reported dichotomously, we analyzed ORs.

To aid interpretation, for each outcome in the review, we estimated the smallest difference between groups that could still be considered clinically significant (minimum clinically significant difference or MCSD). This definition aids interpretation in two main ways: (1) to determine whether a statistically significant difference is important and (2) to determine whether a statistically nonsignificant difference is small enough to exclude the possibility of an important difference. Our estimates were based on published literature, FDA guidance, or the consensus of the research team and TEP.

After hernia repair, a key outcome is RC. For this outcome, we define the MCSD as 3 percentage points (e.g., 1 percent vs. 4 percent for two separate treatments). This was based on statements in two multicenter trials (the U.S. Department of Veterans Affairs trial[36] and the Medical Research Council trial)[37] that such a difference is clinically meaningful. For other anticipated outcomes, we used the following approaches concerning the definitions of minimum clinical significance:

- Length of hospital stay, RTDA, RTW: 1-day difference between groups. For RTDA and RTW, this had been defined as 1 week in the review protocol, but the review team decided to change it to 1 day upon finding that the typical RTDA after inguinal hernia surgery is about 10 days and the typical RTW is about 14 days. On that scale, a week is clearly too large to be considered the "minimum" clinically significant difference, so we changed it to 1 day. This was outlined in a review protocol amendment dated August 9, 2011.
- Number of hospital visits/number of office visits: 20 percent difference between groups (e.g., means of 5 visits and 4 visits).
- Quality of life: 5 percent of the range of the scale (e.g., 5 points on the SF-36, which ranges from 0–100).
- Patient SFN: A one-level change (this outcome is typically measured on an ordinal scale representing various levels of SFN)
- Pain: If reported as a continuous measure, 20 percent of the range of the scale (e.g., two points on the VAS, which typically ranges from 0–10).[38] If reported as a dichotomous measure, we defined the MCSD as an OR of 1.25. This means that if the confidence limits of the OR were fully within the range of 0.80 to 1.25, a conclusion of equivalence may be appropriate. The U. S. Food and Drug Administration uses this same range when setting criteria for concluding bioequivalence.[39]
- Other adverse events: We defined the MCSD in the same way that we did for dichotomous pain.

If meta-analysis was deemed appropriate and possible for a given comparison and a given outcome, we performed DerSimonian and Laird random-effects meta-analysis[40] using Comprehensive Meta-Analysis software (Biostat Inc., Englewood, NJ). Meta-analyses for a given Key Question were performed by the team member responsible for that Key Question. To measure heterogeneity, we used both I^2 and tau. Both are used because I^2 can increase simply by increasing the numbers of patients in the studies (whereas tau is a more direct measure of heterogeneity),[41] but tau is more difficult to interpret because its scale is different for different effect sizes. We defined substantial heterogeneity as a value of tau greater than the MCSD for that outcome. If this occurred, and there were 10 or more studies of the same patient outcome of the same treatment comparison, we conducted meta-regressions using the permutation test[42]

in Stata software (Stata Corp., College Station, TX). Where possible, we investigated up to 10 covariates in these meta-regressions (percentage of patients with bilateral hernia, percentage of patients with recurrent hernia, mean age, percent of laparoscopic patients undergoing TEP, percentage of open patients undergoing Lichtenstein, percentage of centers in university or specialist settings, concealment of allocation, similar levels of prior surgical experience, outcome rater blinding, and length of followup).

Strength of Evidence Rating

We used the system described in the Effective Health Care (EHC) Methods Guide[10] to rate the strength of the evidence (SOE) for the major outcomes for each Key Question. SOE is defined as one's confidence in the evidence supporting a conclusion. It includes four core domains (risk of bias, consistency, precision, and directness) as well as four optional domains (large magnitude of effect, all plausible confounders would reduce the effect, publication bias, and dose-response association). In the EHC grading methodology, the directness domain does not encompass applicability, which is considered outside of the evidence rating system (we discuss our applicability methods in the next section). The various domains were considered together to rate the evidence for the outcome as High, Moderate, Low, or Insufficient. The rating was done by two independent analysts, and disagreements were resolved by consensus. Owens and colleagues, 2009,[10] defined the four ratings as:

- High—"High confidence that the evidence reflects the true effect. Further research is very unlikely to change our confidence in the estimate of effect."
- Moderate—"Moderate confidence that the evidence reflects the true effect. Further research may change our confidence in the estimate of effect and may change the estimate."
- Low—"Low confidence that the evidence reflects the true effect. Further research is likely to change the confidence in the estimate of effect and is likely to change the estimate."
- Insufficient—"Evidence either is unavailable or does not permit a conclusion."

If there were no studies for a given treatment comparison or Key Question, we rated the evidence as Insufficient.

The SOE system requires one to choose the major outcomes that will receive an SOE rating. We carefully considered each Key Question and chose the following outcomes to receive SOE ratings:

- Key Question 1 (surgery vs. WW): Quality of life, long-term pain, hernia strangulation or incarceration
- Key Question 2 (open vs. laparoscopic surgery): RC, length of hospital stay, RTDA, return to work, QOL, patient SFN, long-term pain, epigastric vessel injury, small bowel injury, small bowel obstruction, urinary retention, hematoma, wound infection
- Key Question 3 (comparing different types of open surgery): RC, length of hospital stay, RTDA, return to work, short-term pain, intermediate-term pain, seroma, urinary retention, hematoma, wound infection
- Key Question 4 (comparing different types of laparoscopic surgery): RC, length of hospital stay, RTDA, return to work, short-term pain, intermediate-term pain, urinary retention, hematoma, wound infection

- Key Question 5 (comparing different meshes): RC, QOL, patient SFN, long-term pain, feeling of a foreign body, infection, bleeding
- Key Question 6 (comparing different mesh fixation approaches): Same as for Key Question 5
- Key Question 7 (association between surgical experience and recurrence): SOE was not rated because no rating system exists for evidence on association
- Key Question 8 (comparing different types of open surgery): We did not rate SOE because no studies met inclusion criteria
- Key Question 9 (pediatric open vs. laparoscopic surgery): RC, length of hospital stay, RTDA, patient/parent SFN

We used the following approach to combine the SOE components and determine a rating (High, Moderate, Low, or Insufficient) for a given outcome of a given treatment comparison. We determined whether the combined evidence on that outcome was sufficient to permit a conclusion about the direction of the effect (either favors treatment A, favors treatment B, or indicates approximate equivalence by ruling out the MCSD). The third possibility was considered when the evidence was sufficiently precise to rule out the possibility of a clinically important difference.

If the evidence did not permit a conclusion about the direction of the effect, then the rating was Insufficient (abbreviated INSUFF in our SOE tables). If it was sufficient, then we assigned point values to the four core domains as follows: Risk of bias +2/+1/0 for low/moderate/high; Consistency +1/0/0 for consistent/inconsistent/unknown; Directness +1/0 for direct/indirect; and Precision +1/0 for precise/imprecise. For the additional domains, we sometimes added 1 for a large magnitude of effect, and we sometimes subtracted 1 for potential publication bias or selective outcome reporting (e.g., if a third or fewer of the studies included for that comparison had actually reported that outcome). The other two additional domains (all plausible confounders would reduce the effect, and dose-response association), were not relevant to any of our Key Questions. We added the points for the various domains, and 5+ indicated an SOE rating of High; 4 points indicated an SOE rating of Moderate; 3 points indicated an SOE rating of Low; and 2 or fewer points indicated an SOE rating of Insufficient.

All SOE category assignments (High, Moderate, Low, Insufficient) were performed by the principal investigator independently from the team member(s) responsible for that Key Question, with disagreements resolved by consensus.

Applicability Assessment

For this evidence report, we assessed the applicability of evidence for each Key Question. As defined in the Agency for Healthcare Research and Quality (AHRQ) Effective Health Care Program Methods Guide for Comparative Effectiveness Reviews of Medical Interventions, applicability is "the extent to which the effects observed in published studies are likely to reflect the expected results when a specific intervention is applied to the population of interest under "real-world" conditions."[43] Applicability depends on context and cannot be assessed with a universal rating system.[43] Thus far, no system has been developed for rating the applicability of a body of evidence for inguinal hernia repair.

Assessment of the applicability of a body of evidence is a complex task and involves addressing a series of methodological questions. These questions include:

- What are the population of interest and the "real world" conditions relevant to the stakeholders of this evidence report? From whose perspectives should the applicability of

the evidence be evaluated? This evidence review potentially serves multiple stakeholders, such as policymakers, clinicians, and patients and families. Different stakeholders may have different populations of interest and different applicability issues for consideration.

- What factors may affect the applicability of a study? What factors need to be considered in the assessment of applicability? While the PICOS (i.e., population, intervention, comparator, outcome, and setting) approach may be used to identify these factors,[43] some of the factors may have already been considered, at least in part, in the study inclusion/exclusion process.
- How would the impact of each of these factors be judged or graded? The answer to this question is not always straightforward. For example, it is difficult to judge the exact degree by which the findings of a study that only included patients of 55 years of age or older apply to the younger population. The judgment is often made on a subjective basis.
- How would the impacts of these various factors be synthesized to reach a general conclusion about the applicability of an individual study? Studies included in evidence reviews may report different applicability-related data (e.g., different types of comorbidities) or report the same types of data (e.g., duration of hernia) in different ways (e.g., reported as longer or less than 6 weeks vs. in average years). No validated instrument is currently available for accommodating these differences to reach a general conclusion about the applicability of a study.
- When the evidence consists of multiple studies, how would the applicability of different studies be synthesized to reach a general conclusion about the applicability of the evidence? We did not identify any validated instrument for this type of synthesis.

Given these unresolved methodological issues, we chose a practical approach to assessing the applicability of evidence for this evidence review. The goal of our assessment is to provide useful information to concerned stakeholders in making judgment on whether the evidence is applicable to the population or conditions of their interest.

We first abstracted data from each included study on factors that may affect the applicability of the study. We primarily focused on factors in three areas that are most relevant to the inguinal hernia repair topic:

- Population: demographic characteristics (e.g., age, sex, race, and ethnicity), comorbidity or general physical fitness (e.g., chronic cough, cardiovascular conditions, pulmonary functions, body mass index (BMI), activity assessment scale, and physical component summary), and types of hernia (e.g., primary vs. recurrent, unilateral vs. bilateral, reducible vs. irreducible, and hernia duration)
- Intervention and comparators: inguinal repair procedure being compared, periods of the procedure being performed, co-interventions (e.g., type of anesthesia and perioperative use of antibiotics), and experience of the surgical team
- Setting: geographic (e.g., the United States, Canada, or European countries) and clinical (e.g., academic medical centers vs. community hospitals) settings

Based on a review of the data abstracted, we narratively summarized any patterns reflected from these factors that could potentially affect the applicability of the evidence. We made no attempt to generate any rating or score for the applicability of the evidence, due to the methodological issues discussed. Our narrative summaries were intended to raise stakeholders' attention to potential applicability issues embedded in the evidence. All applicability sections (applicability was not rated on a scale based on the applicability guidance chapter) were written by a clinical team member.

Peer Review and Public Commentary

As part of a newly instituted process at AHRQ, the draft report was reviewed before peer review by the Task Order Officer (TOO) and an AHRQ associate editor (a senior member of a sister EPC). The revised draft report was then sent to invited peer reviewers and was simultaneously uploaded to the AHRQ Web site where it was available for public comment for 28 days. All reviewer comments (both invited and from the public) will be collated and individually addressed. The EPC responses to all comments were documented in a disposition of comment document which will be posted on the Effective Health Care Web site about 3 months after Web publication of the evidence report. The authors of the report had final discretion as to how the report was revised based on the reviewer comments, with oversight by the TOO and Associate Editor.

Results

Overall Description of Included Studies

Searches identified 2,722 potentially relevant articles and we excluded 1,878 of these at the abstract level (Figure 2). A large number of these exclusions (560) were because the study was not published in English. We had employed this exclusion solely for practical purposes, and an important issue is whether including non-English studies would have influenced any of the conclusions of our review. Thus, below, in the summary of each Key Question, we discuss the non-English abstracts that may have been included for that Key Question.

At the full-article level, we excluded another 621 articles, typically due to irrelevance to any of our Key Questions (252 publications), background/review/commentary/protocol articles (80 publications), uncontrolled design (81 publications), or nonrandomized designs without any attempt to control for selection bias (79 publications). An alphabetized list of these 621 exclusions, along with the reason for exclusion, appears in Appendix B.

There remained 223 publications describing 151 unique studies that we included in our review (Table 1). Multiple publications of a given study typically involved reporting additional outcomes not reported in the original publication, longer followup time points, subgroup analyses, or additional clarification of study methods; all such publications were included, and in evidence tables we grouped together all of the study's citations. The largest number of studies addressed Key Question 2a (38 studies), which compared open mesh repair to laparoscopic mesh repair in patients with primary inguinal hernia. Other large evidence bases were found for Key Question 3 (comparing different procedures for open mesh repair, 21 studies), Key Question 5 (comparing meshes, 32 studies), and Key Question 7 (the association between prior surgical experience and RC, in the context of laparoscopic hernia repair, 32 studies). No studies were identified for Key Question 8 (comparing surgical exploration vs. WW for pediatric contralateral inguinal hernia). Sixteen studies were included for multiple Key Questions (e.g., two studies were each included for four Key Questions), because they included three or more groups or reported subgroup analyses. A list of the included studies, along with marks identifying which studies addressed which questions, appears in Table 2 in Appendix C.

Only 16 of 151 studies (10 percent) were conducted exclusively in the United States. An additional 19 studies (12 percent) were conducted in the United Kingdom, Australia, Canada, United States/United Kingdom, or United States/Canada. The remaining 116 studies (77 percent) were conducted in other countries, most prominently Germany (14 studies or 9 percent), Turkey (12 studies or 8 percent), India (11 studies or 7 percent), and Italy (11 studies or 7 percent).

Eleven sections follow, one for each Key Question (Key Question 2 is actually three questions: 2a, 2b, and 2c). Each section is structured in the same manner: (1) an overview of study characteristics for the studies included for that Key Question; (2) a discussion of risk of bias of those particular studies; (3) a summary of findings (including summaries of relevant meta-analyses); (4) a discussion of the applicability of those studies; and (5) a summary (which includes a list of our conclusions for that Key Question, an SOE table, and a discussion of excluded non-English abstracts). All figures displaying meta-analyses are listed in the Figures section, which appears after the References. All evidence tables are in Appendix C, sorted by Key Question (i.e., all of the Key Question 1 tables appear first, then all of the Key Question 2a tables, etc.).

Figure 2. Literature flow diagram

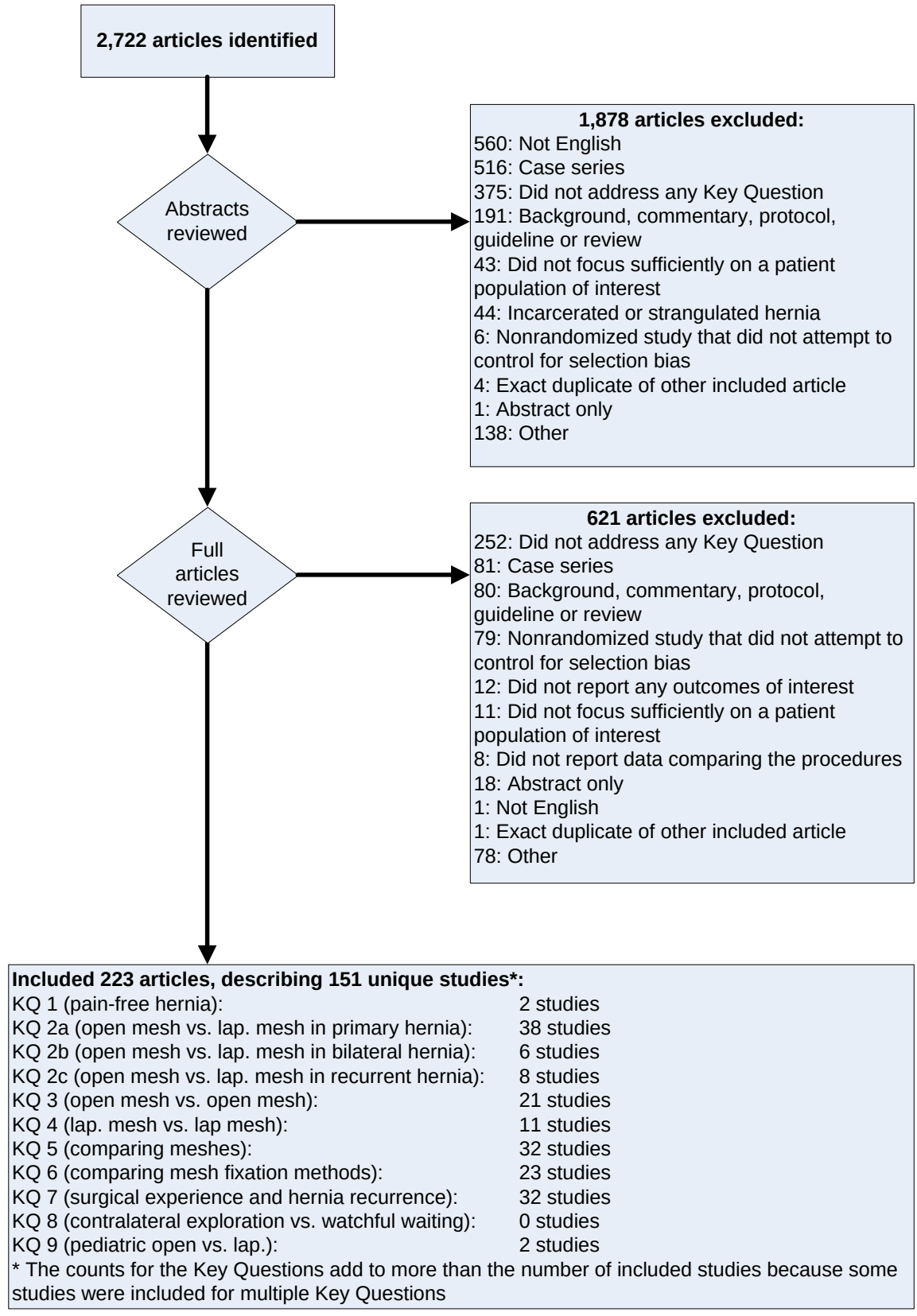


Table 1. Overview of included studies

Key Question	# Included Studies	Study Designs	Length of Followup
1 (pain-free hernia)	2	RCTs, 877 patients	1–4 years
2a (open mesh vs. lap. mesh in primary hernia)	38	36 RCTs, 10,949 patients 2 CTs, 168,389 patients	3 days to 7.4 years
2b (open mesh vs. lap. mesh in bilateral hernia)	6	5 RCTs, 599 patients 1 CT, 3,202 patients	1 year to 18 months
2c (open mesh vs. lap. mesh in recurrent hernia)	8	6 RCTs, 641 patients 2 CTs, 17,516 patients	2–5.3 years
3 (open mesh vs. open mesh)	21	20 RCTs, 4,259 patients 1 CT, 127,535 patients	1 week to 7.4 years
4 (lap. mesh vs. lap. mesh)	11	RCTs, 1,378 patients	2 days to 7.4 years
5 (comparing meshes)	32	RCTs, 5,292 patients	3 weeks to 5 years
6 (comparing mesh fixation methods)	23	22 RCTs, 3,599 patients 1 CT, 82,015 patients	1 week to 7 years
7 (surgical experience and hernia recurrence)	32	6 RCTs, 4,020 patients 8 CTs, 17,965 patients 18 CSs, 17,832 patients	3 months to 10 years
8 (contralateral exploration vs. watchful waiting)	0	NA	NA
9 (pediatric open vs. lap.)	2	RCTs, 172 patients	1–2 years

CSs = case series; CT = nonrandomized controlled trial; lap. = laparoscopic; NA = Not applicable; RCTs = randomized controlled trials

Key Question 1. Pain-free hernia: Does hernia repair differ from watchful waiting in patient-oriented effectiveness outcomes and/or adverse events?

Study Characteristics

General information about the two studies included for this Key Question appears in Table 3 of Appendix C. One study was conducted in the United States and Canada and the other in the United Kingdom. The North American study was a randomized controlled trial (RCT) with more than three centers and the United Kingdom study was a single-center RCT. Both studies compared mesh repair with WW. The RCTs enrolled 720 patients and 157 patients, respectively. In the multi-center study, surgeries were performed between 1999 and 2004 at three university hospitals and two community clinics.[12,44-49] This study was funded by AHRQ and the American College of Surgeons, and the lead author disclosed financial ties with a manufacturer of a mesh plug. The other single-center study conducted at a university hospital did not report the date range of the surgeries or source of funding.[50,51]

Patient enrollment criteria appear in Appendix C in Table 4 (hernia-related criteria), Table 5 (demographic and medical criteria), and Table 6 (other criteria). Enrollment criteria varied widely among both studies. The hernia-related study exclusion criteria in the studies include irreducible hernia (one study), incarcerated hernia (both studies), and femoral hernia (both studies). Regarding patient age criteria, the two studies enrolled patients aged >18 and >55 years of age, respectively. In addition, one study excluded patients unfit for general anesthesia or those with anesthesia risk scores of 3 or 4 or more; the other study excluded patients with infection and all female patients.

Treatment details appear in Table 7 of Appendix C. In one study, mesh repair was performed by the standardized Lichtenstein open tension-free repair as described by Amid[52] under local or general anesthesia. The other study did not report the detail of the "tension-free mesh repair" procedure. Neither of the studies reported the actual number of prior laparoscopic hernia repairs

the surgeons had performed. Instead, studies either didn't mention their prior experience, or simply said the surgeon had general experience in hernia repair.

All reported baseline patient characteristics in the studies included for this Key Question appear in Table 8 of Appendix C. The mean age of the patients ranged from 57.5 to 71.9 years; most patients were male with primary hernias. One study reported medical comorbidities including congestive cardiac failure, prior myocardial infarction, hypertension, chronic obstructive pulmonary disease, chronic cough, prostatism, and diabetes.

Risk of Bias

Our risk-of-bias assessments for both studies appear in Table 9 of Appendix C. One RCT was categorized as Moderate risk of bias for all reported outcomes and the other as either Low (for the outcomes of recurrence, health care utilization, adverse events) or Moderate risk of bias (for pain and QOL). Many reasons underlie the Moderate rating for the two studies that addressed this Key Question. Common reasons involved concealment of allocation (either not performed or not reported), use of subjective outcome measures (pain and QOL), and the blinding of outcome assessors (either not performed or not reported).

Findings

All included data for this Key Question appear in Table 10 of Appendix C.

Quality of Life

One study reported the QOL data on an intention-to-treat basis using the SF-36 instrument.[50,51] At 6 months, the surgical group fared better than the WW group on "general health" and "overall change in health status in the previous 12 months" (mean group difference 5.8, 95% CI, 0.1 to 11.5; mean group difference 9.4, 95% CI, 3.6 to 15.1, respectively). At 12 months, the surgical group still fared better than the WW group on "overall change in health status in the previous 12 months" (mean group difference, 7.3; 95% CI, 0.4 to 14.3; p=0.039). There were no statistically significant differences on other SF-36 items at both 6 and 12 months.

Long-Term Pain

The two studies reviewed for Key Question 1 used different measures for comparing long-term pain (>6 months after surgery). One study reported group differences at 2 years for pain interfering with activities among the intention-to-treat patients. On intention-to-treat analysis, percentage of patients with pain interfering among the surgical group was 2.2 percent compared with 5.1 percent in the WW group. This difference was not statistically significant (OR=0.42; 95% CI, 0.17 to 1.04), but also did not indicate equivalence.[12,44-49] The second study compared the pain (measured in VAS) scores at rest and at movement between the two groups.[50] They reported no statistically significant difference in mean pain (measured in VAS) scores at rest (difference in means = -1.5; 95% CI, -4.8 to 1.8) and at movement (difference in means = -1.5; 95% CI, -6.1 to 2.3) at 12 months. The low precision precludes any conclusion for this outcome.

Adverse Events

We conducted a meta-analysis of acute hernia/strangulation (Figure 3); the evidence was inconclusive, because it was too imprecise to reveal the direction of effect.

Applicability

Two studies are included for review for Key Question 1. We evaluated the studies to identify factors that could potentially affect the applicability of the evidence. As described in the *Methods* section, the goal of the evaluation is to raise stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

Among the two studies, the Fitzgibbons study compared WW with the Lichtenstein procedure,[12,44-49] while the O'Dwyer study compared WW with "tension-free mesh repair."[50,51] The findings of the studies may not apply to the comparison between other hernia repair procedures (e.g., TAPP or TEP) and WW. Meanwhile, both studies were published in 2006 and may not necessarily reflect the comparative performance of the procedures that are performed currently. Neither of the two studies discussed surgeons' prior experience for the surgeries being studied. Therefore, it is unclear whether there are any applicability issues related to the surgeons' level of experience.

Both the Fitzgibbons and O'Dwyer studies excluded patients with incarcerated, strangulated, or femoral hernia. Therefore, the findings of the studies may have an applicability issue for these patients. The two studies also used other enrollment criteria to exclude certain types of patients. For example, the O'Dwyer study did not include patients younger than 55 years of age, and the Fitzgibbons study did not include female patients. Other patient enrollment criteria used in the two studies are provided in Appendix C in Table 4 and Table 6. It is unclear how these enrollment criteria and patients characteristics may affect the applicability of the evidence.

The Fitzgibbons study was conducted in five medical centers in North America (four in the United States and one in Canada). Three of the centers are affiliated with a university and the other two are community medical centers. The O'Dwyer study was conducted in a university hospital in the United Kingdom. Based on the data reported, it is unclear if the geographic or clinical settings of the two studies have any implication in determining the applicability of the evidence. Detailed information on geographic and clinical settings of the two studies is provided in Table 3 of Appendix C.

Summary of Key Question 1

A summary of the comparisons and outcomes we examined in this Key Question is provided in Table 2 below. The evidence was sufficient to permit a conclusion for one outcome:

- Quality of life at 6 months and 1 year was greater for patients who had received mesh repair than for those who were on WW.

Our ratings of the SOE for this outcome also appear in the Table. The factors influencing our assessment of the SOE include the following: the study was at Moderate risk of bias for pain (see the pertinent section above); the consistency is unknown; the outcome is directly important to clinicians and patients; the results are imprecise. We examined the studies that had been excluded for being non-English, and none of them would have been included for this Key Question.

In the Summary of Key Question 1, we looked through the list of non-English articles excluded for being non-English and found none relevant to this Key Question.

Table 2. Key Question 1: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Mesh repair vs. watchful waiting	Acute hernia/ strangulation	2	MOD	C	D	I OR 0.77 (CI 0.06 to 10.8)	?	INSUFF
Mesh repair vs. watchful waiting	Long-term pain at rest (measured in VAS at 2 years after trial entry)	1	MOD	U	D	I Diff in means -1.5 (CI -4.8 to 1.8)	?	INSUFF
Mesh repair vs. watchful waiting	Long-term pain during movement (measured in VAS at 2 years after trial entry)	1	MOD	U	D	I Diff in means -1.5 (CI -6.1 to 2.3)	?	INSUFF
Mesh repair vs. watchful waiting	Long-term pain interfering with activities (intention-to-treat) (measured in VAS at 2 years after trial entry)	1	MOD	U	D	I OR 0.42 (CI 0.17 to 1.04)	?	INSUFF
Mesh repair vs. watchful waiting	Quality of life at 1 year (measured as overall change in health status in previous 12 ,months using the SF-36)	1	MOD	U	D	P (reported 95% CI, difference in means 7.3, CI 0.4 to 14.3)	Mesh plug repair	LOW

CI = Confidence interval; Diff = difference, OR = odds ratio, SOE = strength of evidence; VAS = visual analog scale.
Note:
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct and I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.

Key Question 2a. Does open hernia repair with a mesh differ from laparoscopic hernia repair with a mesh in patient-oriented effectiveness outcomes and/or adverse events? Primary hernias

Study Characteristics

General information about the 38 studies included for this Key Question appears in Table 11 of Appendix C. Seven were conducted in Turkey; five in Sweden; three each in Finland, Germany, and the United States; two each in China, the Netherlands, and the United Kingdom; and the rest in other countries. Twenty were single-center randomized trials; four were two-center randomized trials; seven were RCTs with more than three centers; two were country-wide registry studies (one in Denmark and one in Sweden); and the remaining five were RCTs that did not report the number of centers.

Regarding specific surgical procedures, the most commonly compared procedures were TAPP versus Lichtenstein (14 studies), TEP versus Lichtenstein (14 studies), TAPP versus mesh plug (three studies), TEP versus mesh plug (three studies), and TAPP/TEP versus Lichtenstein (four studies). The RCTs enrolled between 38 and 2,164 patients each; the Swedish registry included 174,527 hernias; and the Danish registry included 67,306 hernias. The dates of patient enrollment were reported by 32 of 38 studies. The average length of the enrollment period was 1.9 years (range 6 months to 14 years). Studies were typically conducted in the mid-1990s and early 2000s.

Fourteen studies were conducted at university hospitals; 13 more were conducted at general and nonuniversity hospitals; five included some university hospitals as well as some nonuniversity hospitals; the remaining six did not report the type(s) of hospitals. Funding for the study was not reported by 26 studies; government funding was reported in six studies; university funding was reported in two studies; three did not report the funding source but did state they had no manufacturer ties; two did report partial manufacturer funding (and one of these stated that the manufacturer had no role in the design, conduct, or analysis of the study). Patient enrollment criteria appear in Appendix C in Table 12 (hernia-related criteria), Table 13 (demographic and medical criteria), and Table 14 (other criteria).

Enrollment criteria varied widely among the 37 studies. The most commonly used hernia-related exclusions were recurrent hernia (20 studies), bilateral hernia (18 studies), and incarcerated hernia (16 studies). Others were femoral hernia (excluded by six studies), “emergency” hernia (excluded by five studies), and scrotal hernia (excluded by four studies). Overall, the studies paint an extraordinarily diverse portrait of the types of hernias deemed relevant to the studies, even though, by virtue of inclusion, they all compared open repair of inguinal hernia to laparoscopic repair of inguinal hernia.

Regarding patient age criteria, 30 of the 38 studies (79 percent) stated that they included any adults or required age >18 years. Twenty-three (61 percent) excluded those unfit for general anesthesia or those with anesthesia risk scores of 3 or 4 or more, and 17 studies excluded those who had undergone a prior surgery in the lower abdomen. Sixteen studies excluded all females, eight excluded pregnant women, and seven excluded those with coagulation disorders. As with the hernia-related exclusions, a large variability existed in how studies selected patients for inclusion.

Treatment details appear in Table 15 of Appendix C. Laparoscopic treatments were TAPP for 13 studies, TEP for 15 studies, and both TAPP and TEP in the remaining 10 studies. Laparoscopic repair invariably used general anesthesia, and the use of staples was the norm

(with some surgeons stapling selectively). Mesh sizes varied widely, from smaller meshes at 7 by 10 cm to larger, 15 by 15 cm meshes; the typical mesh size was between these extremes, such as 10 by 14 cm. None of the studies reported the actual number of prior laparoscopic hernia repairs the surgeons had performed. Instead, studies either didn't mention their prior experience, or simply said surgeons had general laparoscopic skills that were not specific to hernia repair. Five of the 38 studies stated that "all surgeons had performed at least *X* prior procedures" of the type performed in the study (with *X* values of 5, 10, 10, 25, and 100 in the five studies).

Open hernia repairs were mostly Lichtenstein, and meshes were typically secured with sutures. The type of anesthesia was highly variable, with seven studies reporting general anesthesia for all patients, another six only using local or regional anesthesia, and seven others reporting that any type of anesthesia could be used depending on the preference of the patient, surgeon or anesthesiologist. Mesh sizes were variable, with the smallest mesh 6 by 8 cm, and the largest mesh15 by 15 cm, and the most typical size 7 by 12cm.

All reported baseline patient characteristics in the studies included for this Key Question appear in Table 16 of Appendix C. A summary of the most commonly reported baseline characteristics in studies included for Key Questions 2 through 7 appears in Table 3 below (we considered these Key Questions together because they addressed similar populations). The typical patient was a man in his mid-50s with a BMI of 25.3 kg/m^2 (which corresponds to 172 pounds in a male of average height). About a quarter of these men worked in physically strenuous jobs such as manual labor (among the 25 studies reporting this characteristic). This characteristic may be important in the context of hernia surgery because the persistence of symptoms is more likely to delay one's return to physical work than to more sedentary work. In the typical study, most patients had a primary unilateral hernia; slightly under half had an indirect hernia; slightly over half had a right-side hernia.

Table 3. Summary of baseline characteristics

Characteristic	Number of Studies From Key Questions 2-7 Reporting This Characteristic	Median	IQR
Percentage male	107	96% males	92%-100%
Age	132	54 years old	49–58
Body mass index	39	25.3 kg/m^2	25.0–26.7
Percentage physically strenuous job	22	26%	21%–42%
Percentage primary	115	100%	89%–100%
Percentage unilateral	101	93%	76%–100%
Percentage indirect	65	45%	34%–55%
Percentage right-side	42	53%	47%–58%

IQR = Interquartile range.

Risk of Bias

Our risk-of-bias assessments for the 38 studies appear in Table 17 of Appendix C. The 36 RCTs were all categorized as Moderate risk of bias for all of their reported outcomes, and the two registry studies that were both categorized as High risk of bias. The latter two were retrospective and nonrandomized studies that had no concealment of allocation, outcomes assessed with knowledge of treatment, and potentially other differences between the compared groups that may have influenced the registry findings.

Many reasons underlie the Moderate rating for the 36 RCTs. A common reason was that the surgeons may have had much more experience performing the study's open hernia repair procedures than the study's laparoscopic hernia repair procedures. This difference in prior

experience could potentially explain differences in patient outcomes among those who received open versus laparoscopic repair. Only three of the 36 RCTs stated that the surgeons were highly experienced with both types of repair used in the study. Most studies did not report prior experience with the procedures being compared, and a few studies made clear that the surgeons' prior experience was much greater with open repair. Two other common reasons involved concealment of allocation (either not performed or not reported by 18 studies) and the blinding of outcome assessors (either not performed or not reported for more than 90 percent of the studies' data points).

Findings

All included data for this Key Question appear in Table 18 of Appendix C.

Hernia Recurrence

We performed a meta-analysis of the 30 studies reporting this outcome, and found that recurrence was more likely after laparoscopic surgery than after open surgery (summary RR 1.43; 95% CI, 1.15 to 1.79) (Figure 4 upper panel). We had defined the MCSD as a three-percentage-point difference between groups. To aid interpretation, we calculated the overall rate of recurrence in the open repair groups, which was 2.49 percent. Multiplying a 1.79 RR by this rate yields a corresponding rate of 4.46 percent for laparoscopy. The difference between these rates is only 1.97 percent, which is less than our predefined MCSD of three percentage points. This implies that the difference between open and laparoscopy, while statistically significant, is not substantial.

Length of Hospital Stay

Twenty-five of the 38 studies reported an outcome in this category, and 17 of these could be included in a meta-analysis of the length of stay in days (the other eight only reported dichotomous data, e.g., the percentage of patients who had a 1-day stay). The meta-analysis (Figure 5 upper panel) found that length of stay was shorter after laparoscopic surgery than after open surgery (summary difference in means -0.33 days; 95% CI, -0.52 to -0.14). This is only about an 8-hour difference (i.e., a third of a day), which is less than what we defined as the MCSD (1 day; see Methods section).

Return to Daily Activities

Nineteen of the 38 studies reported an outcome in this category, and 15 of these could be included in a meta-analysis of number of days before returning to normal daily activities. The other four could not be included because the authors only reported dichotomous data, did not report numbers of patients, reported only specific activities (such as the length of postoperative time before being able to urinate), or used a functional index scale rather than a length of time to return to activity. The meta-analysis (Figure 6 upper panel) found that RTDA was shorter after laparoscopic surgery than after open surgery (summary weighted mean difference in days of -3.9; 95% CI, -5.6 to -2.2). This is larger than what we defined as the MCSD for this outcome (1 day).

The meta-analysis found substantial heterogeneity and had at least 10 studies, so we performed meta-regressions in an attempt to explain differences among studies. We investigated numerous covariates (percentage of patients with bilateral hernia, percentage of patients with recurrent hernia, mean age, percentage of laparoscopic patients undergoing TEP, percentage of

open patients undergoing Lichtenstein, percentage of centers in university or specialist settings, concealment of allocation, outcome rater blinded), but none of them were statistically significantly associated with the difference between open and laparoscopic repair. Despite differences in the measured size of the effect, the overall direction of the effect consistently favored laparoscopy.

Return to Work

Twenty of 38 studies reported RTW data, and 19 of them were combined in a meta-analysis (the other did not report the Ns). The meta-analysis (Figure 7 upper panel) indicated shorter time to RTW after laparoscopic repair (summary difference in days -4.6 days; 95% CI, -6.1 to -3.1). This is larger than what we defined as the MCSD for this outcome (1 day).

The meta-analysis found substantial heterogeneity and had at least 10 studies, so we performed meta-regressions in an attempt to explain differences among studies. We investigated numerous covariates (percentage of patients with bilateral hernia, percentage of patients with recurrent hernia, mean age, percentage of laparoscopic patients undergoing TEP, percentage of open patients undergoing Lichtenstein, percentage of centers in university or specialist settings, concealment of allocation, similar levels of prior surgical experience, outcome rater blinded), but none of them were statistically significantly associated with the difference between open and laparoscopic repair. Despite differences in the measured size of the effect, the overall direction of the effect consistently favored laparoscopy.

Quality of Life

Only one study reported long-term QOL data, and results suggested equivalence (on the 0-1 scale of Quality Adjusted Life Years [QALYs], the 2-year difference in QALYs was only 0.014; 95% CI, -0.014 to 0.041).

Patient Satisfaction

Three studies reported long-term data on this outcome, but they each reported it in a different way:

- One study reported degree of SFN on a VAS 0–100 scale, with medians of 100 for the laparoscopic group and 98 for the open group. This was reported as not statistically significantly different, but a CI was neither reported nor calculable, so it is unclear whether the results indicate equivalence.
- A second study reported the percentages of patients who were “completely satisfied”/“satisfied”/“unsatisfied” (91/7/1 for the laparoscopic group versus 75/20/5 for the open group). The study also reported the percentage of patients who said they would have this procedure again, which was 98 percent for the laparoscopic group versus 86 percent for the open group. The study did not perform statistical tests on these outcomes, but we did (chi square tests), and both measures showed statistically significantly greater SFN in the laparoscopic group.
- A third study asked four pertinent questions: (1) whether recovery was faster than expected, 59 percent laparoscopy patients versus 45 percent open patients; (2) SFN with operation scars, 82 percent laparoscopy patients versus 71 percent open patients; (3) whether they would recommend that operation to others, 91 percent laparoscopy patients versus 91 percent open patients; and (4) whether they could describe life as “much better,” 62 percent laparoscopy patients versus 61 percent open patients. Authors

did not report any statistical tests on these data, but our tests found that one of the four measures, SFN with operation scars, showed a statistically significant difference (82 percent vs. 71 percent), whereas the others were not statistically significant.

Long-Term Pain

All but one of 14 studies reporting long-term pain (>6 months after surgery) were included in a meta-analysis (Figure 8 upper panel) (the 14th study did not report data dichotomously). This analysis found a lower rate of long-term pain after laparoscopic surgery than after open surgery (OR=0.61; 95% CI, 0.48 to 0.78). This indicates a clinically significant difference in rates.

The meta-analysis found substantial heterogeneity and had at least 10 studies, so we performed meta-regressions in an attempt to explain differences among studies. We investigated numerous covariates (percentage of patients with bilateral hernia, percentage of patients with recurrent hernia, mean age, percentage of laparoscopic patients undergoing TEP, percentage of open patients undergoing Lichtenstein, percentage of centers in university or specialist settings, concealment of allocation, similar levels of prior surgical experience, length of followup), but none of them were statistically significantly with regard to the difference between open and laparoscopic repair. Despite differences in the measured size of the effect, the overall direction of the effect consistently favored laparoscopy.

The severity of the pain may not have differed substantially between treatments. Two of the 14 studies measured the degree of pain severity in the long term. One study found that at 2 years, the between-group difference in pain at rest was no more than 3.5 millimeters, which corresponds to only 2.3 percent of the 150-millimeter scale range. The other study reported pain severity at both 6 months and 1 year: patients receiving laparoscopy had less pain severity, and the difference was about 0.7 points on a 0–10 scale (7 percent of the scale range).

Adverse Events

We conducted meta-analyses of six types of events (epigastric vessel injury reported by 10 studies [Figure 9 upper panel], hematoma reported by 25 studies [Figure 10 upper panel], small bowel injury reported by four studies [Figure 11], small bowel obstruction reported by seven studies [Figure 12], urinary retention reported by 20 studies [Figure 13 upper panel], and wound infection reported by 18 studies [Figure 14 upper panel]). A clear direction of effect was found for three events: epigastric vessel injury (higher rates with laparoscopic repair, OR=2.1; 95% CI, 1.1 to 3.9), hematoma (lower rates with laparoscopic repair, OR=0.70; 95% CI, 0.55 to 0.88), and wound infection (lower rates with laparoscopic repair, OR=0.49; 95% CI, 0.33 to 0.71). For the other three events, the evidence was inconclusive because it was consistent with effects in either direction.

For urinary retention, the meta-analysis found substantial heterogeneity and had at least 10 studies, so we performed meta-regressions in an attempt to explain differences among studies. We investigated numerous covariates (percentage of patients with bilateral hernia, percentage of patients with recurrent hernia, mean age, percentage of laparoscopic patients undergoing TEP, percentage of open patients undergoing Lichtenstein, percentage of centers in university or specialist settings, concealment of allocation, similar levels of prior surgical experience, outcome rater blinded), but none of them were statistically significantly associated with the difference between open and laparoscopic repair.

Another adverse event of concern is intraoperative injury to the spermatic cord (potentially causing infertility). Only two studies reported data on this event. In one study, the event never

occurred (out of 67 patients undergoing open repair and 122 undergoing laparoscopic repair). In the other study, the rates were 1% after open repair (8/994) and 0.1% after laparoscopic repair (1/989).

Applicability

Thirty-seven studies are included for review for Key Question 2a. We evaluated these studies to identify factors that could potentially affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to draw stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

The thirty-seven studies reviewed for Key Question 2a compared various mesh-based open surgeries with laparoscopic procedures. Table 11 in Appendix C provides a detailed description of the procedures being compared in the studies. The two interventions being compared in the meta-analyses—i.e., open versus laparoscopic surgery—included different procedures (e.g., the Lichtenstein method, the mesh plug method, TEP, and TAPP). The findings from the meta-analyses (e.g., effect sizes) might not apply to comparisons of specific procedures (e.g., the Lichtenstein method vs. TEP or the mesh plug method vs. TEP). Meanwhile, in 34 of the 37 studies reviewed for Key Question 2a, the surgeries were performed in the 1990s or early 2000s. This body of evidence may not necessarily reflect the comparative performance of the procedures that are performed currently.

Twenty-one of the 37 studies reviewed for Key Question 2a provided information on surgeons' prior experience for the surgeries being compared.[17,36,37,53-96] Surgeons' level of experience was reported as "experienced," "highly experienced," "with moderate experience," or by the number of prior cases. When the term "experienced" was used, the meaning of the term was rarely defined (e.g., by the number of prior cases or years of practice). Sixteen of the 37 studies reviewed did not report data on surgeons' experience at all. Given the limitation in data reported, we were unable to judge what implication surgeons' experience may have in the applicability of the evidence. Table 15 in Appendix C provides additional detail on the hernia repair procedures performed in the studies, including data on surgeons' experiences.

Patient enrollment criteria and reported baseline characteristics varied significantly across the 37 studies. Almost half of the studies reviewed excluded female patients or patients unfit for general anesthesia. Some studies excluded patients with bilateral or incarcerated hernia. Based on the data reported, we did not identify any clear patterns in the patient characteristics of the studies that indicate significant impact on the applicability of the evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Appendix C in Table 12 and Table 13.

Except for three studies,[36,57,83-88,90] all of the other 34 studies were performed outside of the United States, primarily in European countries. The differences in health care systems and practice patterns between the United States and Europe might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. The clinical settings where the 37 studies were conducted varied significantly, ranging from outpatient surgical clinics to community hospitals to academic medical centers. Based on the data reported, it is unclear how the clinical settings of the studies might affect the applicability of the evidence. Detailed information on geographic and clinical settings of the 37 studies is provided in Appendix C in Table 11.

Summary of Key Question 2a

A summary of the comparisons and outcomes we examined in this Key Question is in Table 4 below. Of the 11 outcomes, the evidence was sufficient to permit a conclusion for eight outcomes:

- Five outcomes favored laparoscopy (RTDA, RTW, long-term pain, hematoma, and wound infection)
- Two outcomes favored open surgery (r and epigastric vessel injury)
- One outcome indicated approximate equivalence (length of stay)

Our ratings of the SOE for these outcomes also appear in the table. Studies were typically at moderate risk of bias (see the pertinent section above); we found some inconsistencies for some outcomes based on effect sizes on opposite sides of a null effect; all of these outcomes are directly important to clinicians and patients; we found some imprecision for some outcomes that precluded conclusions. Two outcomes were judged to have a large magnitude of effect (RTDA and RTW, both of which indicated advantages of laparoscopy in excess of 2 days and possibly as much as 6 days). Three of the adverse events were judged to potentially be associated with publication bias, specifically in the form of selective outcome reporting (for example, only 4 of 37 studies reported rates of small bowel injury, and the authors' choice to report that data may have been influenced by the nature of the findings).

For the outcome of hernia recurrence, we concluded that evidence favors open repair (based on a meta-analysis of 30 studies) in the context of primary hernia. A key concern is timing: for how long does this advantage occur? This is difficult to pinpoint because studies differed in the length of followup. The median length of followup was 1.4 years (range 10 months to 7.3 years). Three studies followed the typical patient for <1 year, 17 studies followed the typical patient for 1-2 years, and the remaining 10 studies followed the typical patient for 2+ years.

Questions about the relative importance of these outcomes need to be considered carefully. Some may believe the advantages of laparoscopic repair (faster recovery and lower rates of minor complications) may outweigh the disadvantages (higher rates of recurrence and epigastric vessel injury), whereas others may believe that its disadvantages outweigh the advantages.

Table 4. Key Question 2a: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lap. vs. open	Hernia recurrence	30	MOD	I	D	P RR 1.43 (CI 1.2 to 1.8)	Open	LOW
Lap. vs. open	Length of stay (days)	25	MOD	I	D	P Diff. -0.33 (CI -0.52 to -0.14)	EQ	LOW
Lap. vs. open	RTDA (days)	19	MOD	C	D	P Diff. 3.9 days (CI 2.2 to 5.6)	Lap.	HIGH*
Lap. vs. open	RTW (days)	20	MOD	C	D	P Diff. 4.6 days (CI 3.1 to 6.1)	Lap.	HIGH*
Lap. vs. open	Quality of life (QALYs)	1	MOD	U	D	P (QALY difference -0.0135 to 0.0405)	?	INSUFF†
Lap. vs. open	Patient satisfaction	3	MOD	I	D	I (CI not calculable)	?	INSUFF†
Lap. vs. open	Long-term pain (% of patients)	14	MOD	C	D	P OR 0.61 (CI 0.48 to 78)	Lap.	MOD
Lap. vs. open	Epigastric vessel injury	9	MOD	C	D	P OR 2.1 (CI 1.1 to 3.9)	Open	LOW†

Table 4. Key Question 2a: Strength of evidence ratings (continued)

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lap. vs. open	Hematoma	25	MOD	I	D	P OR 0.70 (CI 0.55 to 88)	Lap.	LOW
Lap. vs. open	Small bowel injury	4	MOD	I	D	I (OR 0.11 to 4.6)	?	INSUFF†
Lap. vs. open	Small bowel obstruction	7	MOD	C	D	I (OR 0.58 to 8.0)	?	INSUFF†
Lap. vs. open	Urinary retention	20	MOD	I	D	I (OR 0.84 to 1.86)	?	INSUFF
Lap. vs. open	Wound infection	18	MOD	C	D	P OR 0.49 (CI 0.33 to 71)	Lap.	MOD

CI = confidence interval, NA = not applicable, OR = odds ratio, QALY = quality-adjusted life year; RR = relative risk, RTDA = return to activities of daily living, RTW = return to work.

Note:

For risk of bias, MOD. = Moderate.

For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.

For directness, D = direct, I = indirect.

For precision, I = imprecise, P = precise.

For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.

For the column labeled SOE rating, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect. SOE = strength of evidence, and † indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

Nine non-English studies might have met the inclusion criteria for this Key Question if we had not required that studies be published in English.[97-105] Three of these were clearly randomized trials, and the other six may have been randomized (the abstract was unclear on this point).We summarize the results as follows:

- One RCT[100] (comparing laparoscopic intraperitoneal onlay mesh (IPOM) with open mesh plug) found lower rates of hematoma, wound infection, and short-term pain after IPOM, as well as faster recovery after IPOM.
- Another RCT[98] (comparing TAPP with Lichtenstein) did not find faster recovery or less pain after TAPP, and also did not find lower rates of hematoma after TAPP. These results are not consistent with the conclusions of our review. No recurrences were observed, but authors did find three contralateral hernias during TAPP and no such hernias during Lichtenstein.
- A third RCT[99] (comparing TAPP with "open mesh herniorrhaphy") found shorter hospital stay and RTDA after TAPP, and no difference in overall complication rates (specific complications were not delineated in the abstract of the study). Overall consistency with our review is unclear. No RCs were observed in the 1-year followup period.
- One study[97] (possibly randomized, comparing TEP to Lichtenstein) found higher complication rates in the TEP group, and no TEP advantages regarding patient SFN. Specific complications were not reported in the abstract, so consistency with our review is unclear.
- One study[101] (possibly randomized, comparing TEP to Lichtenstein) found that TEP patients had faster recovery and lower rates of long term pain (consistent with our findings), and found no differences in recurrence or complication rates.
- One study[102] (possibly randomized, comparing TEP to "open tension free operation (OTF) using the onlay flat mesh technique") found less short-term pain after TEP.
- One study[103] (possibly randomized, comparing "laparoscopic surgery (intraabdominal preperitoneal repair)" to "open surgery (tension free repair)" only reported short-term surrogate outcomes such as fasting plasma glucose and C-reactive protein, which were not outcomes of interest in our review.
- One study[105] (possibly randomized, comparing "laparoscopic approach" to a set of open procedures ["Bassini, Shouldice, Lichtenstein"]) found laparoscopic advantages regarding "shorter hospitalization, lower morbidity and rapid socioprofessional reintegration." Consistency with our review is mixed.
- One study[106] (possibly randomized, comparing TEP to Stoppa) found 1-year recurrence rates of 2.2 percent and 0 percent (respectively), 3-year recurrence rates of 3.6 percent and 5.2 percent (respectively), and 4-year recurrence rates of 7.4 percent and 10.5 percent (respectively). The longer term rates, which favor laparoscopy, are opposite of our review's findings that long-term recurrence rates favor open surgery for primary hernia.

Key Question 2b. Does open hernia repair with a mesh differ from laparoscopic hernia repair with a mesh in patient-oriented effectiveness outcomes and/or adverse events? Bilateral hernias

Study Characteristics

General information about the six studies included for this Key Question appears in Table 19 of Appendix C. Each was conducted in a different country (Denmark, France, Italy, Switzerland, Turkey, and the United Kingdom). Three were single-center randomized trials, one was a two-center RCT, one was an RCT that did not report the number of centers, and the last was the Danish registry that was also included for Key Question 2a. Three studies compared TEP to the Stoppa procedure, two compared TAPP to Lichtenstein, and the Danish registry compared TAPP/TEP to Lichtenstein (authors combined data on TAPP and TEP procedures). Three of these six studies were also included for Key Question 2a on primary hernia; they were included for this question also because they reported subgroup analyses specifically for those with bilateral hernia.

Patient enrollment in the RCTs ranged from 43 to 403, and patients were enrolled in the same timeframe as the studies included for Key Question 2a (the mid-1990s to early 2000s). Four of the five RCTs were conducted in university hospitals (the fifth did not report the type of hospital). Funding source was unreported in three of the six studies; two involved government funding, and one RCT was supported by a manufacturer (Ethicon Endo-Surgery, Inc., a unit of Johnson & Johnson, New Brunswick, NJ). Patient enrollment criteria appear in Appendix C in Table 20 (hernia-related criteria), Table 21 (demographic and medical criteria), and Table 22 (other criteria). Generally, their criteria were similar to the studies included for Key Question 2a, with the obvious exception that no studies excluded bilateral hernia. Three studies excluded giant scrotal hernia, two excluded femoral hernia, two excluded incarcerated hernia, and one excluded RC. Four included any adults, whereas the other two set more specific age boundaries. Five excluded those unfit for general anesthesia, and three excluded those with prior lower abdominal surgery; only one specifically excluded women.

Treatment details appear in Table 23 of Appendix C. For laparoscopic repair, three studies performed TAPP and three performed TEP; either procedure typically involved general anesthesia. Meshes were typically stapled, and for bilateral hernias, two studies used two meshes in each patients (one on each side), one used a single large (30 by 10 cm) “bikini” mesh, one reported that either one large or two regular-sized meshes were used, and two studies did not report information about meshes. The open procedure was Lichtenstein in three studies and Stoppa in three studies; the Stoppa procedure involves a single large mesh to cover both hernia defects.

Baseline patient characteristics appear in Table 24 of Appendix C, and these were similar to patients included for Key Question 2a (other than the fact that Key Question 2b patients had bilateral hernia). See the pertinent section in Key Question 2a for an overview.

Risk of Bias

Our risk-of-bias assessments for the six studies appear in Table 25 of Appendix C. The five RCTs were all categorized as Moderate risk of bias for all of their outcomes, and the Danish registry study was categorized as High risk of bias. The reasons for this latter category assignment were mentioned above in Key Question 2a (nonrandom assignment, retrospectivity,

lack of concealment of allocation, outcomes assessed with knowledge of treatment, and potential selection bias). Reasons for assigning a Moderate category to the five RCTs were the same as those discussed in Key Question 2a: possible differences in prior surgical expertise, lack of concealment of allocation (either not done or not reported in three of six studies), and lack of outcome assessor blinding (clearly not done in two studies, and unreported in the other four studies).

Findings

All included data for this Key Question appear in Table 26 of Appendix C.

Hernia Recurrence

We performed a meta-analysis of all three studies reporting this outcome specifically for bilateral hernia, and found that the evidence was inconclusive (summary RR 1.07; 95% CI, 0.19 to 6.06) (Figure 4 middle panel). This is inconclusive because the evidence is simultaneously consistent with a large advantage of laparoscopy (recurrence one-fifth as likely with laparoscopy) but also with a large advantage of open repair (recurrence six times as likely with laparoscopy). The length of followup was 1 year in two studies, and a range from 0–3 years in the third study.

Length of Hospital Stay

Four of the six studies reported an outcome in this category, and all of them could be included in a meta-analysis (Figure 5 middle panel). This meta-analysis was inconclusive (summary weighted mean difference in days -1.7; 95% CI, -4.1 to +0.6).

Return to Daily Activities

Both studies reporting RTDA were meta-analyzed, but the resulting estimate was too variable to be conclusive (summary difference in days -9.0; 95% CI, -20.7 to +2.8) (Figure 6 middle panel).

Return to Work

Only one of the six studies reported data on RTW, and the authors reported a much shorter RTW after laparoscopy (median 16 days) than after open surgery (median 30 days; ($p < 0.05$).

Quality of Life

None of the studies reported QOL data.

Patient Satisfaction

None of the studies reported patient SFN data.

Long-Term Pain

None of the studies reported long-term pain data.

Adverse Events

Of the six adverse events we considered major outcomes (see list in Methods section), only three were reported by any of the six studies (hematoma, urinary retention, and wound infection, each reported by two studies). We conducted meta-analyses of these three events, (middle panels

of Figure 10, Figure 13, and Figure 14, respectively), but for all three the evidence was inconclusive because it was consistent with effects in either direction.

Applicability

Six studies are included for review for Key Question 2b. We evaluated these studies to identify factors that might affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to raise stakeholders' awareness of potential applicability issues embedded in the evidence rather than to generate a rating or score for the applicability.

These six studies reviewed for Key Question 2b compared two mesh-based open surgeries—the Stoppa and the Lichtenstein methods—with two laparoscopic procedures— TAPP and TEP— for repairing bilateral hernias. Table 23 of Appendix C provides a detailed description of the procedures being compared in the studies. The two interventions being compared in the meta-analyses—i.e., open versus laparoscopic surgery—included all four different procedures. The findings of the meta-analyses (e.g., effect sizes) might not apply to comparisons of specific procedures (e.g., the Lichtenstein method vs. TAPP, or the Stoppa method vs. TEP). Meanwhile, in one of the four studies, the surgeries were performed between 2003 and 2007.[107] In the other five studies, the surgeries were performed in the 1990s. This body of evidence may not necessarily reflect the comparative performance of the procedures that are performed currently.

One of the six studies reviewed for Key Question 2b provided information on surgeons' prior experience for the surgeries being studied.[58-61] This study reported that the surgeon had a prior experience of 50 cases with TEP. Another study reported the annual numbers of cases performed by hospital departments.[24,108-112] The other four studies reviewed did not report data on the surgeons' level of experience. Given limited data, we were unable to judge what implication surgeons' experience may have in the applicability of the evidence. Table 23 of Appendix C provides additional detail on the hernia repair procedures performed in the studies, including any available data on surgeons' experience.

Patient enrollment criteria and reported baseline characteristics varied significantly across the six studies. For example, some studies excluded patients with prior lower abdominal surgeries, while others studies excluded patients unfit for general anesthesia. Based on the data reported, we did not identify any clear patterns in the patient characteristics of the studies that indicate significant impact on the applicability of the evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Appendix C.

All six studies were performed outside of the United States, primarily in European countries. The differences in health care systems and practice patterns between the United States and Europe might have impact on the applicability of the evidence from the perspectives of U.S. stakeholders. Four of the five RCTs were conducted in university hospitals (the fifth did not report the type of hospital). The only non-RCT study involved 76 centers in Denmark and reported that 76 percent of the surgeries were performed in hospital departments and the other 24 percent occurred in private clinics. Based on the data reported, it is unclear how the clinical settings of the studies might affect the applicability of the evidence. Detailed information on geographic and clinical settings of the six studies is provided in Appendix C in Table 19.

Summary of Key Question 2b

A summary of the comparisons and outcomes we examined in this Key Question is in Table 5 below. The evidence was sufficient to permit conclusions for only one outcome: that bilateral hernia patients return to work sooner if they receive laparoscopic repair. This was rated as Low

SOE because only one of the six included studies reported information on return to work (therefore consistency with other studies could not be determined). This outcome had also been upgraded for a large magnitude of effect, but also was downgraded for potential reporting bias. For other outcomes, the primary reason for the grade of Insufficient was a lack of precision. For example, for RC, the direction of the effect could favor laparoscopy with an OR of about 0.2, or it could favor open surgery with an OR of more than 6. The outcomes downgraded for potential reporting bias included return to activities of daily living, hematoma, urinary retention, and wound infection.

Table 5. Key Question 2b: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lap. vs. open	Hernia recurrence	3	MOD.	I	D	I (RR 0.19 to 6.06)	?	INSUFF
Lap. vs. open	Length of stay (days)	4	MOD.	C	D	I (Diff in days -4.1 to +0.6)	?	INSUFF
Lap. vs. open	RTDA (days)	2	MOD.	C	D	I (Diff in days -20.7 to +2.8)	?	INSUFF†
Lap. vs. open	RTW (days)	1	MOD.	U	D	P 14 days earlier (CI not reported, but p <0.05)	Lap.	LOW*†
Lap. vs. open	Hematoma	2	MOD.	I	D	I (OR 0.074 to 2.56)	?	INSUFF†
Lap. vs. open	Urinary retention	2	MOD.	I	D	I (OR 0.017 to 73.2)	?	INSUFF†
Lap. vs. open	Wound infection	2	MOD.	C	D	I (OR 0.019 to 1.41)	?	INSUFF†

CI = Confidence interval; NA = not applicable, OR = odds ratio, RR = relative risk; RTDA = return to activities of daily living; RTW = return to work.
Note:
For risk of bias, MOD. = Moderate.
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct, I = indirect.
For precision, P = precise, I = imprecise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence. SOE = strength of evidence.
For the column labeled SOE rating, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect, and
† indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

One excluded non-English article compared open and laparoscopic repair for bilateral hernia.[104] The specific comparison was TEP versus Stoppa, and the abstract gave conflicting statements about whether patients were randomly assigned to groups. Because the numbers of patients in the two groups were quite different (43 and 74), it seems unlikely that random assignment was used. Given the possibility of selection bias (assuming the authors employed no analytic controls such as propensity scores), the article would not have met our inclusion criteria for this question.

Key Question 2c. Does open hernia repair with a mesh differ from laparoscopic hernia repair with a mesh in patient-oriented effectiveness outcomes and/or adverse events? Recurrent hernias

Study Characteristics

General information about the eight studies included for this Key Question appears in Table 27 of Appendix C. Two were from Sweden, and the others were from six different countries (Denmark, Finland, France, Greece, the Netherlands, and the United States). Four were single-center RCTs, two were multicenter RCTs, and two were registry studies (Denmark and Sweden, the same registries mentioned under Key Question 2a). The open mesh procedure was Lichtenstein in six studies and the Stoppa procedure in the other two studies. For the laparoscopic mesh procedure, two studies performed TAPP, two performed TEP, one performed both and reported data separately, and the other three performed both TAPP and TEP and combined the data. Four of these eight studies were also included for Key Question 2a on primary hernia; they were included for this question also because they reported subgroup analyses specifically for those with RC.

The six RCTs enrolled between 43 and 184 patients with recurrent inguinal hernia. Patients were enrolled in the same timeframe as the studies included for Key Question 2a (the mid-1990s to early 2000s). Four studies were conducted at general and nonuniversity hospitals, two were conducted at university hospitals, and two included some university hospitals as well as some nonuniversity hospitals. Five studies mentioned funding source: three were government-funded, one was hospital-funded, and one was partially funded by a manufacturer that was not involved in study design and analysis.

Patient enrollment criteria appear in Table 28 (hernia-related criteria), Table 29 (demographic and medical criteria), and Table 30 (other criteria) of Appendix C. Two studies excluded bilateral hernia, two excluded strangulated hernia, two excluded incarcerated hernia, and two excluded giant scrotal hernia (some studies excluded one or more of these hernia types). Four included any adults, whereas the other four set more specific age boundaries. Five excluded those unfit for general anesthesia, three excluded those with prior lower abdominal surgery, three excluded those whose prior hernia operation employed a mesh, three specifically excluded women, and three excluded patients with coagulation disorders.

Treatment details appear in Table 31 of Appendix C. For laparoscopic repair, four studies used both TAPP and TEP, two exclusively performed TAPP, and two exclusively performed TEP. As in previous Key Questions, general anesthesia and mesh stapling were the norm, and a variety of mesh sizes were used. For open repair, six studies used Lichtenstein and two performed Stoppa repairs.

Baseline patient characteristics appear in Table 32 of Appendix C, and these were similar to patients included for Key Question 2a (other than the fact that Key Question 2c patients had recurrent hernia). See the pertinent section in Key Question 2a for an overview.

Risk of Bias

Our risk-of-bias assessments for the eight studies appear in Table 33 of Appendix C. The six RCTs were all categorized as Moderate risk of bias for all of their outcomes, and the two registry studies was categorized as High risk of bias. The reasons for these latter category assignments were mentioned above in Key Question 2a (nonrandom assignment, retrospectivity, lack of concealment of allocation, outcomes assessed with knowledge of treatment, and potential selection bias). Reasons for assigning a Moderate category to the six RCTs were the same as those discussed in Key Question 2a: possible differences in prior surgical expertise, lack of concealment of allocation (either not done or not reported in two of six RCTs), and lack of outcome assessor blinding (clearly not done in one RCT, and unreported in three other RCTs).

Findings

All included data for this Key Question appear in Table 34 of Appendix C.

Hernia Recurrence

Given that this question addresses patients who are undergoing surgery for RC, this outcome is technically hernia *re*-recurrence. Seven of the eight studies reported data on this outcome. A meta-analysis of these data favored laparoscopic repair over open repair (summary RR 0.76; 95% CI, 0.60 to 0.98) (Figure 4 lower panel). The length of followup varied widely across the studies, with one study following patients from 0–3 years and another followed patients for an average of 5.3 years. As with Key Question 2a on primary hernia, we had defined the MCSD for RC as three percentage points. To aid interpretation of the summary RR of 0.76, we calculated the overall rate of re-recurrence in the open repair groups, which was 12.5 percent. Applying an RR of 0.76 to this rate yields a laparoscopic re-recurrence rate of 9.5 percent; applying it to the lower bound of RR 0.60 yields a lower percentage of 7.5 percent; applying it to the upper bound of RR=0.98 yields an upper bound of 12.3 percent. Thus the difference in percentages could be as high as 4.8 percent (12.3 percent to 7.5 percent), which is higher than our MCSD of three percentage points. Thus, it is unclear whether the advantage of laparoscopy for preventing re-recurrence can be considered clinically significant.

Length of Hospital Stay

Five of the eight studies reported an outcome in length of hospital stay, and three of these could be included in a meta-analysis (Figure 5 lower panel) (the other two reported the length-of-stay data only dichotomously). This meta-analysis was inconclusive (summary weighted mean difference=-1.3 days; 95% CI, -2.8 to +0.33).

Return to Daily Activities

Two of three studies reporting RTDA were meta-analyzed (the third used a functional index scale instead of reporting the amount of time). The meta-analysis (Figure 6 lower panel) indicated an advantage of laparoscopic repair (summary weighted mean difference in days=-7.4 days; 95% CI, -11.4 to -3.4).

Return to Work

Two of three studies reporting RTW were meta-analyzed (the third did not report the Ns). The meta-analysis (Figure 7 lower panel) did not indicate a clear direction of effect (summary weighted mean difference -6.4 days; 95% CI, -13.2 to +0.34).

Quality of Life

None of the studies reported QOL data.

Patient Satisfaction

None of the studies reported SFN data.

Long-Term Pain

Three studies reported long-term pain data, and two were meta-analyzed (Figure 8 lower panel) (the third did not report the Ns). This meta-analysis indicated lower rates of long-term pain after laparoscopy (OR=0.24; 95% CI, 0.08 to 0.74). This indicates a clinically significant difference in rates. The severity of pain is unclear, however, because none of the three studies measured long-term pain on a continuous scale.

Adverse Events

Of the six adverse events we considered major outcomes (see list in Methods section), four were reported by any of the six studies (epigastric vessel injury reported by two studies, hematoma reported by one study, urinary retention reported by three studies, and wound infection reported by three studies). We conducted meta-analyses of these four events (lower panels of Figure 9, Figure 10, Figure 13, and Figure 14, respectively), but for all four the evidence was inconclusive because it was consistent with effects in either direction.

Applicability

Eight studies are included for review for Key Question 2c. We evaluated these studies to identify factors that might affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to raise stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

The eight studies reviewed for Key Question 2c compared mesh-based open surgeries including the Stoppa and the Lichtenstein methods with laparoscopic procedures including TAPP and TEP for repairing recurrent hernias. Table 27 of Appendix C provides a detailed description of the procedures being compared in the studies. The two interventions being compared in the meta-analyses—i.e., open versus laparoscopic surgery—included different procedures (e.g., the Lichtenstein and Stoppa methods, TEP, and TAPP). The findings from the meta-analyses (e.g., effect sizes) might not apply to comparisons of specific procedures (e.g., the Lichtenstein method vs. TEP, or the mesh plug method vs. TEP). Meanwhile, in eight studies reviewed for Key Question 2c, the surgeries were performed in the 1990s or early 2000s. This body of evidence may not necessarily reflect the comparative performance of the procedures that are performed currently.

Five of the eight studies reviewed for Key Question 2c discussed surgeons' prior experience for the surgeries being compared.[23,24,36,58-61,83-88,108-113] The surgeons in the studies include experts with "special training," residents, or those having more than 25 or 50 prior cases. Three studies reviewed did not discuss surgeons' prior experiences. Given the data reported, we were

unable to judge what implication surgeons' experience may have in the applicability of the overall evidence. Table 31 of Appendix C provides additional detail on the hernia repair procedures performed in the studies, including data on surgeons' experiences.

Patient enrollment criteria and reported baseline characteristics varied significantly across the eight studies. For example, some studies excluded patients with an American Society of Anesthesiologists (ASA) score >3 or patients with prior lower abdominal surgeries. Some other studies excluded patients unfit for general anesthesia. Based on the data reported, we did not identify any clear patterns in the patient characteristics of the studies that indicate significant impact on the applicability of the evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Table 28 and Table 29 of Appendix C.

Except for one study,[36,83-88] all other seven studies were performed outside of the United States—all in European countries. The differences in health care systems and practice patterns between the United States and Europe might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. The clinical settings where the eight studies were conducted varied significantly, ranging from general surgery clinics, to non-teaching hospitals, to university hospitals. Based on the data reported, it is unclear how the clinical settings of the studies might affect the applicability of the evidence. Detailed information on geographic and clinical settings of the eight studies is provided in Appendix C in Table 27.

Summary of Key Question 2c

A summary of the comparisons and outcomes we examined in this Key Question is in Table 6 below. The evidence permitted conclusions for three outcomes, all of which favored laparoscopic repair over open repair: RC (lower rates after laparoscopy), RTDA (faster after laparoscopy; evidence graded up to High due to a large effect), and long-term pain (lower rates after laparoscopy). Two outcomes (epigastric vessel injury and hematoma) had been downgraded due to potential reporting bias. This section contains no discussion of excluded non-English articles because none of those abstracts addressed recurrent hernia for open versus laparoscopic repair.

As noted in the Introduction, Kumar et al. (1999)[17] suggested that Lichtenstein may be more appropriate for large recurrent hernia than small or medium-sized recurrent hernia. To address this idea, we examined the six (of eight) studies for this Key Question that used Lichtenstein as the open procedure. None of the six had enrollment criteria related to hernia size, nor baseline characteristics specifically about hernia size, nor reported data separately for hernias of different sizes. Thus, whether the Lichtenstein repair is more appropriate for large recurrent hernia is not addressed by these studies.

Table 6. Key Question 2c: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lap. vs. open	Hernia recurrence	7	MOD.	I	D	P RR 0.82 (CI 0.70 to 0.96)	Lap.	LOW
Lap. vs. open	Length of stay (days)	5	MOD.	C	D	I (Diff. in days, CI -2.8 to +0.33)	?	INSUFF
Lap. vs. open	RTDA (days)	3	MOD.	C	D	P 7.4 days earlier (CI 3.4 to 11.4)	Lap.	HIGH*
Lap. vs. open	RTW (days)	3	MOD.	C	D	I (Diff. in days, CI -13.2 to +0.34)	?	INSUFF
Lap. vs. open	Long-term pain (% of patients)	3	MOD.	C	D	P OR 0.24 (CI 0.08 to 0.74)	Lap.	MOD
Lap. vs. open	Epigastric vessel injury	2	MOD.	I	D	I (OR 0.15 to 2.48)	?	INSUFF†
Lap. vs. open	Hematoma	1	MOD.	U	D	I (OR 0.62 to 6.51)	?	INSUFF†
Lap. vs. open	Urinary retention	3	MOD.	I	D	I (OR 0.27 to 1.70)	?	INSUFF
Lap. vs. open	Wound infection	3	MOD.	C	D	I (OR 0.05 to 1.38)	?	INSUFF

NA = Not applicable, OR = odds ratio, RR = relative risk, RTDA = return to activities of daily living, RTW = return to work.
Note:
For risk of bias, MOD. = Moderate.
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct, I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence. SOE = strength of evidence.
For the column labeled SOE rating, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect, and
† indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

Key Question 3. Do different open mesh-based repair procedures (e.g., Lichtenstein repair, mesh plug) differ in patient-oriented effectiveness outcomes and/or adverse events?

Study Characteristics

General information about the 21 studies included for this Key Question appears in Table 35 of Appendix C. Five studies were conducted in Turkey; four in the United Kingdom; three in Sweden; two in the Netherlands; one each in Egypt, Finland, Greece, Poland, and the United States, and one was conducted both in United States and United Kingdom. Fourteen studies were single-center RCTs; two were two-center RCTs; two were three-center RCTs; one was country-wide registry study in Sweden; and the remaining two were RCTs that did not report the number of centers.

Regarding specific surgical procedures, the most commonly compared procedures were Lichtenstein versus mesh plug (seven studies), Lichtenstein versus Prolene Hernia System (PHS) (five studies), Lichtenstein versus the open peritoneal mesh (OPM) technique (three studies), mesh plug versus PHS (two studies), and Lichtenstein versus Kugel (two studies). The RCTs enrolled between 26 and 597 patients each; and the Swedish registry included 142,578 hernias repaired in that country. The dates of patient enrollment were reported by 14 of 21 studies. The average length of the enrollment period was 3.5 years (range 9 months to 14 years). Studies were typically conducted between 2000 and 2010.

Eighteen studies were conducted at university hospitals; two included some university hospitals as well as some nonuniversity hospitals; the remaining did not report the type(s) of hospitals. Funding for the study was not reported by 14 studies; government funding was reported in one study; university funding was reported in two studies; two did not report the funding source but did state they had no manufacturer ties; two reported partial manufacturer funding.

Patient enrollment criteria appear in Table 36 (hernia-related criteria), Table 37 (demographic and medical criteria), and Table 38 (other criteria) of Appendix C. Enrollment criteria varied widely among the 21 studies. The most commonly used hernia-related exclusions were recurrent hernia (13 studies), bilateral hernia (11 studies), “emergency” hernia (10 studies), femoral hernia (9 studies), and incarcerated hernia (9 studies). Others were irreducible hernia (excluded by five studies), scrotal hernia (excluded by three studies), and asymptomatic hernia (excluded by one study). One study included only bilateral hernia. Overall, the studies paint an extraordinarily diverse portrait of the types of hernias deemed relevant to the studies, even though, by virtue of inclusion, they all compared open repair of inguinal hernia to laparoscopic repair of inguinal hernia.

Regarding patient age criteria, 15 of the 21 studies (71 percent) stated that they included any adults or required age >18 years. Three (14 percent) excluded those unfit for general anesthesia or those with anesthesia risk scores of 3 or 4 or more, and three studies excluded those who had undergone a prior surgery in the lower abdomen. Five studies excluded all females, two excluded pregnant women, and two excluded those with coagulation disorders. As with the hernia-related exclusions, there was large variability in how studies selected patients for inclusion.

Treatment details appear in Table 39 of Appendix C. All reported baseline patient characteristics in the studies included for this Key Question appear in Table 40 of Appendix C.

Risk of Bias

Our risk-of-bias assessments for the 21 studies appear in Table 41 of Appendix C. The 20 RCTs were categorized as Moderate or low risk of bias for their reported outcomes, and the one registry study that was categorized as High risk of bias.

The reasons for this latter category assignment were mentioned above in Key Question 2a (nonrandom assignment, retrospectivity, lack of concealment of allocation, outcomes assessed with knowledge of treatment, and potential selection bias). Common reasons for assigning a Moderate category to the RCTs were the same as those discussed in Key Question 2a: possible differences in prior surgical expertise, lack of concealment of allocation, and lack of outcome assessor blinding.

Findings

All included data for this Key Question appear in Table 42 of Appendix C. To address this Key Question, multiple comparisons involving different surgical procedures were performed. Summarized below are findings for the comparisons for which two or more studies had reported data on at least one outcome of interest.

Lichtenstein Versus Mesh Plug (Seven Studies)

Hernia Recurrence

We performed a meta-analysis of three studies reporting this outcome (Figure 15), and identified a summary RR of 1.07 (95% CI, 0.33 to 3.42). The length of followup in the three studies was one year, 1.7 years, and three years. We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the Lichtenstein group, which was 1.07 percent. Multiplying a 3.42 RR with this rate yielded a corresponding rate of 3.67 percent for low-weight PP mesh group. The difference between these rates is only 2.59 percent, which is less than our predefined MCSD of three percentage points. This suggests approximate equivalence in recurrence rates.

Length of Hospital Stay

None of the studies of this comparison reported this outcome.

Return to Daily Activities

Two studies reported this outcome, and were included in a meta-analysis of number of days before returning to normal daily activities (Figure 16). The meta-analysis was inconclusive (summary difference in means: -4.38 days; 95% CI, -13.17 to 4.41).

Return to Work

Two studies reported return-to-work data, and were combined in a meta-analysis. The meta-analysis (Figure 17) indicated shorter time to return to work after Lichtenstein repair (summary difference in means: -4.0; 95% CI, -6.97 to -1.02). This is larger than what we defined as the MCSD for this outcome (1 day).

Short-Term Pain

Four studies reporting short-term pain on VAS (<1 month after surgery) were included in a meta-analysis (Figure 18). The meta-analysis was inconclusive (summary difference in means: -1.48; 95% CI, -3.36 to 0.39 points on a 0–10 scale).

Intermediate-Term Pain

None of the studies of this comparison reported this outcome.

Adverse Events

We conducted meta-analyses of four types of adverse events (seroma reported by three studies, hematoma reported by five studies, wound infection reported by five studies, and urinary retention reported by two studies) (Figure 19, Figure 20, Figure 21, and Figure 22, respectively). A clear direction of effect was found for one event: seroma (lower rates with Lichtenstein repair, OR=0.39; 95% CI, 0.16 to 0.94). For the other three events, the evidence was inconclusive.

Lichtenstein Versus Prolene Hernia System (Five Studies)

Hernia Recurrence

We performed a meta-analysis of four studies reporting this outcome (Figure 23), and found a summary RR=2.53; 95% CI, 0.56 to 11.45). We had defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the Lichtenstein repair groups, which was 1.3 percent. Applying an RR of 2.53 to this rate yields a Lichtenstein recurrence rate of 3.3; applying it to the lower bound of RR 0.56 yields a lower percentage of 0.7 percent; applying it to the upper bound of RR=11.45 yields an upper bound of 14.9 percent. Thus the difference in percentages could be as high as 14.2 percent (14.9 percent to 0.7 percent), which is higher than our MCSD of three percentage points. Thus, the evidence is too imprecise to permit a conclusion.

Length of Hospital Stay

One study found equivalence for this outcome (difference in means -0.03 days; 95% CI, -0.29 to 0.23).

Return to Daily Activities

None of the studies of this comparison reported this outcome.

Return to Work

Two studies reported RTW data, and were combined in a meta-analysis (Figure 24). The meta-analysis was inconclusive (summary difference in means -4.57 days; 95% CI, -15.74 to 6.6).

Short-Term Pain

Two studies reporting short-term pain using VAS (≤1 month after surgery) were included in a meta-analysis (Figure 25). We found equivalence comparing Lichtenstein to PHS (summary difference in means: -0.03; 95% CI, -0.37 to 0.31, points on a 0–10 scale).

Intermediate-Term Pain

Two studies reporting short-term pain using VAS (>1 month but ≤6 months after surgery) were included in a meta-analysis (Figure 26). The meta-analysis was inconclusive (summary difference in means: -1.03; 95% CI, -2.4 to 0.33, points on a 0–10 scale).

Adverse Events

We conducted meta-analyses of two types of adverse events (hematoma reported by two studies and wound infection reported by three studies) (Figure 27 and Figure 28, respectively). The evidence was inconclusive for both events.

Lichtenstein Versus Open Preperitoneal Mesh (Three Studies)

Hernia Recurrence

None of the studies of this comparison reported this outcome.

Length of Hospital Stay

One study reported an outcome in this category, and the evidence was inconclusive (difference in means -0.4; 95% CI, -1.03 to 0.23).

Return to Daily Activities

One study reported an outcome in RTDA, and the evidence was inconclusive (difference in means -0.16; 95% CI, -1.87 to 1.55).

Return to Work

One study reported an outcome in RTW, and the evidence was inconclusive (difference in means -0.88; 95% CI, -2.66 to 0.9).

Short-Term Pain

One study reporting short-term pain using VAS (≤1 month after surgery) was evaluated and found equivalence comparing Lichtenstein to OPM (difference in means -0.27; 95% CI, -1.35 to 0.81, points on a 0–10 scale).

Intermediate-Term Pain

None of the studies of this comparison reported this outcome.

Adverse Events

One study reported hematoma (no events in the Lichtenstein vs. one event in the OPM group) and another reported wound infection (one event the Lichtenstein vs. one event in the OPM group). The evidence was inconclusive for both events.

Mesh Plug Versus Prolene Hernia System (Two Studies)

Hernia Recurrence

One study reported recurrence (one recurrence in mesh plug vs. none in the PHS group), and the evidence was inconclusive.

Length of Hospital Stay

None of the studies of this comparison reported this outcome.

Return to Daily Activities

None of the studies of this comparison reported this outcome.

Return to Work

None of the studies of this comparison reported this outcome.

Short-Term Pain

Two studies reporting short-term pain using VAS (≤1 month after surgery) were evaluated using meta-analysis (Figure 29) and found equivalence comparing mesh plug to PHS (difference in means -0.07; 95% CI, -0.41 to 0.27, points on a 0–10 scale).

Intermediate-Term Pain

None of the studies of this comparison reported this outcome.

Adverse Events

One study reported hematoma and wound infection. The evidence was inconclusive for both events.

Lichtenstein Versus Kugel (Two Studies)

Hernia Recurrence

One study reported data on recurrence (one recurrence in Lichtenstein group vs. none in the Kugel group), and the evidence was inconclusive.

Length of Hospital Stay

None of the studies of this comparison reported this outcome.

Return to Daily Activities

None of the studies of this comparison reported this outcome.

Return to Work

None of the studies of this comparison reported this outcome.

Short-Term Pain

One study reporting short-term pain using VAS (≤1 month after surgery) was evaluated and found equivalence comparing Lichtenstein to Kugel (difference in means: -0.3; 95% CI, -0.91 to 0.31, points on a 0–10 scale).

Intermediate-Term Pain

One study reporting intermediate-term pain using VAS (>1 month but ≤6 months after surgery) was evaluated and found equivalence comparing Lichtenstein to Kugel (difference in means: -0.6; 95% CI, -1.21 to 0.01, points on a 0–10 scale).

Adverse Events

One study reported hematoma, seroma, and wound infection. The evidence was inconclusive for all three events.

Applicability

Twenty-one studies are included for review for Key Question 3. We evaluated these studies to identify factors that might affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to raise stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

The studies reviewed for Key Question 3 compared various open mesh-based procedures for hernia repair, including Lichtenstein, mesh plug (using the Perfix or Proloop device), Trabucco (using the Hertra device), "preperitoneal mesh," "plug," PHS, Kugel, Nyhus, "open properitoneal mesh," Stoppa, and Read-Rives methods. Lichtenstein and mesh plug are the most commonly compared procedures in these studies. Table 39 in Appendix C provides a detailed description of the procedures being compared in the studies. For Key Question 3, we summarized the findings separately by each comparison of surgical procedures, because the evidence for one set of comparisons does not apply to a different set of comparisons.

Fourteen of the 21 studies reviewed for Key Question 3 reported the date range of the surgeries being performed. In these studies, the majority of the surgeries were performed in 1990s and early 2000s. The other seven studies reviewed for Key Question 3 did not report a date range for surgeries. This body of evidence for Key Question 3 may not necessarily reflect the comparative performance of the procedures that are performed currently.

Most of the studies included for review for Key Question 3 did not report the surgeons' prior experience for the procedures being compared. Only two studies reported these data. One study primarily depended on "surgeons in training," and the other one used "highly experienced" surgeons.[56,67] No study reported the number of prior cases or years of practice of the surgeons. Given the limitation in the data reported, we were unable to judge what implication surgeons' experience may have in the applicability of the evidence. Table 39 in Appendix C provides additional detail on the surgical procedures compared in the studies, including data on surgeons' experiences.

Patient enrollment criteria and reported baseline characteristics varied significantly across the 21 studies. While most studies included all adult patients, several studies only included patients older than 30 or 40 years of age.[19,56,114] Many studies excluded patients with recurrent, bilateral, incarcerated, strangulated, or femoral hernias. Five studies excluded all female patients.[19,20,56,115,116] Based on the data reported, we did not identify any clear patterns in the patient characteristics of the studies that indicate significant impact on the applicability of the evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Appendix C in Table 36 and Table 40.

Except for two studies,[18,116] all other studies were performed outside of the United States—13 studies from European countries, 5 from Turkey, and 1 from Egypt. The differences in health care systems and practice patterns between the United States and other regions might affect applicability of the evidence from the perspectives of U.S. stakeholders. Except for three studies[56,117-125] all other 18 studies were performed in university hospitals. The evidence for Key Question 3 is potentially more applicable to academic clinical settings. Detailed information on geographic and clinical settings of the 21 studies is provided in Table 35 in Appendix C.

Summary of Key Question 3

A summary of the comparisons and outcomes we examined in this Key Question is provided in Table 7 below. Of the 31 outcomes, the evidence was sufficient to permit a conclusion for eight outcomes:

- Two outcomes favored Lichtenstein compared with mesh plug (RTW and seroma)
- One outcome indicated approximate equivalence of the Lichtenstein procedure to mesh plug (RC)
- One outcome indicated approximate equivalence of Lichtenstein to PHS (short-term pain)
- One outcome indicated approximate equivalence of Lichtenstein to OPM (short-term pain)
- One outcome indicated approximate equivalence of mesh plug to PHS (short-term pain)
- Two outcomes indicated approximate equivalence comparing Lichtenstein to Kugel (short-term pain, intermediate-term pain).

Our ratings of the SOE for these outcomes also appear in Table 7. Most studies were at moderate risk of bias (see the pertinent section above); some inconsistencies were found for some outcomes based on effect sizes on opposite sides of a null effect; all of these outcomes are directly important to clinicians and patients; some imprecision was found for some outcomes that precluded conclusions. Four outcomes (return to daily activity, return to work, urinary retention, hematoma) for the Lichtenstein versus mesh plug comparison were judged to potentially be associated with publication bias, specifically in the form of selective outcome reporting (for example, only two of seven studies reported these outcomes, and the authors' choice to report that data may have been influenced by the nature of the findings). Likewise, length of stay for the Lichtenstein versus PHS comparison was judged to potentially be associated with publication bias, also in the form of selective outcome reporting (only one of five studies reported this outcome).

Table 7. Key Question 3: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lichtenstein vs. mesh plug	Recurrence	3	MOD	C	D	P RR 1.07 (CI 0.33 to 3.42)	EQ	MOD
Lichtenstein vs. mesh plug	Return to daily activities (days)	2	MOD	I	D	I Diff in means -4.38 (CI -13.17 to 4.41)	?	INSUFF*
Lichtenstein vs. mesh plug	Return to work (days)	2	MOD	C	D	P Diff in means -4 (CI -6.97 to -1.02)	Lichtenstein	MOD*†
Lichtenstein vs. mesh plug	Short-term pain (measured in VAS)	4	MOD	I	D	I Diff in means -1.48 (CI -3.36 to 0.39)	?	INSUFF
Lichtenstein vs. mesh plug	Seroma	3	MOD	C	D	P OR 0.39 (CI 0.16 to 0.94)	Lichtenstein	MOD
Lichtenstein vs. mesh plug	Hematoma	5	MOD	C	D	I OR 0.8 (CI 0.47 to 1.37)	?	INSUFF
Lichtenstein vs. mesh plug	Wound infection	5	MOD	C	D	I OR 1.55 (CI 0.79 to 3.05)	?	INSUFF
Lichtenstein vs. mesh plug	Urinary retention	2	MOD	C	D	I OR 2.17 (CI 0.36 to 13.1)	?	INSUFF
Lichtenstein vs. PHS	Recurrence	4	MOD	C	D	I RR 2.53 (CI 0.56 to 11.45)	?	INSUFF
Lichtenstein vs. PHS	Length of stay (days)	1	MOD	U	D	P Diff in means -0.03 (CI -0.29 to 0.23)	?	INSUFF†
Lichtenstein vs. PHS	Return to work (days)	2	MOD	I	D	I Diff in means-4.57 (CI -15.74 to 6.6)	?	INSUFF
Lichtenstein vs. PHS	Short-term pain (measured in VAS)	2	MOD	C	D	P Diff in means -0.03 (CI -0.37 to 0.31)	EQ	MOD

Table 7. Key Question 3: Strength of evidence ratings (continued)

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lichtenstein vs. PHS	Intermediate-term pain (measured in VAS)	2	MOD	I	D	I Diff means -1.03 (CI -2.4 to 0.33)	?	INSUFF
Lichtenstein vs. PHS	Hematoma	2	MOD	C	D	I OR 0.49 (CI 0.21 to 1.14)	?	INSUFF
Lichtenstein vs. PHS	Wound infection	3	MOD	C	D	I OR 0.99 (CI 0.48 to 2.06)	?	INSUFF
Lichtenstein vs. OPM	Length of stay (days)	1	MOD	U	D	I Diff in means -0.4 (CI -1.03 to 0.23)	?	INSUFF
Lichtenstein vs. OPM	Return to daily activities (days)	1	MOD	U	D	I Diff in means -0.16 (CI -1.87 to 1.55)	?	INSUFF
Lichtenstein vs. OPM	Return to work (days)	1	MOD	U	D	I Diff in means -0.88 (CI -2.66 to 0.9)	?	INSUFF
Lichtenstein vs. OPM	Short-term pain (measured in VAS)	1	MOD	U	D	P Diff in means -0.27 (CI -1.35 to 0.81)	EQ	LOW
Lichtenstein vs. OPM	Hematoma	1	MOD	U	D	I OR 0.32 (CI 0.01 to 8.23)	?	INSUFF
Lichtenstein vs. OPM	Wound infection	1	MOD	U	D	I OR 1 (CI 0.06 to 16.93)	?	INSUFF
Mesh plug vs. PHS	Recurrence	1	MOD	U	D	I RR 2.87 (CI 0.12 to 69.76)	?	INSUFF
Mesh plug vs. PHS	Short-term pain (measured in VAS)	2	MOD	C	D	P Diff in means -0.07 (CI -0.41 to 0.27)	EQ	MOD
Mesh plug vs. PHS	Hematoma	1	MOD	U	D	I OR 0.83 (CI 0.39 to 1.75)	?	INSUFF
Mesh plug vs. PHS	Wound infection	1	MOD	U	D	I OR 6.36 (CI 0.76 to 53.48)	?	INSUFF

Table 7. Key Question 3: Strength of evidence ratings (continued)

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Lichtenstein vs. Kugel	Recurrence	1	MOD	U	D	I RR 3 (CI 0.12 to 72.41)	?	INSUFF
Lichtenstein vs. Kugel	Short-term pain (measured in VAS)	1	MOD	U	D	P Diff in means -0.3 (CI -0.91 to 0.31)	EQ	LOW
Lichtenstein vs. Kugel	Intermediate-term pain (measured in VAS)	1	MOD	U	D	P Diff in means -0.6 (CI -1.21 to 0.01)	EQ	LOW
Lichtenstein vs. Kugel	Hematoma	1	MOD	U	D	I OR 0.33 (CI 0.01 to 8.21)	?	INSUFF
Lichtenstein vs. Kugel	Seroma	1	MOD	U	D	I OR 0.33 (CI 0.01 to 8.21)	?	INSUFF
Lichtenstein vs. Kugel	Wound infection	1	MOD	U	D	I OR 0.33 (CI 0.01 to 8.21)	?	INSUFF

Diff = difference, OR = odds ratio, RR = relative risk, VAS = visual analog scale.
Note:
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct, I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.
For the column labeled SOE rating, SOE = strength of evidence, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect. and
† indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

Six non-English studies might have met the inclusion criteria for this Key Question if we had not required that studies be published in English.[126-131] Four of these were clearly RCTs, one non-RCT, and one may have been randomized (the abstract was unclear on this point).We summarize the results as follows:

- One study[126] (possibly randomized, comparing Lichtenstein with PHS) stated that authors assessed length of stay, RTDA, and pain. However, the findings were not reported in the abstract.
- One non-RCT[127] (comparing PHS with Lichtenstein) found no complications and reported patient SFN after Lichtenstein and PHS.
- One RCT[128] (comparing Trabucco vs. plug-and-patch vs. Lichtenstein) reported a higher incidence of postoperative hematoma in the Lichtenstein group. None of our included studies directly compared any of these procedures with each other.
- One RCT[129] (comparing PHS with mesh plug) reported that more patients in the mesh plug group complained of numbness than those in the PHS group. However, numbness was not reported by the two included studies in our review that compared PHS to mesh plug.
- One RCT[132] (comparing peritoneal mesh graft with Lichtenstein in patients with recurrent hernia) found one re-recurrence in the mesh group and three re-recurrences in the Lichtenstein group at long-term followup (1–4 years).
- One RCT[131] (comparing Lichtenstein with mesh plug) reported there were no recurrences in both groups.

Key Question 4. Do different laparoscopic mesh-based repair procedures (e.g., transabdominal preperitoneal repair, totally extraperitoneal repair) differ in patient-oriented effectiveness outcomes and/or adverse events?

Study Characteristics

General information about the 11 studies included for this Key Question appears in Table 43 of Appendix C. Two studies each were conducted in Austria, China, and Turkey; and the rest were each conducted in Egypt, Greece, India, Italy, and the United States. Eight studies were single-center RCTs; one was multicenter RCT; and the remaining two were RCTs that did not report number of centers.

Regarding specific surgical procedures, the most commonly compared procedures were TAPP versus TEP (nine studies). The other two studies compared different variants types of surgical approaches for TEP or TEP versus IPOM. The RCTs enrolled between 44 and 144 patients each. The dates of patient enrollment were reported by five of the eight studies. The average length of the enrollment period was 3.9 years (range 1.5–5.8 years).

Six studies were conducted at university hospitals; one at a surgical laparoscopic institute; one at a nonuniversity hospital; one at a surgery clinic; and the remaining two did not report the type(s) of hospitals. Funding for the study was not reported by eight studies; government funding was reported in one study; university funding was reported in one study; and one did not report the funding source but did state that it had no manufacturer ties.

Patient enrollment criteria appear in Table 44 (hernia-related criteria), Table 45 (demographic and medical criteria), and Table 46 (other criteria) of Appendix C. Enrollment criteria varied widely among the 11 studies. The most commonly used hernia-related exclusions were recurrent hernia (eight studies), bilateral hernia (8 studies), and incarcerated hernia (six

studies). Others were femoral hernia (excluded by one study) and giant hernia (one study). Overall, the studies paint an extraordinarily diverse portrait of the types of hernias deemed relevant to the studies, even though, by virtue of inclusion, they all compared TAPP repair of inguinal hernia to either TEP or IPOM repair of inguinal hernia.

Regarding patient age criteria, 8 of the 11 studies stated that they included any adults or required patients aged older than 18 years. Six excluded patients that were unfit for general anesthesia or those with anesthesia risk scores of 3 or 4 or more, and two studies excluded those who had undergone a prior surgery in the lower abdomen. Two studies excluded all females, one excluded patients with ascites, and two excluded those with coagulation disorders. As with the hernia-related exclusions, there was large variability in how studies selected patients for inclusion.

Treatment details appear in Table 47 of Appendix C. None of the studies reported the actual number of prior hernia repairs the surgeons had performed. Instead, all 11 studies simply said surgeon had general skills that were not specific to hernia repair. Two of the 11 studies stated that all operations were performed by one consultant surgeon.

All reported baseline patient characteristics in the studies included for this Key Question appear in Table 48 of Appendix C.

Risk of Bias

Our risk-of-bias assessments for the 11 studies appear in Table 49 of Appendix C. Eight RCTs were categorized as Moderate risk of bias for all of their reported outcomes. Three RCTs were categorized as Low risk of bias for all of their reported outcomes. Common reasons for assigning a Moderate category to the studies were the same as those discussed in Key Question 2a: possible differences in prior surgical expertise, lack of concealment of allocation, and lack of outcome assessor blinding.

Findings

All extracted data for this Key Question appear in Table 50 of Appendix C. Described below are studies that compared TAPP with TEP.

Transabdominal Preperitoneal Repair Versus Totally Extraperitoneal Repair (Nine Studies)

Hernia Recurrence

We performed a meta-analysis of five studies reporting this outcome and found that the evidence was inconclusive (summary RR 0.86; 95% CI, 0.30 to 2.50) (Figure 30).

Length of Hospital Stay

Five studies reported this outcome and were included in a meta-analysis (Figure 31). The meta-analysis was inconclusive (summary difference in means -0.04 days; 95% CI, -0.12 to 0.04).

Return to Daily Activities

Two studies reported RTDA and were included in a meta-analysis (Figure 32). This meta-analysis of number of days before returning to normal daily activities was inconclusive (summary difference in means -5.88 days; 95% CI, -17.84 to 6.09).

Return to Work

Four studies reported return-to-work data and three were combined in a meta-analysis (Figure 33). A fourth study that reported outcome data as return to "unrestricted" work was not included in the meta-analysis. The meta-analysis indicated shorter time-to-return-to-work after TAPP repair (summary difference in means -1.44 days; 95% CI, -2.65 to -0.23). The 95% confidence of interval spans the value that we defined as the MCSD for the outcome (one day). Therefore, it is unclear whether the difference found is clinically significant.

Short-Term Pain (Measured in Visual Analog Scale)

Five studies reporting short-term pain (1 month or less after surgery) on the pain (measured in VAS) scale were included in a meta-analysis (Figure 34). This analysis found approximately equivalent rates of short-term pain (summary difference in means: -0.11; 95% CI, -0.25 to 0.03 points on a 0–10 scale).

Intermediate-Term Pain (Measured in Visual Analog Scale)

Only one study reported data on this outcome at 3 months, and the results suggested equivalence on the 0–10 VAS scale (1.28 $\pm$ 0.45 in the TAPP group vs. 1.09 $\pm$ 0.45 in the TEP).

Long-Term Pain (Measured in Visual Analog Scale)

Only one study reported data on this outcome at 38 months, and the results suggested equivalence on the 0–10 VAS scale (none in the TAPP group vs. none in the TEP group).

Adverse Events

We conducted meta-analyses of three types of events (hematoma [four studies], urinary retention [five studies], and wound infection [six studies]) (Figure 35, Figure 36, and Figure 37, respectively). The evidence was inconclusive for hematoma (OR=1.15; 95% CI, 0.33 to 4.00), urinary retention (OR=0.80; 95% CI, 0.31 to 2.03), and wound infection (OR=1.47; 95% CI, 0.33 to 6.55).

Applicability

Eleven studies are included for review for Key Question 4. We evaluated these studies to identify factors that could potentially affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to raise stakeholders' awareness of potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

Nine of the 11 studies compared two laparoscopic procedures for hernia repair—TAPP and TEP. One study compared TEP and IPOM,[133] while another study compare four different types of TEP.[134] Table 47 of Appendix C provides a detailed description of the procedures being compared in the studies. For Key Question 4, we summarized the evidence by different comparison of surgical procedures, because the evidence for one set of comparisons does not apply to a different set of comparisons.

Seven of the 11 studies included for review reported the date range of the surgeries performed.[67,92,93,133-137] In four of the seven studies, the surgeries were performed in 1990s to early 2000s.[67,92,93,133,135] In the other three studies, the surgeries were performed from 2004 to 2009.[134,136,137] The other four studies reviewed for Key Question 4 did not report a date range of surgeries being performed. The body of evidence for Key Question 4 may not necessarily reflect the comparative performance of the procedures that are performed at the current time.

Surgeons' prior experience with the procedures being compared varied across the studies (not all studies reported this data). Some studies reported that more senior surgeons had been used, while other studies reported using surgeons who might have needed supervision. No study reported the number of prior cases or years of practice of the surgeons. Given the data reported, we were unable to judge what implication surgeons' experience may have for the applicability of the evidence. Table 47 of Appendix C provides additional detail on the surgical procedures compared in the studies, including data on surgeons' prior experience with the procedures.

Most of the studies reviewed for Key Question 4 excluded patients with recurrent, bilateral, or incarcerated hernias. Most studies also excluded patients unfit for general anesthesia. The evidence might be less applicable to these patient populations being excluded from the studies. Other patient enrollment criteria used varied significantly across the studies. For example, some studies excluded patients with giant or strangulated hernia, while other studies excluded female patients or patients with an ASA score >3. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Table 44 and Table 48 of Appendix C.

Except for a smaller study (with 66 patients),[57] all other studies were performed outside of the United States—two each from Austria, China, and Turkey, and one study each from Egypt, Greece, India, and Italy. The differences in health care systems and practice patterns between the United States and other regions might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. The clinical settings in these studies range from general surgical clinics, to specialized surgical institute, to academic medical centers. Based on the data reported, it is unclear how the clinical settings of the studies might have affected the applicability of the evidence. Detailed information on geographic and clinical settings of the six studies is provided in Table 43 of Appendix C.

Summary of Key Question 4

A summary of the comparisons and outcomes we examined for Key Question 4 is in Table 8 below. Of the 10 outcomes, the evidence was sufficient to permit a conclusion for four outcomes:

- One outcome favored TAPP compared with TEP (RTW)
- One outcome indicated equivalence for TAPP versus TEP (short-term pain)
- One outcome indicated equivalence for TAPP versus TEP (intermediate-term pain)
- One outcome indicated equivalence for TAPP versus TEP (long-term pain)

Our ratings of the SOE for these outcomes also appear in Table 8. The majority of the studies were at Moderate risk of bias (see the pertinent section above); we found some inconsistencies for some outcomes based on effect sizes on opposite sides of a null effect; all of these outcomes are directly important to clinicians and patients; imprecision was found for some outcomes that precluded conclusions. One of the outcomes for the TAPP versus TEP comparison (RTDA) was judged to potentially be associated with publication bias, specifically in the form of selective outcome reporting. Only two of the nine studies reported RTDA, and the authors' choice to report that data may have been influenced by the nature of the findings.

Table 8. Key Question 4: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
TAPP vs. TEP	Recurrence	5	MOD	C	D	I RR 0.86 (CI 0.30 to 2.50)	?	INSUFF
TAPP vs. TEP	Length of stay (days)	5	MOD	I	D	I Diff in means -0.04 (CI -0.12 to 0.04)	?	INSUFF
TAPP vs. TEP	Return to daily activities (days)	2	MOD	I	D	I Diff in means -5.88 (CI -17.84 to 6.09)	?	INSUFF*
TAPP vs. TEP	Return to work (days)	3	MOD	C	D	P Diff in means -1.44 (CI -2.65 to -0.23)	TAPP	MOD
TAPP vs. TEP	Short-term pain (measured in VAS)	5	MOD	C	D	P Diff in means -0.11 (CI -0.25 to 0.03)	EQ	MOD
TAPP vs. TEP	Intermediate-term pain (measured in VAS	1	MOD	U	D	P (CI CI not reported, but p=0.001)	EQ	LOW
TAPP vs. TEP	Long-term pain (measured in VAS	1	MOD	U	D	P (CI CI and p not reported)	EQ	LOW
TAPP vs. TEP	Hematoma	4	MOD	C	D	I OR 1.15 (CI 0.33 to 4.00)	?	INSUFF
TAPP vs. TEP	Urinary retention	5	MOD	C	D	I OR 0.80 (CI 0.31 to 2.03)	?	INSUFF
TAPP vs. TEP	Wound infection	6	MOD	C	D	I OR 1.47 (CI 0.33 to 6.55)	?	INSUFF

Diff = difference, OR = odds ratio, RR = relative risk, VAS = visual analog scale
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct, I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.
For the column labeled SOE rating, SOE = strength of evidence, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect. and † indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

One non-English study might have met the inclusion criteria for this Key Question if we had not required that studies be published in English.[138] The study may have been randomized (the abstract was unclear on this point).The study compared TAPP versus TEP and found reduced length of stay after TEP.

Key Question 5. Do different mesh products differ in patient-oriented effectiveness outcomes and/or adverse events?

Surgical mesh products for hernia repair are typically made from PP or polyester. However, other materials such as polytetrafluoroethylene (PTFE), polyglactin, polyglycolic acid, and polyamide are also used.[139] One reason a surgeon may debate the use of one mesh versus another is the mechanical support the mesh is reported to provide the deficient abdominal wall.[139] Mohamed and colleagues[139] listed seven important properties of the ideal mesh:

1. Strong enough to withstand physiologic stresses over a long period of time
2. Conform to the abdominal wall
3. Promote strong host tissue ingrowth, which mimics normal tissue healing
4. Resist the formation of bowel adhesions and erosions into visceral structures
5. Not induce allergic reaction or adverse foreign body reactions
6. Resist infection
7. Be noncarcinogenic.

PP mesh has been the standard material against which other materials are compared.[140] According to Robinson and colleagues,[140] an advantage of PP is that infections can be treated without mandatory removal of the mesh, while other materials such as PTFE may require removal. Biologic mesh materials such as porcine are decellularized living tissues composed of collagen matrix.[140] Two theoretical concerns for the use of biologic materials for hernia repair include potential transmission of diseases and the reduction in tensile strength of the mesh.[140]

Study Characteristics

General information for the 32 studies addressing Key Question 5 can be found in Table 51 of Appendix C. Nine were conducted in Germany; five in Sweden and/or Finland; four in India; three in Italy; two each in Poland and the United States; and one each in Belgium, Bosnia, Burkina Faso, Estonia, France, Hong Kong, and Pakistan. Twenty-one studies were single-center RCTs; six RCTs reported multiple centers; and four RCTs did not report the type of center. One RCT was conducted in 15 centers in Poland.[141]

The identified studies assessed various mesh comparisons. Table 9 below lists the comparison types and the number of studies addressing each comparison. The RCTs enrolled between 25 and 600 patients. Twenty-four studies reported patient enrollment dates indicating that studies were conducted between 1996 and 2011.

Table 9. Key Question 5: Mesh comparisons

Comparison	Number of Studies
PP vs. Low-weight PP	6[142-147]
PP vs. combination materials	17[141-143,146,148-160]
PP vs. coated PP	6[142,143,150,161-163]
PP vs. 3D PHS System	2[164,165]
PP vs. porcine	2[158,166,167]
PP vs. PP[1]	1[160]
PP vs. polyethylene[1]	1[168]
PP vs. polyester[1]	1[169]
Low weight PP vs. coated PP[1]	1[142,143]
Combination materials vs. porcine[1]	1[158]
Low weight PP vs. combination materials[1]	3[142,143,146]
PP vs. PTFE[1]	1[147]
Low weight PP vs. PTFE[1]	1[147]
PP vs. PVDF[1]	1[170]
Combination materials vs. coated PP[1]	3[142,143,150]
Coated PP light vs. coated PP extra-light[1]	1[171]
Nylon vs. combination materials[1]	1[172]
ePTFE patch vs. ePTFE plus antimicrobial preservative agents patch[1]	1[173]

[1]No meta-analysis performed for this comparison.
ePTFE = Expanded PTFE; PP = polypropylene; PTFE = polytetrafluoroethylene; PVDF = polyvinylidene fluoride.

Twenty-two studies were conducted at general and nonuniversity hospitals; six were conducted at university hospitals; two included some university hospitals as well as some nonuniversity hospitals; and the remaining two studies did not report the type(s) of hospitals. Eleven of the 32 studies for Key Question 5 reported their source of funding, six of which were supported by funding from Ethicon Endo-Surgery.

Patient enrollment criteria appear in Table 52 (hernia-related criteria), Table 53 (demographic and medical criteria), and Table 54 (other criteria) of Appendix C. Enrollment criteria varied among the 32 studies. The most commonly used hernia-related exclusions were recurrent hernia (15 studies), incarcerated hernia (12 studies), strangulated hernia (10 studies), and bilateral hernia (9 studies). Patients were also excluded if they had an emergency repair (seven studies) or a femoral hernia (six studies), scrotal hernia (four studies), asymptomatic hernia (two studies), and obstructed hernia (two studies).

Thirty studies enrolled patients of a minimum age of 18 years. One study set the minimum age for enrollment at 15 years and a second study set the minimum age at 16 years. Ten studies excluded female patients; two studies each excluded patients with prior general anesthesia, an ASA score >4, pregnant women, and those with infection. Four studies each excluded patients with prior lower abdominal surgery and prior mesh surgery. Lastly, one study each excluded patients with prior treatment, coagulation disorders, advanced carcinoma, and an ASA score >2.

Treatment details appear in Table 55 of Appendix C. Mesh sizes ranged from 4.5 by 10 cm to 15 by 15 cm. The mesh size most frequently reported was 10 by 15 cm. The following table (Table 10) lists various mesh materials, some of which were reported in our literature results for Key Question 5.[140] Nine studies reported that surgeons had experience in hernia repair. Of these, two mentioned the number of hernia repairs the surgeons had previously performed and one mentioned the number of years of surgeon experience in hernia repair. The surgical procedures performed included 17 studies performing Lichtenstein, 6 performing TEP, 5 performing TAPP, and 4 studies did not specify the surgical procedure.

Table 10. Key Question 5: Types of mesh materials

Material	Trade Name
Polypropylene (PP)	VISILEX™, PerFix™, KUGEL™ Hernia Patch, 3DMAX™ (Davol, Inc.) PROLENE™ (Ethicon Endo-Surgery) SURGIPRO™ (Covidien) Prolite™, Prolite Ultra (Atrium Medical Corp.)
Polyester or Polyethylene-terephthalate	MERSILENE™ (Ethicon Endo-Surgery) Parietex™ (Covidien)
Polytetrafluorethylene (PTFE)	GORE-TEX®, Gore® DUALMESH®, Gore® DUALMESH® Plus, Gore® MYCROMESH® (W.L. Gore & Associates, Inc.) DULEX™, Reconix® (Davol.)
PP/PTFE	Composix®, Composix ® EX, Ventralex® (Davol, Inc.)
PP/Cellulose	PROCEED™ (Ethicon Endo-Surgery)
PP/Seprafilm	SEPRAMESH™, SEPRAMESH™ IP (Davol, Inc.)
PP/Vicryl	VYPRO™, VYPRO™ II (Ethicon Endo-Surgery)
PP/Monocryl (poliglecaprone)	ULTRAPRO™ (Ethicon Endo-Surgery)
Polyester/Collagen Film	Parietex™ Composite (Covidien)
Porcine	Surgisis® (Cook Biotech, Inc.)
Human	AlloDerm® Regenerative Tissue Matrix (LifeCell Corp.)

Reported baseline patient characteristics in the studies included for this Key Question appear in Table 56 of Appendix C. A summary of the most commonly reported baseline characteristics in studies included for Key Questions 2 through 7 appears in section Key Question 2a of this report along with Table 3 (please refer to Key Question 2a for further detail).

Risk of Bias

The risk-of-bias assessments for the 32 studies appear in Table 57 of Appendix C. Twenty-nine studies were categorized as Moderate risk of bias for all of their reported outcomes. One study was categorized as Low risk of bias for all outcomes,[160] and the category for two studies was mixed (Moderate and Low). One study with a mixed category had a Low risk of bias for most outcomes, and Moderate risk of bias for adverse events.[174] The second study was categorized as Moderate risk of bias for most outcomes, and Low risk of bias for adverse events and hospital stay.[175]

Many reasons underlie the Moderate rating for the 33 RCTs. Two of the most common reasons involved concealment of allocation (either not performed or not reported by 19 studies) and the blinding of outcome assessors (either not performed or not reported by 26 studies).

Findings

The included data for Key Question 5 appears in Table 58 of Appendix C. We have organized this section by type of comparison and outcomes assessed through meta-analysis. We considered seven comparisons to be major:

- Standard PP versus low-weight PP
- PP versus combination materials
- PP versus coated PP
- PP versus 3D PROLENE™ Hernia System (PHS)
- PP versus porcine
- Combination materials versus porcine
- Low-weight PP versus combination materials

Polypropylene Versus Low-Weight Polypropylene

Hernia Recurrence

We performed a meta-analysis of three studies comparing PP mesh to low-weight PP mesh, (Figure 38), and identified a summary RR of 1.94 (95% CI, 0.35 to 10.78). We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the PP mesh group, which was 1.03 percent. Multiplying a 10.78 RR with this rate yielded a corresponding rate of 11.1 percent for low-weight PP mesh group. The difference between these rates is more than 10 percentage points, which is greater than our predefined MCSD. Thus, the evidence is too imprecise to permit a conclusion.

Quality of Life

Studies did not report this outcome.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

Three studies reporting long-term pain (>6 months after surgery) as overall VAS scores were included in a meta-analysis (Figure 39) and we found a summary difference in means of 0.15 (95% CI, -0.28 to 0.59 points on a 0–10 scale). The results indicate approximate equivalence between the PP mesh and low-weight PP for the outcome of long-term pain.

Adverse Events

We conducted meta-analyses of two types of events: feeling of foreign body (two studies), (Figure 40) and infection (three studies) (Figure 41). We identified a summary OR of 1.23 (95% CI, 0.48 to 3.17) for the outcome of feeling a foreign body and an OR of 1.59 (95% CI, 0.19 to 13.11) for the outcome of infection. These CIs extend beyond our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Polypropylene Versus Combination Materials (e.g., Polypropylene, Polyglactin)

Hernia Recurrence

We performed a meta-analysis of nine studies comparing PP mesh to combination material mesh (Figure 42), and identified a summary RR of 1.12 (95% CI, 0.59 to 2.10). The median length of follow-up was 1.1 years (range 1 year to 5 years). All nine studies followed the typical patient for at least one year. We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the PP mesh group, which was 2.1 percent. Multiplying a 2.10 RR with this rate yielded a corresponding rate of 4.4 percent for the combination material mesh group. The difference between these rates is only 2.31 percent, which is less than our predefined MCSD of three percentage points. This implies approximate equivalence between PP mesh and combination material mesh for this outcome.

Quality of Life

Four studies comparing PP mesh with combination material mesh reported QOL data for various domains of the Short-form 36 (SF-36). Since these studies did not provide an overall QOL score, we were unable to combine the data for meta-analysis. We did provide some discussion of the studies' reported results.

One study assessing development of life quality reported that any differences identified between PP mesh and combination material mesh diminished beyond the 12th postinterventional week.[160] A second study, reporting scores for various domains found there was "no detectable difference in any dimension of QOL on the SF-36 between the two treatment groups either before or six months after hernia repair."[157] Another study making the comparison of PP mesh with combination material mesh reported that "the SF-36 results showed few significant differences between groups."[141] The fourth study reported results of QOL assessment at 8 weeks and 1 year. At both time points, the authors found "no clinically relevant difference" between the treatment groups for various domains of the SF-36.[152,153]

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

Three studies reporting long-term pain (>6 months after surgery) as an overall VAS score were included in a meta-analysis (Figure 43). We identified a summary difference in means of 0.09 (95% CI, -0.21 to 0.40). The results indicate approximate equivalence between these treatment groups for the outcome of long-term pain.

Adverse Events

We conducted meta-analyses of two types of events: feeling of foreign body (four studies), (Figure 44) and infection (five studies) (Figure 45). The summary OR for feeling of foreign body was 0.91 (95% CI, 0.35 to 2.40) and for infection was 1.29 (95% CI, 0.63 to 2.64). Neither of these outcomes permits a conclusion, due to low precision. The wide CIs for both outcomes include our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Polypropylene Versus Coated Polypropylene (e.g., Beta-D-Glucan)

Hernia Recurrence

We performed a meta-analysis of three studies comparing PP mesh to coated PP mesh (Figure 46) and identified a summary RR of 1.2 (95% CI, 0.42 to 3.39). We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the PP mesh group, which was 2.3 percent. Multiplying a 3.39 RR yielded a corresponding rate of 7.79 percent for the coated PP mesh group. The difference (7.79 percent versus 2.3 percent) is greater than our predefined MCSD of three percentage points. Thus the evidence is too imprecise to permit a conclusion.

Quality of Life

One study comparing PP mesh with coated PP mesh reported QOL.[163] At post-operative days 7 and 30, the authors reported scores on the Short-Form 12 (SF-12). We calculated a difference in means of 0.40 (95% CI, -5.32 to 6.12); the wide CI indicates that the finding is inconclusive.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

Two studies reporting long-term pain (>6 months after surgery) were included in a meta-analysis (Figure 47). This analysis found a summary OR of 2.84 (95% CI, 0.35 to 23.05). Although the summary OR appears to say patients with the coated PP mesh may experience more long-term pain, the wide CIs for both outcomes include our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Adverse Events

One study comparing PP mesh with coated PP mesh reported infection rates.[162] The authors reported a total of four infections identified in the PP mesh group and two in the coated-PP mesh group.[162] We calculated an OR of 1.63 (95% CI, 0.29 to 9.05) for this outcome, and the wide CI means that the evidence is inconclusive.

Polypropylene Versus 3D Prolene Hernia System (Two Studies)

Hernia Recurrence

We performed a meta-analysis of two studies comparing PP mesh to 3D PHS System (Figure 48), and identified a summary RR of 1.05 (95% CI, 0.07 to 16.47). The studies included for this comparison reported zero events of RC. The evidence is too imprecise to permit a conclusion.

Quality of Life

Studies did not report this outcome.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

Studies did not report this outcome.

Adverse Events

We conducted meta-analyses of two studies reporting infection (Figure 49). The analysis found a summary OR of 0.51 (95% CI, 0.09 to 2.88), which expands beyond our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Polypropylene Versus Porcine (Two Studies)

Hernia Recurrence

We performed a meta-analysis of two studies comparing PP mesh with porcine mesh (Figure 50) and identified a summary RR of 1.93 (95% CI, 0.17 to 22.29). We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the PP mesh group, which was 2 percent. Multiplying a 22.294 RR with this rate yielded a corresponding rate of 44.58 percent for the porcine mesh

group. The difference between these rates is more than 40 percentage points, which is greater than our predefined MCSD of three percentage points. Thus, the evidence is too imprecise to permit a conclusion.

Quality of Life

Studies did not report this outcome.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

One study comparing PP mesh with porcine mesh reported a VAS score for pain at rest and pain on movement at 3 years.[166,167] For the outcome of pain at rest, we calculated a difference in means of 0.00 (95% CI, -0.94 to 0.94) and a difference in means of 0.39 (95% CI, -0.55 to 1.33) for the outcome of pain on movement. The results indicate approximate equivalence between the treatment groups for the outcome of long-term pain.

Adverse Events

Studies did not report this outcome.

Combination Materials Versus Porcine

Hernia Recurrence

One study comparing combination material mesh with porcine mesh reporting RC found zero events in each treatment group. We calculated an RR of 1.00 (95% CI, 0.02 to 47.38); the wide CI indicates that the finding is inconclusive.

Quality of Life

The study did not report this outcome.

Patient Satisfaction

The study did not report this outcome.

Long-Term Pain (>6 Months)

The study did not report this outcome.

Adverse Events

One study comparing combination material mesh with porcine reported the feeling of stiffness and a foreign body in the groin.[158] We calculated an OR of 5.69 (95% CI, 0.94 to 34.46); the wide CI indicates that the finding is inconclusive.

Low-Weight Polypropylene Versus Combination Materials

Hernia Recurrence

One study comparing low-weight PP mesh with combination material mesh reported RC.[146] We calculated an RR of 0.51 (95% CI, 0.05 to 5.54); the wide CI indicates that the finding is inconclusive.

Quality of Life

One study comparing low-weight PP mesh with combination material mesh reported the impairment of physical activity at 1 year.[142,143] We calculated an OR of 0.49 (95% CI, 0.04 to 5.54); the wide CI indicates that the finding is inconclusive.

Patient Satisfaction

The study did not report this outcome.

Long-Term Pain (>6 Months)

One study comparing low-weight PP mesh with combination material mesh reported overall VAS scores for the outcome of long-term pain.[146] We calculated a difference in means of 0.00 (95% CI, -0.65 to 0.65). This implies approximate equivalence between low-weight PP mesh and combination material mesh.

A second study reported the number of patients experiencing pain in the inguinal region at 1 year.[142,143] We calculated an OR of 1.0 (95% CI, 0.25 to 4.07); the wide CI indicates that the finding is inconclusive.

Adverse Events

One study comparing low-weight PP mesh with combination material mesh reported infection and the feeling of a foreign body.[146] We calculated an OR of 1.73 (95% CI, 0.54 to 5.55) for the outcome of feeling a foreign body. For the outcome of infection, the calculated OR is 0.35 (95% CI, 0.01 to 8.64). Both findings are inconclusive.

Applicability

Thirty-two studies are included for review for Key Question 5. We evaluated these studies to identify factors that might affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to draw stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

The 32 studies compared different mesh products used in hernia repair. See Table 55 of Appendix C for a detailed description of the mesh products compared in the studies. For Key Question 5, we summarized the evidence for each comparison of mesh products.

In 22 of the 32 studies reviewed for Key Question 5, the surgeries were performed 5 or more years ago (before 2006). The evidence may not necessarily reflect the comparative performance of the state-of-the-art mesh products that are currently used in clinical practice.

The majority of the 32 studies reviewed did not report data on surgeons' prior experiences with the hernia repair procedures or the mesh products being used. For the studies that did report such data, the meaning of "experience" was not explicitly defined (e.g., by the number of prior cases or years of practice). Given the data reported, we were unable to judge what implication surgeons' experience may have in the applicability of the evidence. Table 55 of Appendix C

provides additional detail on the surgical procedures compared in the studies, including data on surgeons' prior experience.

Patient enrollment criteria and reported baseline characteristics varied significantly across the 32 studies reviewed. The most commonly used exclusions were recurrent hernia (15 studies), incarcerated hernia (12 studies), bilateral hernia (9 studies), strangulated hernia (10 studies), hernia requiring emergency repair (7 studies), and femoral hernia (6 studies). From the reported data, we did not identify any general pattern in the patient population enrolled that may have a significant impact on the applicability of the overall evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Table 52 and Table 56 of Appendix C.

Except for three studies, all other 29 studies were performed outside of the United States, primarily in European countries. The differences in health care systems and practice patterns between the United States and other regions might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. The clinical setting varied significantly across the studies, ranging from outpatient surgical clinics, community hospitals, and academic medical centers. Based on the data reported, it is unclear how the clinical settings of the studies might have affected the applicability of the evidence. Detailed information on geographic and clinical settings of the studies is provided in Table 51 of Appendix C.

Summary of Key Question 5

A summary of the comparisons and outcomes we examined for this Key Question can be found in Table 11 below. Of the 11 outcomes, the evidence was sufficient to permit a conclusion for 2 outcomes assessed by the various comparisons of mesh types:

- Long-term pain (>6 months) for the comparisons of PP mesh versus low-weight PP mesh and PP mesh versus porcine indicated approximate equivalence.
- Recurrence for the comparison of PP mesh versus combination material mesh indicated approximate equivalence.

Our ratings of the SOE for these outcomes also appear in the table. Studies were typically a Moderate risk of bias (see Risk of Bias section) and considered direct. The SOE ratings for comparisons with meta-analytic results ranged from Insufficient to Moderate. For the outcome of recurrence, the evidence indicated a nonsubstantial difference between treatment groups for the comparison of PP mesh versus combination material mesh. The SOE for this comparison was Moderate. The comparisons of PP versus low-weight PP and PP versus porcine received a low SOE rating for the outcome of long-term pain. For this outcome, two other comparisons initially received a low SOE rating: PP versus combination materials; and low-weight PP versus combination materials. However, the SOE rating was downgraded to insufficient because less than one-third of the studies included for these comparisons reported the outcome of long-term pain, indicating a possibility of selective outcome reporting. Some imprecision was found for several comparisons and the analyzed outcomes of interest that precluded conclusions. For the outcome of feeling of foreign body, the finding was inconclusive for the following comparisons: PP mesh versus low-weight PP mesh, PP mesh versus combination material mesh, combination materials versus porcine, and low-weight PP versus combination materials. The outcome of infection was inconclusive for several comparisons: PP mesh versus low-weight mesh, PP mesh versus combination material mesh, PP mesh versus coated PP mesh, PP mesh versus 3D PHS, and low-weight PP versus combination materials. For the outcome of recurrence the finding was inconclusive for the comparisons of PP mesh versus low-weight PP, PP mesh versus coated PP

mesh, PP versus 3D PHS, PP versus porcine, combination materials versus porcine, and low-weight PP versus combination materials. For the outcome of long-term pain the finding was inconclusive for the PP mesh versus coated PP mesh comparison.

Questions about the relative importance of these outcomes need to be considered carefully. Some may believe the advantages of various "lighter weight," "partially absorbable" mesh types outweigh the disadvantages of the typical mesh material such as PP mesh.

FDA has a Web page devoted specifically to the topic of surgical mesh in the context of hernia repair.[26] It states:

> "Hundreds of thousands of hernia repair operations are performed each year both with and without surgical mesh, and patients generally recover quickly and do well after surgery. However, FDA has received reports of complications associated with the mesh. The complications include adverse reactions to the mesh, adhesions (when the loops of the intestines adhere to each other or the mesh), and injuries to nearby organs, nerves or blood vessels. Other complications of hernia repair can occur with or without the mesh, including infection, chronic pain and RC. Most of the complications reported to us so far have been associated with mesh products that have been recalled and are no longer on the market."[26]

We searched the FDA Web site and identified the following official product calls:

- The first, involving Bard Composix Kugel Extra Large Oval Patches, was initiated in December 2005 and was expanded in March 2006 and also in January 2007.[27] The Class I recall applies to this specific product and only to meshes manufactured before October 2005. The stated reason for the recall on the FDA Web site was "The 'memory recoil ring' that opens the Bard® Composix® Kugel® Mesh Patch can break under the stress of placement of the large sized products in the intra-abdominal (inside the belly area) space."
- The second product recall was for 14 lot numbers of the XenMatrix Surgical Graft. This was a Class I recall initiated in January 2011 and applies only to the products distributed between July 1, 2010, and October 31, 2010. The FDA Web site stated that the recall was because "testing cannot confirm that all units of XenMatrix Surgical Graft are within FDA requirements for endotoxin levels. Several lots have been found to have elevated endotoxin levels."[28]
- The third product recall was for 15 lot numbers of the Bard Flat Mesh; this Class I recall was initiated in March 2010 and applies to products distributed between October 21, 2008, and October 27, 2009. The FDA Web site stated that the recall was because "the product was deemed a counterfeit. The product does not meet manufacturer's specifications."[29]

Table 11. Key Question 5: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
PP vs. low-weight PP	Recurrence	3	MOD	C	D	I (RR 0.35 to 10.78)	?	INSUFF
PP vs. low-weight PP	Long term pain (≥6 months) (0–10 scale)	3	MOD	I	D	P Diff. in scores 0.43 (CI -0.28 to 0.59)	EQ	LOW
PP vs. low-weight PP	Feeling of foreign body	2	MOD	C	D	I (OR 0.48 to 3.17)	?	INSUFF†
PP vs. low-weight PP	Infection	3	MOD	C	D	I (OR 0.19 to 13.11)	?	INSUFF
PP vs. combination materials	Recurrence	9	MOD	C	D	P RR 1.12 (CI 0.59 to 2.10)	EQ	MOD
PP vs. combination materials	Long term pain (≥6 months) (0–10 scale) VAS	3	MOD	I	D	P (Diff -0.21 to 0.40)	?	INSUFF†
PP vs. combination materials	Feeling of foreign body	4	MOD	C	D	I (OR 0.35 to 2.40)	?	INSUFF†
PP vs. combination materials	Infection	5	MOD	C	D	I (OR 0.63 to 2.64)	?	INSUFF†
PP vs. coated PP	Recurrence	3	MOD	C	D	I (RR 0.42 to 3.39)	?	INSUFF
PP vs. coated PP	Quality of Life	1	MOD	U	D	I (Diff -5.3 to 6.1)	?	INSUFF†
PP vs. coated PP	Long term pain (≥6 months)	2	MOD	C	D	I (OR 0.35 to 23.05)	?	INSUFF†
PP vs. coated PP	Infection	1	MOD	U	D	I (OR 0.29 to 9.05)	?	INSUFF†
PP vs. 3D PHS	Recurrence	2	MOD	C	D	I (RR 0.07 to 16.47)	?	INSUFF
PP vs. 3D PHS	Infection	2	MOD	C	D	I (OR 0.09 to 2.88)	?	INSUFF
PP vs. porcine	Recurrence	2	MOD	C	D	I (RR 0.17 to 22.29)	?	INSUFF

Table 11. Key Question 5: Strength of evidence ratings (continued)

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
PP vs. porcine	Long term pain (≥6 months) VAS at rest (0–10 scale)	1	MOD	U	D	P Diff in scores 0 (CI -0.94 to 0.94)	EQ	LOW
PP vs. porcine	Long term pain (≥6 months) VAS on movement (0–10 scale)	1	MOD	U	D	P Diff in scores 0.39 (CI -0.55 to 1.33)	EQ	LOW
Combination materials vs. porcine	Recurrence	1	MOD	U	D	I (RR 0.02 to 47.38)	?	INSUFF
Combination materials vs. porcine	Feeling of foreign body	1	MOD	U	D	I (OR 0.94 to 34.46)	?	INSUFF
Low-weight PP vs. combination materials	Recurrence	1	MOD	U	D	I (RR 0.05 to 5.54)	?	INSUFF†
Low-weight PP vs. combination materials	Quality of Life	1	MOD	U	D	I (OR 0.04 to 5.54)	?	INSUFF†
Low-weight PP vs. combination materials	Long-term pain (≥6 months) (0–10 scale)	1	MOD	U	D	P (Diff -0.65 to 0.65)	?	INSUFF†
Low-weight PP vs. combination materials	Long-term pain (≥6 months) in inguinal region	1	MOD	U	D	I (OR 0.25 to 4.07)	?	INSUFF†
Low-weight PP vs. combination materials	Feeling of foreign body	1	MOD	U	D	I (OR 0.54 to 5.55)	?	INSUFF†
Low-weight PP vs. combination materials	Infection	1	MOD	U	D	I (OR 0.01 to 8.64)	?	INSUFF†

Diff = difference, OR = odds ratio, RR = relative risk, VAS = visual analog scale
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct, I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.
For the column labeled SOE rating, SOE = strength of evidence, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect. and
† indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

Three non-English studies might have met the inclusion criteria for this Key Question if we had not required that studies be published in English.[176-178] Two of these were stated to be randomized trials, and we are unsure whether the fourth study was randomized; however, it was a comparison study. We summarize the results as follows:

- One study[176] comparing Bard Corp. meshes with Auto Suture Co. hernia link plug and netted patch found that after 12 months of followup, a total of 42 patients reported having a foreign body sensation, 47 patients experienced other complications, and 4 infections were recorded. The authors concluded that there was no statistically significant difference between the two treatment groups and that these particular meshes had similar effectiveness. These results are consistent with the conclusions of our review. Our results indicated an inconclusive finding for the outcome of feeling of foreign body and infection rates for all comparisons
- One RCT[177] comparing a rigid PP mesh with a softer PP mesh found that patients with the rigid PP mesh reported testicular sensitivity to touch, pain upon ejaculation, and pulling sensation during urination. These complications are stated to be reported less frequently in patients with the softer PP mesh group. These individual domains of pain were not discussed for this report; instead we assessed overall pain scores. Our results indicated approximate equivalence for the outcome of long-term pain (greater than 6 months) for the following comparisons: PP versus low-weight PP, PP versus combination material, PP mesh versus porcine, and low-weight PP versus combination material mesh.
- Another RCT[178] comparing PP mesh with expanded PTFE mesh and a control group found there was no difference in VAS pain between the two meshes, as well as no significant difference of incidence of infections and other adverse events. The authors concluded that both of the included mesh types were safe and effective with a low recurrence rate. Our results indicated approximate equivalence for the outcome of long-term pain (>6 months) for the following comparisons: PP versus low-weight PP, PP versus combination material, PP mesh versus porcine, and low-weight PP versus combination material mesh. For the outcome of recurrence, our results indicated approximate equivalence for the comparison of PP mesh versus comparison material mesh.

Key Question 6. Do different mesh-fixation methods (e.g., no fixation, sutures, glue) differ in patient-oriented effectiveness outcomes and/or adverse events?

Study Characteristics

General information about the 23 studies included for Key Question 6 can be found in Table 59 of Appendix C. Four were conducted in Italy; three each in Australia and the United States; two each in Finland, India, Spain, and Switzerland; and one each in China, Germany, Poland, Sweden, and the United Kingdom. Nineteen studies were single-center RCTs, two RCTs were conducted in at least two centers, one RCT was conducted in three centers, and one RCT did not report the type of center.

The identified studies assessed various mesh fixation comparisons. Table 12 below lists the comparison types and the number of studies addressing each comparison. Twenty-two RCTs enrolled between 27 and 600 patients, and a Swedish registry included 142,578 hernias. Nineteen

studies reported patient enrollment dates between 1996 and 2011, and one study did not report the dates of enrollment.[179]

Table 12. Key Question 6: Fixation methods comparisons

Comparison	Number of Studies
Tacks or staples vs. no fixation	7[180-186]
Fibrin glue vs. staples	5[179,187-190]
Sutures vs. tacks	3[191-193]
Sutures vs. glue	7[194-200]
Comparing different types of staples (e.g., EndoANCHOR™ staples vs. EMS™ staples, Ethicon Endo-Surgery)	2[190,193]
Absorbable sutures (short or long term) vs. nonabsorbable	1[201]
Glue vs. no fixation	1[202]

Seventeen studies were conducted at general and nonuniversity hospitals, one study was conducted at a university hospital, and five studies did not report the type(s) of hospitals. Three studies reported their funding source. One study received funding from a public foundation in Spain,[188] one study received funding from a hospital group in China,[187] and the Swedish registry received funding from various sources (e.g., Sweden's National board of Health and Welfare).[125]

Patient enrollment criteria appear in Table 60 (hernia-related criteria), Table 61 (demographic and medical criteria), and Table 62 (other criteria) of Appendix C. Enrollment criteria varied among the 23 studies. The most commonly used hernia-related exclusions were recurrent hernia (12 studies), incarcerated hernia (7 studies), bilateral (5 studies), and strangulated hernia (6 studies). Others were emergency hernia (eight studies), femoral hernia (five studies), giant hernia (two studies), scrotal hernia (two studies), and giant scrotal hernia (two studies).

Twenty studies enrolled patients of a minimum age of 18 years, two studies enrolled patients of a minimum age of 15 years, and one study had a minimum enrollment age of 16 years. Five studies excluded female patients, four studies excluded those with prior general anesthesia, two studies excluded patients with ASA scores of >4, three excluded patients with prior abdominal surgery, and two studies excluded patients with prior infections. The following exclusions were reported in one study each: prior mesh surgery and coagulation disorders.

Treatment details appear in Table 63 of Appendix C. Various manufacturers of mesh fixation material were represented in the included studies. Some of the fixation materials identified included Vivostat®, Autosuture™, ENDOPATH®, and Indermil® Tissue Adhesive. Eleven studies reported that surgeons had experience in hernia repair. One study reported that team members performed more than 4,000 TEP repairs between 1994 and 2008.[186] Another study reports that the surgeon had previously performed 97 primary open inguinal hernia repairs.[200] The surgical procedures reported in the studies varied. Lichtenstein method was reported in eight studies, TEP in six studies, and TAPP in six studies; three studies did not specify the surgical procedure. With open surgical procedures, mesh materials are always fixated, while fixation is optional with laparoscopic procedures.

All reported baseline patient characteristics in the studies included for this Key Question appear in Table 64 in Appendix C. A summary of the most commonly reported baseline characteristics in studies included for Key Questions 2 to 7 appears in section Key Question 2a along with Table 3 (please refer to Key Question 2a for further detail).

Risk of Bias

The risk-of-bias assessments for the 23 studies can be found in Table 65 of Appendix C. Twenty studies were categorized as Moderate risk of bias for all of their reported outcomes. One study was categorized as Low risk of bias for all outcomes[193] except testicular swelling and evidence of atrophy; these outcomes were categorized as Moderate risk of bias. Another study was categorized as Low risk of bias for all outcomes except for return to work, which was categorized as Moderate risk of bias.[184] One study received a Low risk of bias category for the outcomes of urinary retention, seroma/hematoma, infection, and recurrence.[200] All other outcomes were categorized as moderate. Lastly, one study was categorized as Moderate risk of bias for most outcomes,[189] but the outcomes of recurrence, postoperative hospital stay, recovery time to normal activity, and adverse events (e.g., hematoma, infection) were categorized as Low risk of bias.

Many reasons underlie the Moderate rating for the 23 RCTs. Two of the most common reasons involved concealment of allocation (either not performed or not reported by 13 studies) and the blinding of outcome assessors (either not performed or not reported by more than 14 studies).

Findings

All included data for this Key Question appear in Table 66 of Appendix C. We have organized this section by type of comparison, followed by outcomes assessed through meta-analysis. We considered the following five comparisons to be major:

- Tacks or staples versus no fixation
- Fibrin glue versus staples
- Suture versus tacks
- Suture versus glue
- Absorbable sutures versus nonabsorbable sutures

Tacks or Staples Versus No Fixation

Hernia Recurrence

We performed a meta-analysis of four studies comparing tacks or staples with no fixation method (Figure 51) and identified a summary RR of 0.50 (95% CI, 0.08 to 3.01). The median follow-up was 2 years (range 1 to 2 years). All four studies followed the typical patient for at least one year. We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the group with no fixation, which was 1.4 percent. Multiplying a 3.01 RR with this rate yielded a corresponding rate of 4.21 percent for the tacks or staples group. The difference between these rates is 2.81 percentage points, which is less than our predefined MCSD of three percentage points. This implies approximate equivalence in recurrence rates between the two groups.

Quality of Life

Studies did not report this outcome.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

One study comparing tacks or staples versus no fixation reported long-term pain.[186] We calculated a difference in means of 0.03 (95% CI, -0.76 to 0.82) for this outcome. This implies approximate equivalence between tacks or staples and no fixation for the outcome of long-term pain.

Adverse Events

One study comparing tacks or staples with no fixation method reported two adverse events, bleeding and infection.[182] Eleven patients in the tacks or staples group and 10 patients in the no fixation group experienced bleeding. We calculated an OR of 1.12 (95% CI, 0.45 to 2.78) for the outcome of bleeding. We calculated an OR of 3.036 (95% CI, 0.12 to 75.57) for the outcome of infection. The wide CIs indicate the evidence is inconclusive.

Fibrin Glue Versus Staples

Hernia Recurrence

We performed a meta-analysis of three studies comparing fibrin glue with staples (Figure 52) and identified a summary RR of 1.237 (95% CI, 0.31 to 4.96). We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the fibrin glue group, which was 2.4 percent. Multiplying a 4.96 RR with this rate yielded a corresponding rate of 12 percent for the staples group. The difference between these rates is 9.6 percent, which is more than our predefined MCSD of three percentage points, indicating the evidence is inconclusive.

Quality of Life

One study comparing fibrin glue with staples reported QOL.[189] We calculated a difference in means of 0.00 (95% CI, -0.09 to 0.09) for this outcome. This implies approximate equivalence between fibrin glue and staples for the outcome of QOL.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

Three studies reporting long-term pain (>6 months after surgery) as an overall score on the VAS were included in a meta-analysis (Figure 53). This analysis found a difference in means of -0.47 (95% CI, -0.68 to -0.27), indicating a lower rate of long-term pain with glue fixation than staple fixation. This indicates a clinically significant difference in rates.

Adverse Events

Studies did not report this outcome.

Sutures Versus Tacks

Hernia Recurrence

We performed a meta-analysis of two studies comparing sutures with tacks (Figure 54) and identified a summary RR of 1.98 (95% CI, 0.16 to 22.21). We defined the MCSD as a three-

percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the sutures group, which was 0.69 percent. Multiplying a 22.21 RR with this rate yielded a corresponding rate of 15.3 percent for the tacks group. The difference between these rates is over 14 percentage points, which is greater than our predefined MCSD. Thus, the evidence is too imprecise to permit a conclusion.

Quality of Life

Studies did not report this outcome.

Patient Satisfaction

Studies did not report this outcome.

Long-Term Pain

Studies did not report this outcome.

Adverse Events

Studies did not report this outcome.

Sutures Versus Glue

Hernia Recurrence

We performed a meta-analysis of four studies comparing sutures with glue (Figure 55) and identified a summary RR of 0.71 (95% CI, 0.30 to 1.71). The median follow-up was 1.7 years (range 6 months to 5 years). One study followed the typical patient for <1 year, and three studies followed the typical patient for 1 to 5 years. We defined the MCSD as a three-percentage-point difference between groups, to aid interpretation; we calculated the overall rate of recurrence in the sutures group, which was 2.6 percent. Multiplying a 1.71 RR with this rate yielded a corresponding rate of 4.45 percent for the glue group. The difference between these rates is 1.85 percentage points and indicates approximate equivalence.

Quality of Life

Studies did not report this outcome.

Patient Satisfaction

One study comparing sutures with glue reported patient SFN. We calculated a difference in means of -0.24 (95% CI, -0.58 to 0.10). This implies approximate equivalence for the outcome of patient SFN when comparing suture fixation and glue fixation.

Long-Term Pain

Three studies comparing sutures with glue reported long-term pain. We calculated a difference in means of 0.10 (95% CI, -0.07 to 0.27); the wide CI implies approximate equivalence of long-term pain when comparing sutures with glue fixation (Figure 56).

One study reported the number of patients who were pain-free when walking at 1 year and the number of patients reporting scrotal or testicular pain at 1 year.[199] We calculated an OR of 0.32 (95% CI, 0.03 to 3.15) for the outcome of pain-free walking and an OR of 2.04 (95% CI,

0.18 to 22.78) for scrotal or testicular pain. The wide CIs include our MCSD of 0.8 to 1.25. Thus, the evidence for these outcomes is too imprecise to permit a conclusion.

Adverse Events

We conducted meta-analyses of infection for four studies comparing sutures with glue (Figure 57). Our analysis found a summary OR of 0.58 (95% CI, 0.16 to 2.06). The wide CI includes our pre-determined MCSD of 0.8 to 1.25. Thus, the evidence implies approximate equivalence.

One study reported the feeling of foreign body at 1 year for the comparison of sutures versus glue.[199] We calculated an OR of 0.81 (95% CI, 0.47 to 1.39); the wide CI includes our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Absorbable Sutures Versus Nonabsorbable Sutures

Hernia Recurrence

One study comparing absorbable sutures with nonabsorbable sutures reported one event of RC in each treatment group.[201] We calculated an RR of 1.00 (95% CI, 0.06 to 15.72); the wide CI indicates that the evidence is insufficient for a conclusion.

Quality of Life

The study did not report this outcome.

Patient Satisfaction

One study comparing absorbable sutures with nonabsorbable sutures reported patient SFN.[201] At mean follow-up of 2.1 years, 73 (90 percent) patients in the absorbable suture group and 77 (95 percent) patients in the nonabsorbable suture group reported being satisfied with the operation. We calculated an OR of 0.47 (95% CI, 0.14 to 1.64). The wide CI includes our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Long-Term Pain

One study comparing absorbable sutures with nonabsorbable sutures reported long-term pain.[201] At a mean followup of 2.1 years, 21 (26 percent) patients in the absorbable sutures group reported having pain within the past month, and 19 (23.4 percent) patients in the nonabsorbable group reported the same. We calculated an OR of 1.14 (95% CI, 0.56 to 2.33). The wide CI includes our MCSD of 0.8 to 1.25. Thus, the evidence is too imprecise to permit a conclusion.

Adverse Events

One study comparing absorbable sutures with nonabsorbable sutures reported infection.[201] We calculated an OR of 3.04 (95% CI, 0.12 to 75.67); the wide CI indicates that the evidence is inconclusive.

Applicability

Twenty-three studies are included for review for Key Question 6. As described in the Methods section, the goal of the evaluation is to raise stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

The 23 studies reviewed for Key Question 5 compared different mesh fixation methods. Table 63 of Appendix C provides a detailed description of the fixation methods being compared in the studies. For Key Question 6, we summarized the evidence by different comparison of mesh fixation methods. In the vast majority of these studies, the surgeries were performed in the 1990s or early 2000s. The evidence may not necessarily reflect the comparative performance of the state-of-the-art mesh fixation methods that are currently used in clinical practice.

Ten studies reported that surgeons had experience in hernia repair. Eight of the studies reported having used experienced surgeons, and two specifically defined the level and meaning of experience (e.g., by the number of prior cases or years of practice). One study reported having used first- or second-year residents. The remaining 12 studies did not report surgeons' prior experiences with hernia repair. Given the data reported, we were unable to judge what implication surgeons' experience may have in the applicability of the evidence. Table 63 of Appendix C provides additional detail on the surgical procedures compared in the studies, including data on surgeons' experiences.

Patient enrollment criteria and reported baseline characteristics varied significantly across the 23 studies reviewed. From the reported data, we did not identify any general pattern in the patient population enrolled that may have a significant impact on the applicability of the overall evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Table 60 and Table 64 of Appendix C.

Except for three studies,[180,185,191] all other studies were performed outside of the United States, primarily in European countries. The differences in health care systems and practice patterns between the U.S. and other regions might have an impact on the applicability of the evidence from the perspectives of the U.S. stakeholders. The clinical setting varied significantly across the studies, ranging from outpatient surgical clinics, an infirmary, community hospitals, and academic medical centers. Based on the data reported, it is unclear how the clinical settings of the studies might have affected the applicability of the evidence. Detailed information on geographic and clinical settings of the six studies is provided in Table 59 in Appendix C.

Summary of Key Question 6

A summary of the comparisons and outcomes we examined for Key Question 6 can be found in Table 13 below. Of the 11 outcomes, the evidence was sufficient to permit a conclusion for two outcomes assessed by the various comparisons of mesh fixation types:

- Long-term pain (>6 months) for the comparison of fibrin glue with staples favors fibrin glue
- Long-term pain (>6 months) for the comparison of sutures versus glue indicated approximate equivalence
- Recurrence for the comparisons of tacks or staples versus no fixation, and sutures versus glue indicated approximate equivalence

Our ratings of the SOE for these outcomes also appear in the table. Studies were typically a Moderate risk of bias (see Risk of Bias section above). Our SOE ratings for comparisons with meta-analytic results ranged from Low to Moderate. For the outcome of long-term pain, the comparison of fibrin glue versus staples received a Moderate SOE rating. The comparisons of tacks or staples versus no fixation, fibrin glue versus staples, and sutures versus glue received a Moderate SOE rating for the outcome of recurrence. Imprecision was identified for several comparisons and the analyzed outcomes, precluding any conclusions.

Questions about the relative importance of these outcomes need to be considered carefully. Some may believe the advantages of various mesh fixation methods that prevent significant tension (e.g., glue) may outweigh the disadvantages of other types of fixation methods (e.g., staples).

Table 13. Key Question 6: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Tacks or staples vs. no fixation	Recurrence	4	MOD	C	D	P RR 0.50 (CI 0.08 to 3.01)	EQ	MOD
Tacks or staples vs. no fixation	Long-term pain (≥6 months)	1	MOD	U	D	I (Diff -0.76 to 0.82)	?	INSUFF†
Tacks or staples vs. no fixation	Bleeding	1	MOD	U	D	I (OR 0.45 to 2.78)	?	INSUFF†
Tacks or staples vs. no fixation	Infection	1	MOD	U	D	I (OR 0.12 to 75.57)	?	INSUFF†
Fibrin glue vs. staples	Recurrence	3	MOD	C	D	I (RR 0.31 to 4.96)	?	INSUFF
Fibrin glue vs. staples	Quality of life	1	MOD	U	D	I (Diff -0.09 to 0.09)	?	INSUFF†
Fibrin glue vs. staples	Long term pain (≥6 months) (0-10 scale)	3	MOD	C	D	P Diff -0.47 (CI -0.68 to -0.27)	Favors fibrin glue	MOD
Sutures vs. tacks	Recurrence	2	MOD	C	D	I (RR 0.16 to 22.21)	?	INSUFF
Sutures vs. glue	Recurrence	4	MOD	C	D	P RR 0.71 (CI 0.30 to 1.71)	EQ	MOD
Sutures vs. glue	Patient Satisfaction	1	MOD	U	D	I (Diff -0.58 to 0.10)	?	INSUFF†
Sutures vs. glue	Long term pain (≥6 months) (0-10 scale)	3	MOD	I	D	P Diff 0.10 (CI -0.07 to 0.27)	EQ	LOW
Sutures vs. glue	Long-term pain (≥6 months) pain-free walking	1	MOD	U	D	I (OR 0.03 to 3.15)	?	INSUFF†
Sutures vs. glue	Long-term pain (≥6 months) scrotal or testicular pain	1	MOD	U	D	I (OR 0.18 to 22.78)	?	INSUFF†
Sutures vs. glue	Feeling of foreign body	1	MOD	U	D	I (OR 0.47 to 1.39)	?	INSUFF†
Sutures vs. glue	Infection	4	MOD	C	D	I (RR 0.16 to 2.06)	?	INSUFF

Table 13. Key Question 6: Strength of evidence ratings (continued)

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Absorbable sutures vs. nonresorbable sutures	Recurrence	1	MOD	U	D	I (OR 0.06 to 15.72)	?	INSUFF
Absorbable sutures vs. nonresorbable sutures	Long term pain (≥6 months) (0-10 scale) VAS	1	MOD	U	D	I (OR 0.56 to 2.33)	?	INSUFF
Absorbable sutures vs. nonresorbable sutures	Satisfaction	1	MOD	U	D	I (OR 0.14 to 1.64)	?	INSUFF
Absorbable sutures vs. nonresorbable sutures	Infection	1	MOD	U	D	I (OR 0.12 to 75.67)	?	INSUFF

Diff = difference, OR = odds ratio, RR = relative risk, VAS = visual analog scale
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct and I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.
For the column labeled SOE rating, SOE = strength of evidence, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect. and † indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

One non-English study might have met the inclusion criteria for this Key Question if we had not required that studies be published in English.[203] This study is an RCT that compared resorbable suture material with nonabsorbable suture material. The authors report that differences in the recurrence rates following the use of these fixation methods were not statistically significant. Our results indicate approximate equivalence for the outcome of RC for the comparison of fibrin glue with staples.

Key Question 7. For each type of laparoscopic mesh repair, what is the association between surgical experience and hernia recurrence?

Study Characteristics

Thirty-two studies were included for this question (Table 14). Sixteen involved only TEP, 12 involved only TAPP, one reported separate data on TEP and TAPP, and three provided combined data on TAPP and TEP. Totals per procedure were 17 TEP, 13 TAPP, and 3 combined TEP/TAPP. Within each of these subgroups, most studies reported data by stages (e.g., the recurrence rate among the first A patients was *x* percent, whereas the recurrence rate among the subsequent C patients was *y* percent). Other studies reported data comparing surgeons or centers with different levels of prior experience. All extracted information from the studies for this Key Question appear in Table 67 through Table 74 of Appendix C.

Table 14. Overview of Key Question 7 studies

Procedure	Total Number of Studies	Number That Compared Stages	Number That Compared Surgeons or Centers
TEP	17	15	4
TAPP	13	12	4
Combined TAPP/TEP	3	0	3

Note: Two TEP studies and three TAPP studies reported data in two ways (compared stages and also compared surgeons/centers). Also, one study reported separate data on TEP and TAPP.

TAPP = Transabdominal preperitoneal repair; TEP = totally extraperitoneal repair.

Hernia recurrence (RC) rate is a time-sensitive outcome; therefore, studies should *factor out the length of followup* when measuring the association between surgical experience and RC. The problem is that those undergoing earlier operations have had more time to experience recurrence, and so an observed higher rate of recurrence may be caused simply by a time confound. Unfortunately, a full 26 of the 32 included studies (81 percent) failed to report data that factored out the length of followup. Some of these 26 studies acknowledged the time confound; however, these still did not report data in a more interpretable way (e.g., comparing *1-year recurrence rates* between the first half of the series and the last half of the series).

Another problem with interpreting surgical experience data involves the evolution of surgical techniques over time. If a surgeon changes the mesh over time, or the details of the procedure for inserting the mesh, a reduction in recurrence rates may be due not to surgical expertise but rather procedural differences. Thirteen of the 32 included studies (41 percent) reported changing important procedural aspects over time, such as the size of the mesh (which typically involved the use of larger meshes in later time periods).

Another concern involves selective outcome reporting. Not all studies of laparoscopic hernioplasty have reported data on the association between surgical experience and RC. Of the 47 studies included for other laparoscopy Key Questions (Key Question 2 and/or Key Question 4), only 4 of 47 were included for this question, Key Question 7. The other 43 studies were

focused on treatment comparisons rather than surgical experience; most of the 32 included studies for Key Question 7 were case series of laparoscopy.

This question focuses on surgical experience specific to *laparoscopic hernia* repair. Wright and colleagues (1998)[82] asserted that *general* laparoscopic experience (i.e., experience with nonhernia laparoscopic procedures) does not necessary apply to laparoscopic hernia repair:[82] "In addition, the fact that a surgeon has ample experience in one particular area of laparoscopic surgery does not mean that he or she will be able to operate in other areas without appropriate training. As pointed out by Grundfest, a surgeon who has performed 250 laparoscopic cholecystectomies will not be qualified to perform a laparoscopic colon resection. Additional training is required for any particular procedure before the surgeon incorporates it into his or her practice."[82]

Risk of Bias

We did not formally assess risk of bias for this Key Question because the question's intent is not to attribute cause. Above, we discussed our concerns about interpretation of the reported results on the association between surgical experience and RC.

Findings

Unfortunately, the included studies reported data in markedly different ways (Table 15). Among studies comparing an early set to later set(s) of repairs, the size of the early set varied from a low of 10 repairs to a high of 825 repairs. The compared portions of the series were typically of different sizes. Granted, this can be addressed by using recurrence *rates*, but nevertheless it is unclear how authors chose their cut points; one possibility is that they structured their data with an eye toward showing the largest possible reduction in recurrence rates over time. The reporting differences mean that one cannot use the data to estimate the length of the learning curve for TEP or TAPP in the context of hernia repair. Interpretation is further compounded by common problems (mentioned above) of ignoring the time confound, procedural evolutions over time, and selective outcome reporting.

Table 15. Variation in reporting of Key Question 7 data

Study	How the Stages Were Reported
Bittner et al. 2002[204-208]	First 600 hernia repairs vs. last 7,450 hernia repairs First 500 vs. next 1,700 vs. next 500 First 600 vs. next 4,405 First 132 vs. next 132
Bobrzynski et al. 2001[209]	First 10 vs. last 326
Cheah et al. 2004[210]	First 119 vs. last 63
Davies et al. 1995[211,212]	First 10 vs. next 90 vs. next 100 vs. last 100
Dulucq et al. 2009[213]	First 200 vs. next 1,254 vs. last 902
Edwards et al. 2000[214]	First 30 vs. last 30 First 30 vs. last 27 First 30 vs. last 22
Feliu-Pala et al. 2001[215]	First 100 vs. next 400 vs. last 491
Ferzli et al. 1995[216]	First 100 vs. last 149
Geis et al. 1993[217]	First 50 vs. last 314
Kapiris et al., 2001[218]	First 325 vs. last 3,205
Kieturakis et al. 1994[219]	First 20 vs. last 130
Lal et al. 2004[220]	First 10 vs. next 10 vs. next 10 vs. last 26
Lau et al. 2002[221]	First 20 vs. next 20 vs. next 20 vs. next 20 vs. next 20 vs. last 20
Liem et al. 1997[82,222-227]	First 10 vs. next 10 vs. last 10
MRC et al. 1999[17,37,76-82]	First 10 vs. next 10 vs. last 10
Pikoulis et al. 2002[228]	First 50 vs. next 50 vs. last 209
Ramshaw et al. 2001[229]	First 300 vs. last 624
Schultz et al. 2001[230]	First 500 vs. next 500 vs. next 500 vs. next 500 vs. last 500
Swadia 2011[231]	First 412 vs. next 535 vs. last 592
Tamme et al. 2003[232]	First 825 vs. last 4,378
Voitk et al. 1998[233]	First 50 vs. last 50
Zendejas et al. 2011[234]	First 40 vs. next 40 vs. next 40 vs. next 40 vs. next 40 vs. next 40 vs. last 24 First 110 vs. last 866

Given this large variation, no meta-analysis was conducted. Instead, we present a general summary of the results in Table 16 below. Most studies reported results in the expected direction: lower recurrence rates with increased experience. This was also true when examined more specifically for TEP (11 of 17 studies) and TAPP (11 of 13 studies).

Table 16. Summary of results of Key Question 7 studies

Procedure	Lower Recurrence With Increased Experience	Mixed Results, No Effect, or No Recurrences Observed	Higher Recurrence With Increased Experience
TEP	11	6	0
TAPP	11	3	0
Combined TAPP/TEP	1	1	1

TAPP = Transabdominal preperitoneal repair; TEP = totally extraperitoneal repair.
One study reported separate data on TEP and TAPP, so it is represented twice in the table (specifically in the column labeled "lower recurrence with increased experience").

Applicability

Thirty-two studies are included for review for Key Question 7. We evaluated these studies to identify factors that might affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to raise stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

The 32 studies reviewed for Key Question 7 compared the recurrence rates of TAPP, TAP, or combined TAPP and TEP between surgeons or medical centers with varying experience or between surgeries operated earlier versus later in the series. Table 71 of Appendix C provides a

detailed description of the laparoscopic procedures being studied. For Key Question 7, we summarized the findings separately by different procedures (Table 16) because the evidence for one type of laparoscopic procedure may not apply to a different type of procedure.

Except for three studies,[231,234,235] the surgeries were all performed in 1990s or early 2000s. The findings about the experience-recurrence association may not necessarily apply to current state-of-the-art procedures.

Patient enrollment criteria and reported baseline characteristics varied significantly across the 32 studies. It is unclear whether any of the reported patient characteristics or enrollment criteria have a significant implication in the applicability of the overall evidence. Detailed patient enrollment criteria and baseline characteristics of these studies are provided in Table 68 and Table 72 of Appendix C.

Except for 8 studies[36,83-88,214,216,217,219,229,234,236] all other 24 studies were performed outside of the United States, primarily in European countries. The differences in health care systems and practice patterns between the United States and other geographic regions might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. The clinical setting varied significantly across the studies, ranging from community hospitals, to teaching or university hospitals, to specialized hernia or laparoscopy centers. The reported data do not allow us to judge whether the geographic or clinical settings have any significant impact on the applicability of the overall evidence. Based on the data reported, it is unclear how the clinical settings of the studies might have affected the applicability of the evidence. Detailed information on geographic and clinical settings of the six studies is provided in Table 67 of Appendix C.

Summary of Key Question 7

This section found a large amount of evidence reporting that greater surgical experience with laparoscopic herniorrhaphy is associated with lower recurrence rates. The variations in reporting, however, made it impossible to estimate the length of the learning curve. Key problems arose in interpreting the data in three areas: the possibility of a time confound (that earlier patients had been followed for longer and had more time to have recurrences), procedural evolutions (that details of the procedure often changed over time making it difficult to pinpoint the effect of expertise), and selective outcome reporting (that the studies reporting this association may have chosen to do so because of the nature of the data).

We examined the abstracts of studies excluded for being non-English and found that 17 of them might have met all the other inclusion criteria for this Key Question.[237-253] Thirteen involved TAPP, two involved TEP, one combined TAPP/TEP data, and one did not report which laparoscopic procedure had been performed. These studies were substantially similar to the 32 already included, with similar reports of decreasing recurrence over time, as well as the same problems in interpretation (e.g., no control for the time confound). Thus, their inclusion would not have altered our discussion of the evidence for this Key Question.

Key Question 8. Pediatric patients: For a possible contralateral hernia, does same-operation repair/exploration differ from watchful waiting in patient-oriented effectiveness outcomes and/or adverse events?

No studies met the inclusion criteria for this question. The Discussion section contains a detailed discussion of this topic.

Key Question 9. Pediatric patients: Does open hernia repair without a mesh differ from laparoscopic hernia repair without a mesh in patient-oriented effectiveness outcomes and/or adverse events?

Study Characteristics

General information about the two studies included for this Key Question appears in Table 75 of Appendix C. One study was conducted in China, and the other one was conducted in Finland. Both studies were single-center RCTs conducted at a university hospital with an enrollment of 89 patients and 83 patients, respectively. The length of the enrollment period was 5.3 years for one study and 1 year for the second study. The second study's authors indicated that they had no financial relationship for disclosure.

Patient enrollment criteria appear in Table 76 (hernia-related criteria), Table 77 (demographic and medical criteria), and Table 78 (other criteria) of Appendix C. Enrollment criteria varied between the studies. Hernia-related study exclusion criteria included recurrent hernia (1 study), bilateral hernia (1 study), incarcerated hernia (both studies), femoral hernia (both studies), and "emergency" hernia (both studies). Regarding patient age criteria, one study enrolled patients aged 4 months to16 years, the other study enrolled patients aged older than 3 months to 9 years. As with the hernia-related exclusions, there was variability in how studies selected patients for inclusion.

Treatment details appear in Table 79 of Appendix C. Neither of the studies reported the actual number of prior laparoscopic hernia high ligations the surgeons had performed. One study did not mention surgeons' prior experience; the other one mentioned that the surgeon had general laparoscopy skills. Both studies reported baseline patient characteristics included for this Key Question (Table 80 of Appendix C). Most of the patients in the two studies were males.

Risk of Bias

Our risk-of-bias assessments for both studies appear in Table 81 of Appendix C. Both RCTs were categorized as Moderate risk of bias for all of their reported outcomes. Common reasons for assigning a Moderate category to the studies were similar to those discussed in Key Question 2a: possible differences in prior surgical expertise, lack of concealment of allocation, and lack of outcome assessor blinding.

Findings

All included data for this Key Question appear in Table 82 of Appendix C.

Hernia Recurrence

We performed a meta-analysis of both studies reporting this outcome (Figure 58) and found that the evidence was inconclusive (summary RR 1.54, 95% CI, 0.2 to 11.6).

Length of Hospital Stay

Both studies reported an outcome in length of hospital stay and were included in a meta-analysis (Figure 59). The meta-analysis found that length of stay was shorter after laparoscopic surgery than after open surgery (summary difference -1.13 hours, 95% CI, -1.77 to -0.49). Given the CI included values of less than 1 (what we defined as the MCSD) as well as values above 1, the finding's clinical significance remains unclear.

Return to Daily Activities

Both studies reported an outcome in this category and were included in a meta-analysis of number of hours before returning to normal daily activities (Figure 60). The result of the meta-analysis was equivalent (summary difference -2.77 hours, 95% CI, -11.24 to 5.69).

Long-Term Patient Satisfaction

One study reported long-term SFN. Patient SFN was recorded (unsatisfactory = 0, satisfactory = 1, good = 2, and excellent = 3) by patients or parents, the attending nurse, and the surgeon (minimum points = 0, maximum points = 9). The parents were more satisfied (difference in SFN points 1, 95% CI, 0.47 to 1.53) in the laparoscopic group compared with the open group.

Long-Term Cosmesis

One study reported this outcome. Cosmesis was recorded (unsatisfactory = 0, satisfactory = 1, good = 2, and excellent = 3) by patients or parents, the attending nurse, and the surgeon (minimum points = 0, maximum points = 9). The parents in the laparoscopic group were more content with cosmesis than those in the open group (difference in SFN points 0.25; 95% CI, 0.12 to 0.38).

Applicability

Two studies are included for review for Key Question 9. We evaluated these studies to identify factors that might affect the applicability of the evidence. As described in the Methods section, the goal of the evaluation is to draw stakeholders' attention to potential applicability issues embedded in the evidence rather than generating a rating or score for the applicability.

Both studies compared open with laparoscopic procedures. The procedures in the Chan study were performed from 2003 to 2004,[254] and those in the Koivusalo study were performed from 2002 to 2007.[255] The evidence may not reflect the comparative effectiveness and safety of the current state-of-the-art open versus laparoscopic procedures. Surgeons' prior experiences for the procedures being compared were not reported in the studies. We were unable to judge whether there is any applicability issues related to surgeons' prior experiences.

Neither study included very young patients. The Chan study excluded patients younger than 3 months, and the Koivusalo study excluded patients younger than 4 months. Meanwhile, both studies excluded patients with incarcerated or strangulated hernia. The findings of the studies may not apply to the patient populations being excluded. Both studies also used additional patient exclusion criteria. For example, the Chan study did not include patients with recurrent hernia, and the Koivusalo study did not include patients with bilateral hernia. Other patient enrollment criteria used by the two studies are provided in Table 76, Table 77 and Table 78 of Appendix C. The findings of the studies may have a more restricted applicability in the populations being excluded from the studies.

Both studies were conducted outside of the United States; the Chan study was conducted in Hong Kong, and the Koivusalo study was conducted in Finland. The differences in health care systems and practice patterns between the United States and other regions might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. Both studies were conducted in a university hospital. The evidence is potentially more applicable to academic settings.

Summary of Key Question 9

A summary of the comparisons and outcomes we examined in this Key Question is in Table 17 below. Of the five outcomes reported, the evidence was sufficient to permit a conclusion for three outcomes:

- Three outcomes favored laparoscopy (length of stay, long-term SFN, and long-term cosmesis)
- One outcome indicated approximate equivalence comparing laparoscopy with open high ligation (return to daily activities)

Our ratings of the SOE for these outcomes also appear in Table 17. Studies were all at Moderate risk of bias (see the pertinent section above); some inconsistencies were found for some outcomes based on effect sizes on opposite sides of a null effect; all of these outcomes are directly important to clinicians and patients; imprecision was found for some outcomes that precluded conclusions. Questions about the relative importance of these outcomes need to be considered carefully. We examined the studies that had been excluded for being non-English language publications, none of which would have been included for this Key Question.

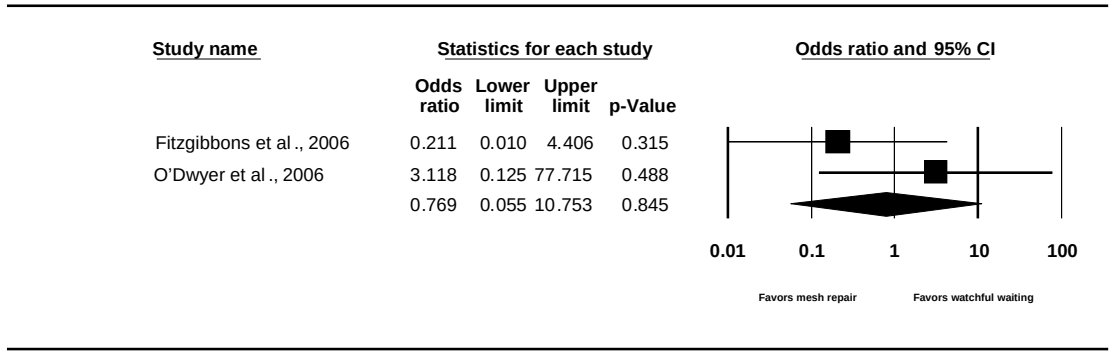
Table 17. Key Question 9: Strength of evidence ratings

Comparison	Outcome	# Studies	Overall Risk of Bias	Consistency	Directness	Precision	Evidence Favors	SOE Rating
Laparoscopic vs. open high ligation	Length of stay (hours)	2	MOD	C	D	P Diff in means -1.13 (-1.77 to -0.49)	Laparoscopic	MOD
Laparoscopic vs. open high ligation	Return to daily activities (hours)	2	MOD	I	D	P Diff in means -2.77 (-11.24 to 5.69)	EQ	LOW
Laparoscopic vs. open high ligation	Recurrence	2	MOD	I	D	I RR 1.54 (0.2 to 11.6)	?	INSUFF
Laparoscopic vs. open high ligation	Long-term patient satisfaction	1	MOD	U	D	P Diff in means 1.00 (0.47 to 1.53)	Laparoscopic	LOW
Laparoscopic vs. open high ligation	Long-term cosmesis	1	MOD	U	D	P Diff in means 0.25 (0.12 to 0.38)	Laparoscopic	LOW

Diff = difference
For consistency, C = consistent, I = inconsistent, U = unknown consistency because there was only one study.
For directness, D = direct, I = indirect.
For precision, I = imprecise, P = precise.
For the column labeled "Evidence favors," ? denotes inconclusive evidence, and EQ denotes approximate equivalence.
For the column labeled SOE rating, SOE = strength of evidence, INSUFF = insufficient, * indicates that the SOE was upgraded due to a large magnitude of effect. and † indicates that the SOE was downgraded due to publication bias or selective outcome reporting.

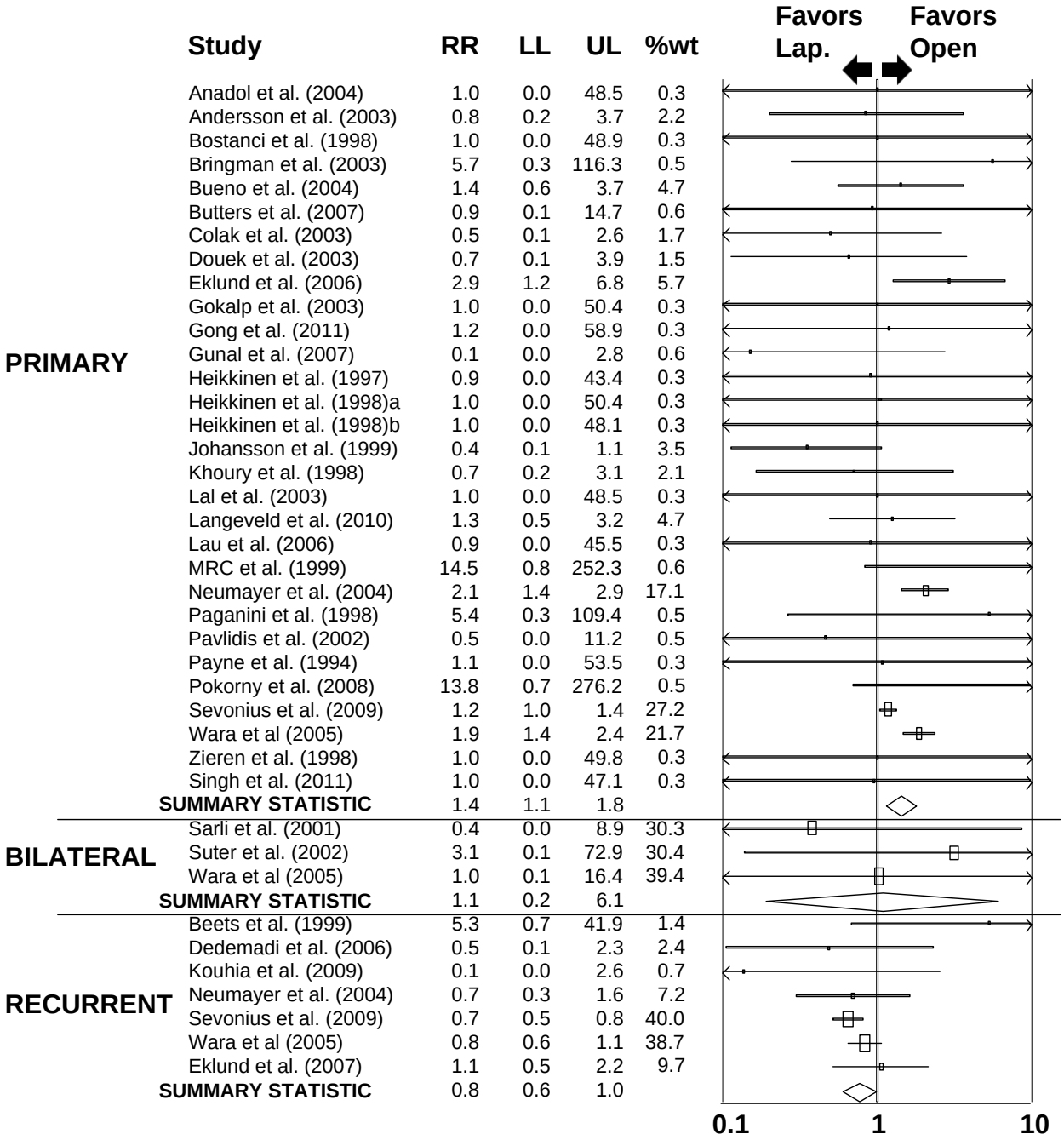
Figures

Figure 3. Key Question 1: Meta-analysis of acute hernia/strangulation



(I^2=30%, tau=1.08)

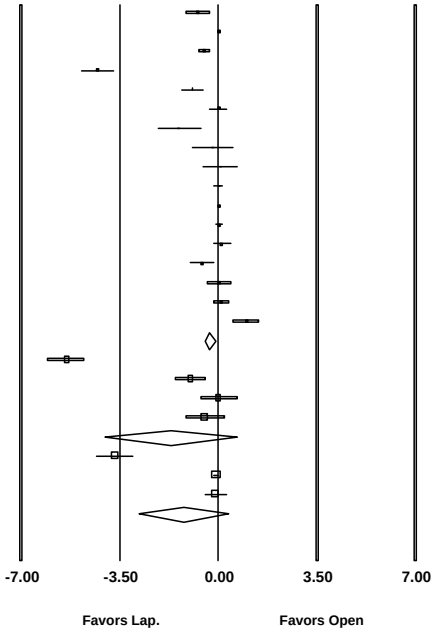
Figure 4. Key Question 2: Meta-analyses of recurrence



KQ2a: I^2=21%, tau=0.21
KQ2b: I^2=0%, tau=0
KQ2c: I^2=25%, tau=0.15

Figure 5. Key Question 2: Meta-analyses of length of stay

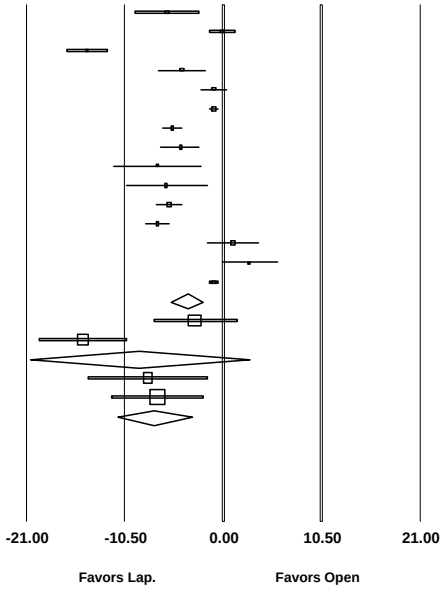
Group by kq	Study name	Difference in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
2a	Anadol et al. (2004)	-0.720	0.219	0.048	-1.150	-0.290	-3.285	0.001
2a	Andersson et al. (2003)	0.050	0.042	0.002	-0.033	0.133	1.178	0.239
2a	Bueno et al. (2004)	-0.500	0.120	0.015	-0.736	-0.264	-4.152	0.000
2a	Champault et al. (1997)	-4.300	0.306	0.094	-4.899	-3.701	-14.060	0.000
2a	Colak et al. (2003)	-0.930	0.213	0.045	-1.348	-0.512	-4.361	0.000
2a	Gokalp et al. (2003)	0.000	0.180	0.033	-0.353	0.353	0.000	1.000
2a	Gong et al. (2011) ov	-1.400	0.402	0.162	-2.188	-0.612	-3.483	0.000
2a	Heikkinen et al. (1997)	-0.200	0.374	0.140	-0.932	0.532	-0.535	0.592
2a	Lal et al. (2003)	0.080	0.325	0.106	-0.558	0.718	0.246	0.806
2a	Langeveld et al. (2010)	0.000	0.091	0.008	-0.178	0.178	0.000	1.000
2a	Lau et al. (2006)	0.000	0.006	0.000	-0.012	0.012	0.000	1.000
2a	MRC et al. (1999)	0.000	0.076	0.006	-0.149	0.149	0.000	1.000
2a	Neumayer et al. (2004)	0.100	0.174	0.030	-0.241	0.441	0.575	0.565
2a	Pavlidis et al. (2002)	-0.600	0.222	0.049	-1.034	-0.166	-2.708	0.007
2a	Payne et al. (1994)	0.010	0.230	0.053	-0.441	0.461	0.043	0.965
2a	Picchio et al. (1999)	0.100	0.141	0.020	-0.177	0.377	0.707	0.479
2a	Zieren et al. (1998)	1.000	0.250	0.063	0.510	1.490	4.000	0.000
2a		-0.333	0.097	0.009	-0.523	-0.144	-3.452	0.001
2b	Champault et al. (1997)	-5.400	0.344	0.118	-6.073	-4.727	-15.715	0.000
2b	Ozmen et al. (2010)	-1.000	0.288	0.083	-1.563	-0.437	-3.478	0.001
2b	Sarli et al. (2001)	0.000	0.352	0.124	-0.689	0.689	0.000	1.000
2b	Suter et al. (2002)	-0.500	0.368	0.136	-1.222	0.222	-1.357	0.175
2b		-1.725	1.209	1.463	-4.096	0.645	-1.426	0.154
2c	Champault et al. (1997)	-3.700	0.352	0.124	-4.389	-3.011	-10.523	0.000
2c	Dedemadi et al. (2006)	-0.080	0.069	0.005	-0.215	0.055	-1.165	0.244
2c	Kouhia et al. (2009)	-0.100	0.218	0.048	-0.528	0.328	-0.458	0.647
2c		-1.254	0.810	0.656	-2.841	0.333	-1.549	0.121



KQ2a: I^2=94%, tau=0.34
KQ2b: I^2=98%, tau=2.39
KQ2c: I^2=98%, tau=1.38

Figure 6. Key Question 2: Meta-analyses of return to activities of daily living

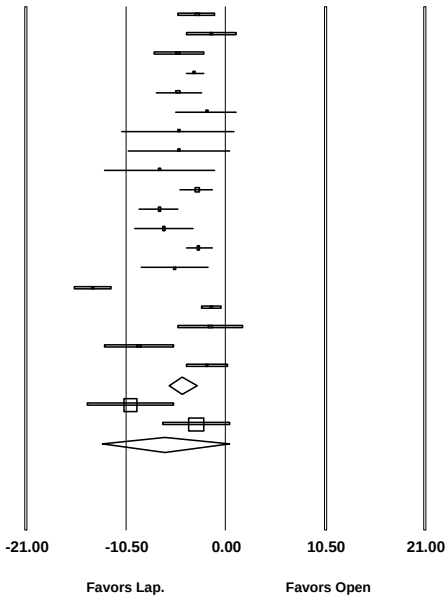
Group by kq	Study name	Difference in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
2a	Andersson et al. (2003)	-6.000	1.799	3.236	-9.526	-2.474	-3.335	0.001
2a	Bender et al. (2009)	-0.100	0.772	0.597	-1.614	1.414	-0.129	0.897
2a	Bringman et al. (2003)	-14.500	1.166	1.359	-16.785	-12.215	-12.437	0.000
2a	Colak et al. (2003)	-4.400	1.377	1.896	-7.099	-1.701	-3.196	0.001
2a	Douek et al. (2003)	-1.000	0.764	0.583	-2.497	0.497	-1.309	0.190
2a	Gokalp et al. (2003)	-1.000	0.286	0.082	-1.560	-0.440	-3.498	0.000
2a	Gong et al. (2011)	-5.400	0.587	0.344	-6.550	-4.250	-9.202	0.000
2a	Hamza et al. (2010)	-4.580	1.117	1.249	-6.770	-2.390	-4.099	0.000
2a	Heikkinen et al. (1998) a	-7.000	2.469	6.097	-11.840	-2.160	-2.835	0.005
2a	Heikkinen et al. (1998) b	-6.000	2.266	5.137	-10.442	-1.558	-2.647	0.008
2a	Johansson et al. (1999)	-5.800	0.755	0.569	-7.279	-4.321	-7.687	0.000
2a	MRC et al. (1999)	-7.000	0.656	0.431	-8.286	-5.714	-10.665	0.000
2a	Paganini et al. (1998)	1.000	1.464	2.142	-1.869	3.869	0.683	0.494
2a	Picchio et al. (1999)	2.800	1.566	2.452	-0.269	5.869	1.788	0.074
2a	Zieren et al. (1998)	-1.000	0.316	0.100	-1.620	-0.380	-3.162	0.002
2a		-3.897	0.864	0.747	-5.590	-2.203	-4.509	0.000
2b	Douek et al. (2003)	-3.000	2.301	5.295	-7.510	1.510	-1.304	0.192
2b	Suter et al. (2002)	-15.000	2.435	5.928	-19.772	-10.228	-6.161	0.000
2b		-8.974	6.000	35.999	-20.733	2.786	-1.496	0.135
2c	Beets et al. (1999)	-8.000	3.282	10.771	-14.432	-1.568	-2.438	0.015
2c	Dedemadi et al. (2006)	-7.000	2.581	6.661	-12.059	-1.941	-2.712	0.007
2c		-7.382	2.029	4.116	-11.358	-3.406	-3.639	0.000



KQ2a: I^2=95%, tau=3.11
KQ2b: I^2=92%, tau=8.15
KQ2c: I^2=0%, tau=0

Figure 7. Key Question 2: Meta-analyses of return to work

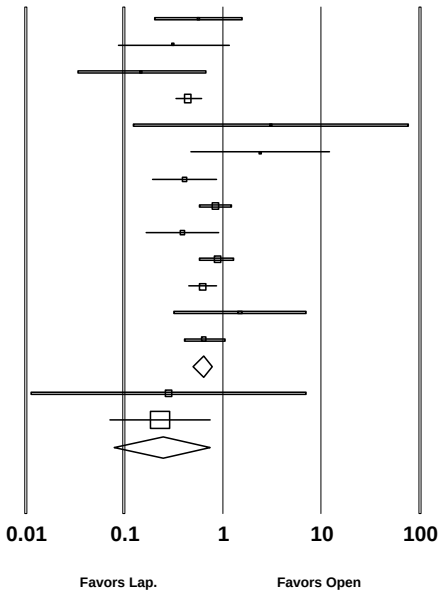
Group by kq	Study name	Difference in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
2a	Andersson et al. (2003)	-3.000	1.038	1.078	-5.035	-0.965	-2.890	0.004
2a	Butler et al. (2007)	-1.500	1.417	2.008	-4.277	1.277	-1.058	0.290
2a	Douek et al. (2003)	-5.000	1.384	1.916	-7.713	-2.287	-3.612	0.000
2a	Eklund et al. (2006)	-3.300	0.515	0.265	-4.309	-2.291	-6.413	0.000
2a	Gokalp et al. (2003)	-5.000	1.277	1.630	-7.502	-2.498	-3.916	0.000
2a	Hamza et al. (2010)	-2.030	1.674	2.803	-5.312	1.252	-1.212	0.225
2a	Heikkinen et al. (1997)	-5.000	3.022	9.130	-10.922	0.922	-1.655	0.098
2a	Heikkinen et al. (1998)a	-5.000	2.773	7.692	-10.436	0.436	-1.803	0.071
2a	Heikkinen et al. (1998)b	-7.000	3.022	9.130	-12.922	-1.078	-2.317	0.021
2a	Johansson et al. (1999)	-3.000	0.923	0.852	-4.810	-1.190	-3.249	0.001
2a	Khoury et al. (1998)	-7.000	1.089	1.186	-9.134	-4.866	-6.429	0.000
2a	Lal et al. (2003)	-6.500	1.660	2.756	-9.754	-3.246	-3.915	0.000
2a	Langeveld et al. (2010)	-2.800	0.739	0.547	-4.249	-1.351	-3.787	0.000
2a	Lau et al. (2006)	-5.400	1.827	3.337	-8.980	-1.820	-2.956	0.003
2a	MRC et al. (1999)	-14.000	1.048	1.099	-16.055	-11.945	-13.353	0.000
2a	Neumayer et al. (2004)	-1.500	0.560	0.314	-2.598	-0.402	-2.677	0.007
2a	Pavlidis et al. (2002)	-1.600	1.792	3.211	-5.112	1.912	-0.893	0.372
2a	Payne et al. (1994)	-9.100	1.861	3.465	-12.748	-5.452	-4.889	0.000
2a	Zieren et al. (1998)	-2.000	1.188	1.413	-4.329	0.329	-1.683	0.092
2a		-4.614	0.758	0.574	-6.099	-3.129	-6.088	0.000
2c	Beets et al. (1999)	-10.000	2.340	5.475	-14.586	-5.414	-4.274	0.000
2c	Kouhia et al. (2009)	-3.100	1.899	3.605	-6.822	0.622	-1.633	0.103
2c		-6.415	3.447	11.884	-13.171	0.342	-1.861	0.063



KQ2a: I^2=88%, tau=2.93
KQ2c: I^2=81%, tau=4.39

Figure 8. Key Question 2: Meta-analyses of long-term pain

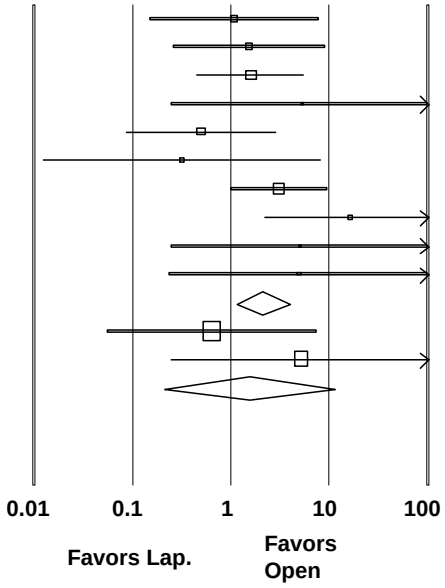
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Andersson et al. (2003)	0.570	0.199	1.628	-1.050	0.294
2a	Bringman et al. (2003)	0.317	0.084	1.191	-1.701	0.089
2a	Douek et al. (2003)	0.150	0.033	0.685	-2.447	0.014
2a	Eklund et al. (2006)	0.448	0.321	0.626	-4.712	0.000
2a	Gokalp et al. (2003)	3.099	0.124	77.572	0.688	0.491
2a	Johansson et al. (1999)	2.448	0.469	12.774	1.062	0.288
2a	Koninger et al. (2004)	0.414	0.193	0.891	-2.257	0.024
2a	Langeveld et al. (2010)	0.834	0.559	1.245	-0.887	0.375
2a	Lau et al. (2006)	0.396	0.167	0.940	-2.100	0.036
2a	MRC et al. (1999)	0.879	0.574	1.345	-0.594	0.552
2a	Neumayer et al. (2004)	0.629	0.440	0.899	-2.543	0.011
2a	Pokorny et al. (2008)	1.500	0.316	7.123	0.510	0.610
2a	Sevonius et al. (2009)	0.653	0.393	1.085	-1.646	0.100
2a		0.614	0.483	0.782	-3.961	0.000
2c	Beets et al. (1999)	0.285	0.011	7.221	-0.761	0.447
2c	Kouhia et al. (2009)	0.232	0.070	0.776	-2.371	0.018
2c		0.238	0.077	0.738	-2.488	0.013



KQ2a: I^2=39%, tau=0.25
KQ2c: I^2=0%, tau=0

Figure 9. Key Question 2: Meta-analyses of epigastric vessel injury

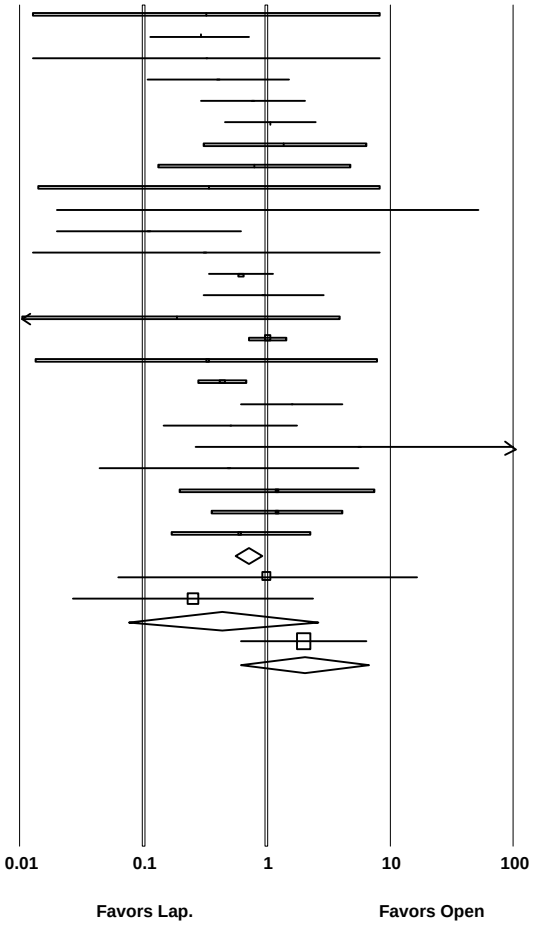
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Andersson et al. (2003)	1.078	0.148	7.841	0.074	0.941
2a	Bueno et al. (2004)	1.508	0.249	9.121	0.447	0.655
2a	Eklund et al. (2006)	1.598	0.449	5.688	0.724	0.469
2a	Gokalp et al. (2003)	5.252	0.247	111.684	1.063	0.288
2a	Gunal et al. (2007)	0.500	0.086	2.894	-0.774	0.439
2a	Heikkinen et al. (1998)	0.317	0.012	8.260	-0.691	0.490
2a	Langeveld et al. (2010)	3.019	0.963	9.463	1.896	0.058
2a	MRC et al. (1999)	16.215	2.141	122.789	2.697	0.007
2a	Zieren et al. (1998)	5.127	0.242	108.509	1.050	0.294
2a	Singh et al. (2011)	4.915	0.231	104.616	1.020	0.308
2a		2.080	1.111	3.896	2.288	0.022
2c	Dedemadi et al. (2006)	0.652	0.056	7.642	-0.340	0.734
2c	Eklund et al. (2007)	5.210	0.246	110.409	1.059	0.289
2c		1.502	0.204	11.060	0.399	0.690



KQ2a: I^2=9%, tau=0.30
KQ2c: I^2=7%, tau=0.4

Figure 10. Key Question 2: Meta-analyses of hematoma

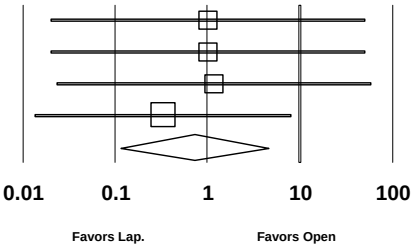
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Anadol et al. (2004)	0.320	0.012	8.245	-0.687	0.492
2a	Andersson et al. (2003)	0.290	0.113	0.748	-2.561	0.010
2a	Bostanci et al. (1998)	0.323	0.013	8.232	-0.684	0.494
2a	Bringman et al. (2003)	0.405	0.104	1.576	-1.303	0.192
2a	Bueno et al. (2004)	0.770	0.281	2.109	-0.509	0.611
2a	Eklund et al. (2006)	1.063	0.439	2.569	0.135	0.893
2a	Gokalp et al. (2003)	1.380	0.296	6.441	0.410	0.682
2a	Gong et al. (2011)	0.787	0.126	4.896	-0.257	0.797
2a	Gunal et al. (2007)	0.342	0.014	8.632	-0.652	0.514
2a	Hamza et al. (2010)	1.000	0.019	52.362	0.000	1.000
2a	Heikkinen et al. (1997)	0.111	0.020	0.626	-2.491	0.013
2a	Heikkinen et al. (1998)	0.317	0.012	8.260	-0.691	0.490
2a	Johansson et al. (1999)	0.617	0.333	1.145	-1.530	0.126
2a	Khoury et al. (1998)	0.944	0.297	2.999	-0.097	0.923
2a	Lal et al. (2003)	0.184	0.008	4.041	-1.073	0.283
2a	Langeveld et al. (2010)	1.015	0.692	1.488	0.074	0.941
2a	Lau et al. (2006)	0.330	0.013	8.199	-0.676	0.499
2a	MRC et al. (1999)	0.433	0.267	0.703	-3.382	0.001
2a	Neumayer et al. (2004)	1.584	0.612	4.104	0.948	0.343
2a	Paganini et al. (1998)	0.500	0.141	1.772	-1.074	0.283
2a	Payne et al. (1994)	5.645	0.264	120.628	1.108	0.268
2a	Picchio et al. (1999)	0.490	0.043	5.579	-0.575	0.566
2a	Pokorny et al. (2008)	1.212	0.193	7.624	0.205	0.838
2a	Zieren et al. (1998)	1.216	0.356	4.159	0.312	0.755
2a	Singh et al. (2011)	0.607	0.162	2.275	-0.740	0.459
2a		0.696	0.553	0.875	-3.096	0.002
2b	Ozmen et al. (2010)	1.000	0.060	16.713	0.000	1.000
2b	Sarli et al. (2001)	0.250	0.026	2.448	-1.191	0.234
2b		0.433	0.074	2.550	-0.925	0.355
2c	Beets et al. (1999)	2.000	0.615	6.509	1.151	0.250
2c		2.000	0.615	6.509	1.151	0.250



KQ2a: I^2=7%, tau=0.14
KQ2b: I^2=0%, tau=0

Figure 11. Key Question 2: Meta-analysis of small bowel injury

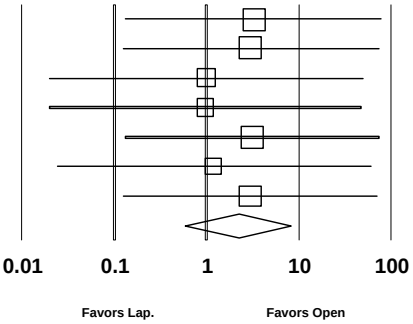
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Colak et al. (2003)	1.000	0.020	51.132	0.000	1.000
2a	Douek et al. (2003)	1.000	0.020	50.644	0.000	1.000
2a	Gong et al. (2011)	1.190	0.023	61.033	0.087	0.931
2a	MRC et al. (1999)	0.326	0.013	8.027	-0.686	0.493
2a		0.715	0.112	4.555	-0.356	0.722



KQ2a: I^2=0%, tau=0

Figure 12. Key Question 2: Meta-analysis of small bowel obstruction

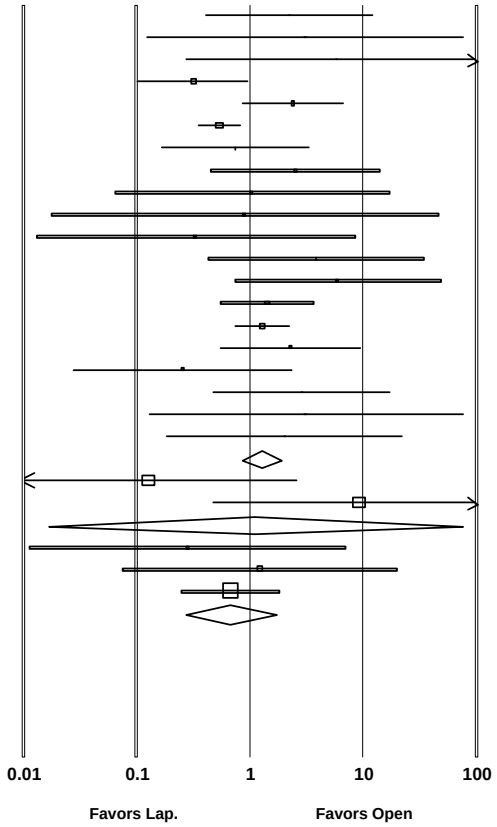
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Andersson et al. (2003)	3.264	0.131	81.293	0.721	0.471
2a	Bueno et al. (2004)	3.015	0.122	74.457	0.675	0.500
2a	Colak et al. (2003)	1.000	0.020	51.132	0.000	1.000
2a	Douek et al. (2003)	0.967	0.019	49.007	-0.017	0.987
2a	Eklund et al. (2006)	3.153	0.128	77.551	0.703	0.482
2a	Gong et al. (2011)	1.190	0.023	61.033	0.087	0.931
2a	MRC et al. (1999)	2.967	0.120	73.069	0.665	0.506
2a		2.159	0.583	8.001	1.152	0.249



KQ2a: I^2=0%, tau=0

Figure 13. Key Question 2: Meta-analyses of urinary retention

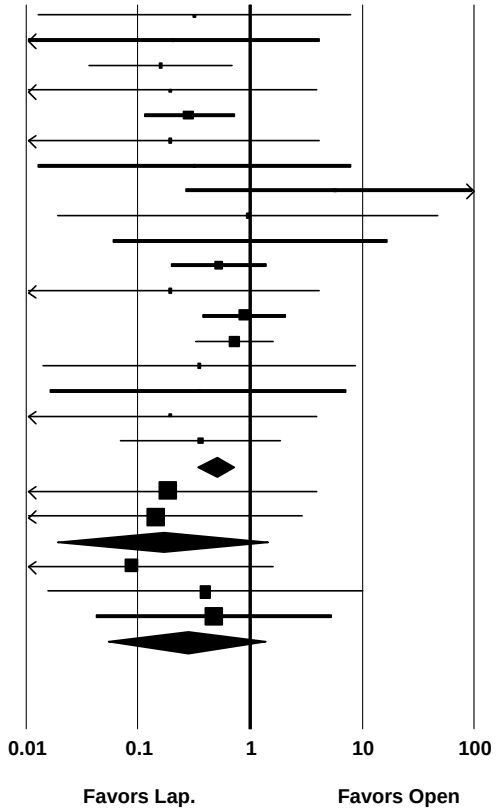
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Andersson et al. (2003)	2.247	0.400	12.627	0.919	0.358
2a	Bostanci et al. (1998)	3.095	0.121	78.868	0.684	0.494
2a	Bringman et al. (2003	5.791	0.274	122.236	1.129	0.259
2a	Bueno et al. (2004)	0.320	0.101	1.009	-1.945	0.052
2a	Douek et al. (2003)	2.414	0.833	7.001	1.622	0.105
2a	Eklund et al. (2006)	0.542	0.338	0.867	-2.553	0.011
2a	Gokalp et al. (2003)	0.750	0.161	3.500	-0.366	0.714
2a	Gong et al. (2011)	2.500	0.439	14.233	1.033	0.302
2a	Gunal et al. (2007)	1.051	0.064	17.397	0.035	0.972
2a	Heikkinen et al. (1997)	0.902	0.017	47.815	-0.051	0.960
2a	Heikkinen et al. (1998)	0.333	0.013	8.627	-0.662	0.508
2a	Johansson et al. (1999)	3.901	0.432	35.212	1.213	0.225
2a	Langeveld et al. (2010)	5.981	0.716	49.965	1.651	0.099
2a	MRC et al. (1999)	1.420	0.535	3.774	0.704	0.481
2a	Neumayer et al. (2004)	1.287	0.731	2.266	0.875	0.381
2a	Paganini et al. (1998)	2.304	0.545	9.736	1.135	0.256
2a	Payne et al. (1994)	0.255	0.028	2.369	-1.201	0.230
2a	Pokorny et al. (2008)	2.859	0.454	17.997	1.119	0.263
2a	Simmermacher et al. (2000)	3.113	0.125	77.560	0.692	0.489
2a	Zieren et al. (1998)	2.026	0.180	22.797	0.572	0.568
2a		1.247	0.836	1.861	1.081	0.280
2b	Ozmen et al. (2010)	0.130	0.006	2.617	-1.332	0.183
2b	Sarli et al. (2001)	9.400	0.455	193.994	1.451	0.147
2b		1.100	0.017	73.157	0.044	0.965
2c	Beets et al. (1999)	0.286	0.011	7.244	-0.759	0.448
2c	Dedemadi et al. (2006)	1.240	0.074	20.833	0.149	0.881
2c	Eklund et al. (2007)	0.679	0.243	1.892	-0.741	0.459
2c		0.675	0.268	1.699	-0.835	0.404



KQ2a: I^2=31%, tau=0.45
KQ2b: I^2=74%, tau=2.61
KQ2c: I^2=0%, tau=0

Figure 14. Key Question 2: Meta-analyses of wound infection

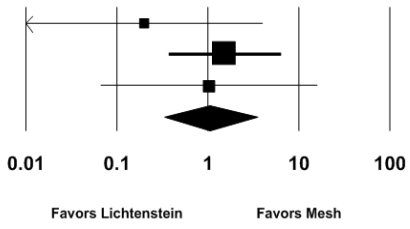
Group by kq	Study name	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
2a	Anadol et al. (2004)	0.320	0.012	8.245	-0.687	0.492
2a	Andersson et al. (2003)	0.202	0.010	4.282	-1.026	0.305
2a	Bueno et al. (2004)	0.158	0.035	0.716	-2.393	0.017
2a	Colak et al. (2003)	0.194	0.009	4.120	-1.052	0.293
2a	Douek et al. (2003)	0.282	0.110	0.723	-2.634	0.008
2a	Gokalp et al. (2003)	0.197	0.009	4.184	-1.042	0.297
2a	Hamza et al. (2010)	0.320	0.012	8.245	-0.687	0.492
2a	Heikkinen et al. (1998)	5.732	0.260	126.420	1.106	0.269
2a	Khoury et al. (1998	0.947	0.019	48.038	-0.027	0.978
2a	Lal et al. (2003)	1.000	0.059	16.928	0.000	1.000
2a	Langeveld et al. (2010)	0.527	0.192	1.441	-1.248	0.212
2a	Lau et al. (2006)	0.196	0.009	4.135	-1.047	0.295
2a	MRC et al. (1999)	0.894	0.375	2.131	-0.254	0.800
2a	Neumayer et al. (2004)	0.715	0.316	1.617	-0.805	0.421
2a	Payne et al. (1994)	0.354	0.014	8.899	-0.631	0.528
2a	Pokorny et al. (2008)	0.346	0.016	7.422	-0.678	0.498
2a	Zieren et al. (1998)	0.195	0.009	4.127	-1.050	0.294
2a	Singh et al. (2011)	0.359	0.067	1.928	-1.195	0.232
2a		0.487	0.333	0.711	-3.719	0.000
2b	Ozmen et al. (2010)	0.188	0.009	4.069	-1.066	0.286
2b	Sarli et al. (2001)	0.143	0.007	2.944	-1.260	0.207
2b		0.163	0.019	1.413	-1.646	0.100
2c	Beets et al. (1999)	0.088	0.005	1.684	-1.614	0.106
2c	Dedemadi et al. (2006)	0.396	0.015	10.138	-0.560	0.576
2c	Kouhia et al. (2009)	0.469	0.041	5.349	-0.610	0.542
2c		0.271	0.053	1.375	-1.576	0.115



KQ2a: I^2=0%, tau=0
KQ2b: I^2=0%, tau=0
KQ2c: I^2=0%, tau=0

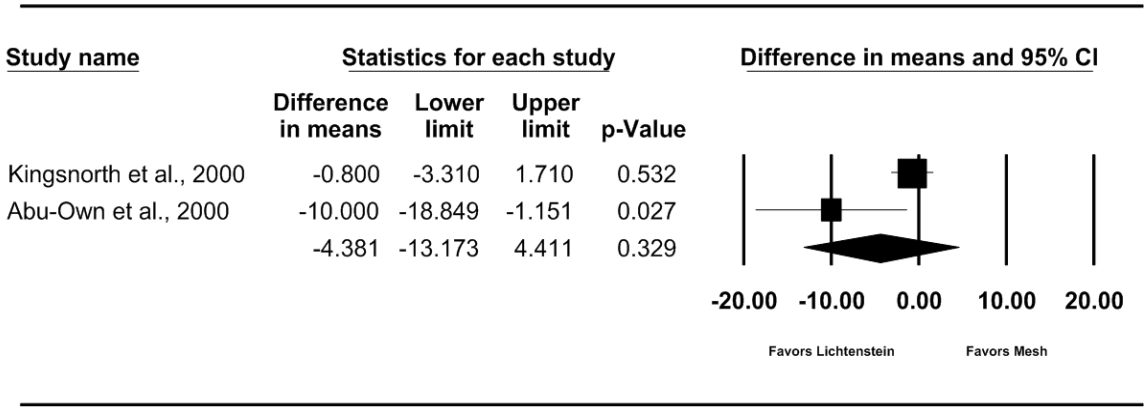
Figure 15. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of recurrence

Study name	Risk ratio	Lower limit	Upper limit	p-Value
Bringham et al., 2003	0.200	0.010	4.115	0.297
Frey et al., 2007	1.553	0.375	6.442	0.544
Dalenback et al., 2009	1.034	0.065	16.373	0.981
	1.065	0.332	3.419	0.916



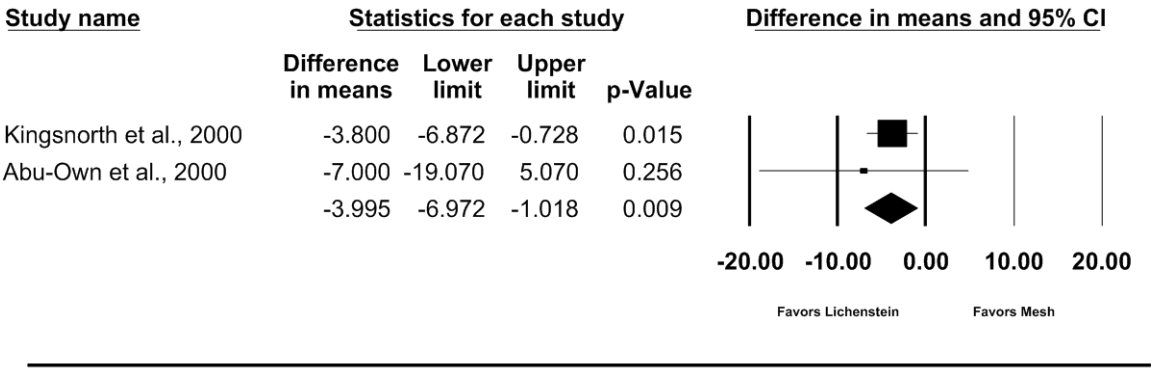
(I^2=0%, tau=0)

Figure 16. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of return to activities of daily living



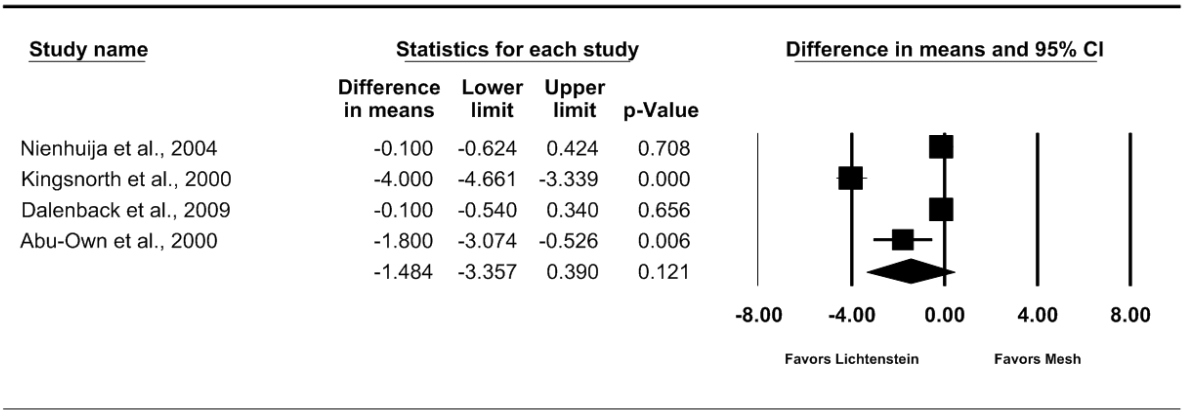
(I^2=74%, tau=31.3)

Figure 17. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of return to work



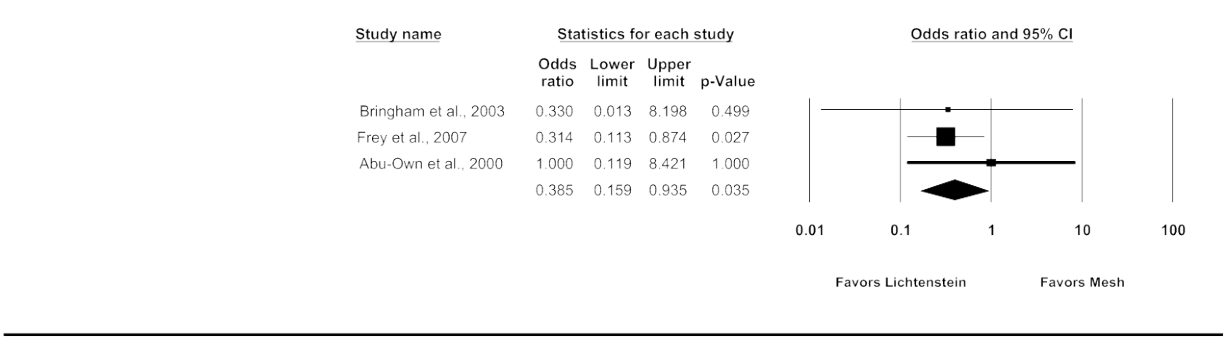
(I^2=0%, tau=0)

Figure 18. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of short-term pain



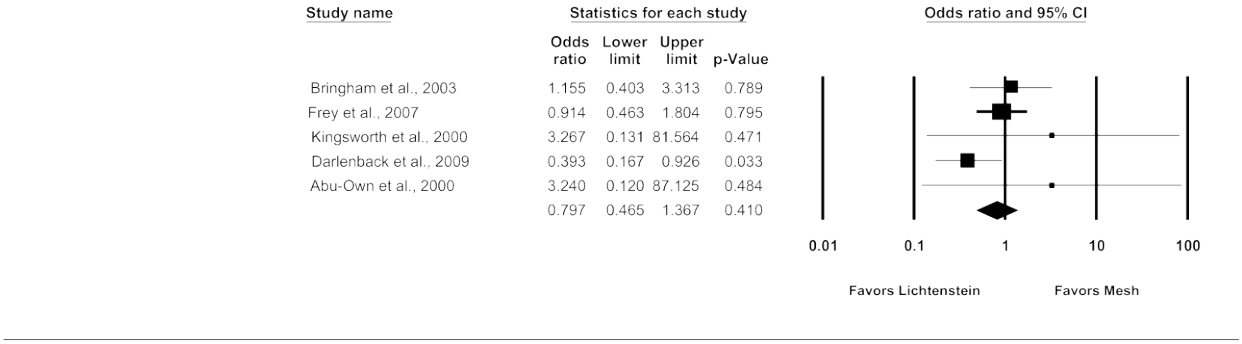
(I^2=97%, tau=3.5)

Figure 19. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of seroma



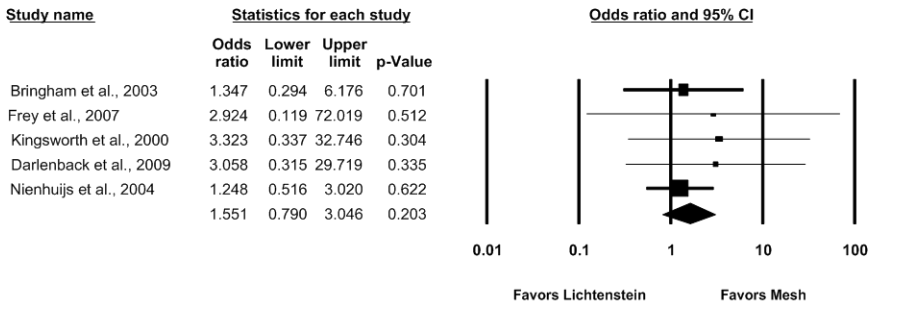
(I^2=0%, tau=0)

Figure 20. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of hematoma



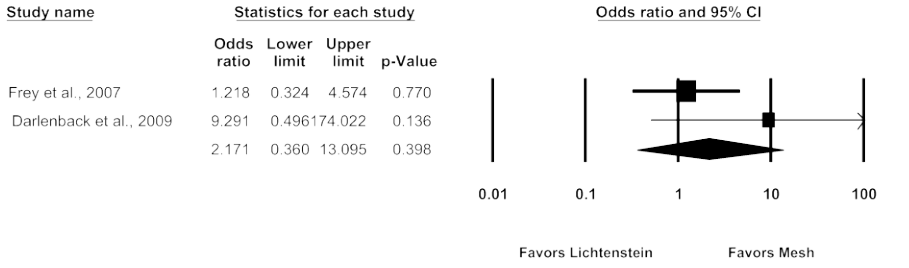
(I^2=14%, tau=0.06)

Figure 21. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of infection



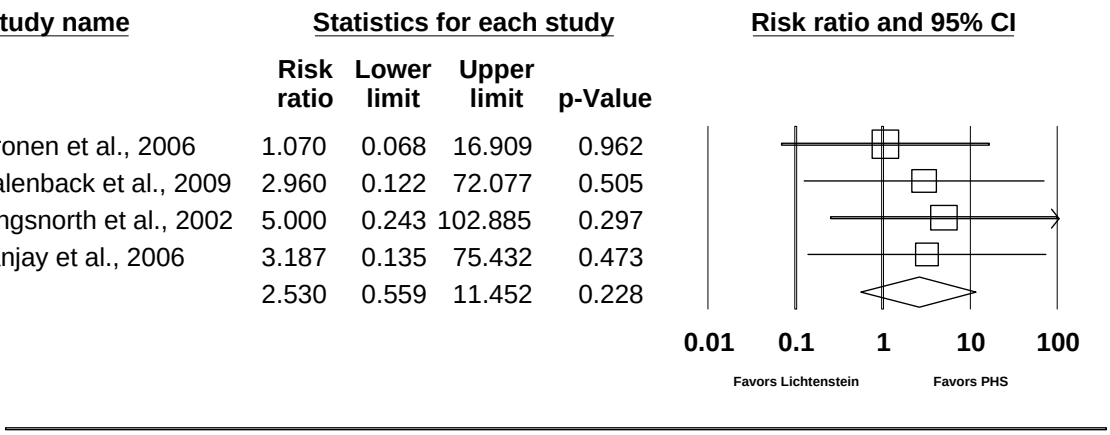
(I^2=0%, tau=0)

Figure 22. Key Question 3: Lichtenstein versus mesh plug, meta-analysis of urinary retention



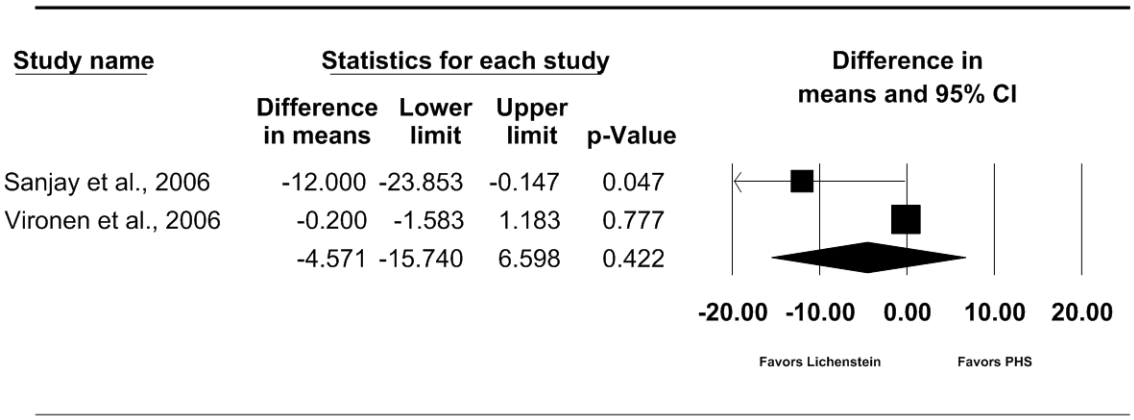
(I^2=35%, tau=0.72)

Figure 23. Key Question 3: Lichtenstein versus Prolene Hernia System, meta-analysis of recurrence



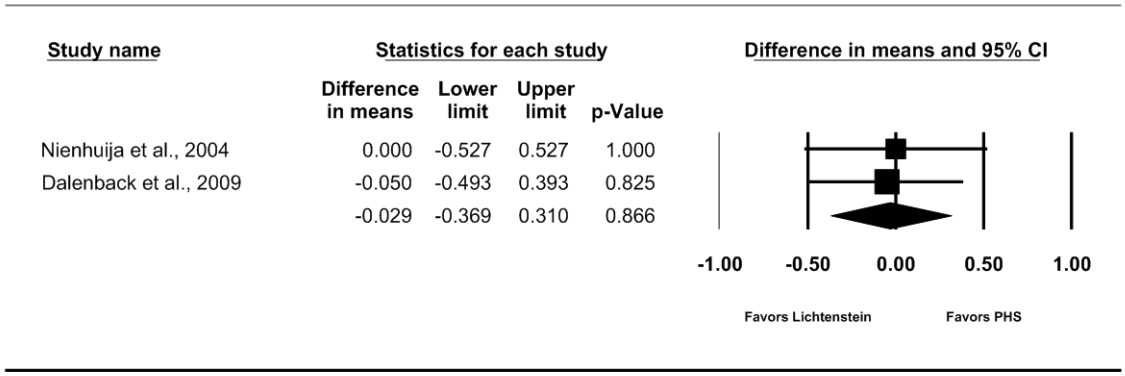
(I^2=0%, tau=0)

Figure 24. Key Question 3: Lichtenstein versus Prolene Hernia System, meta-analysis of return to work



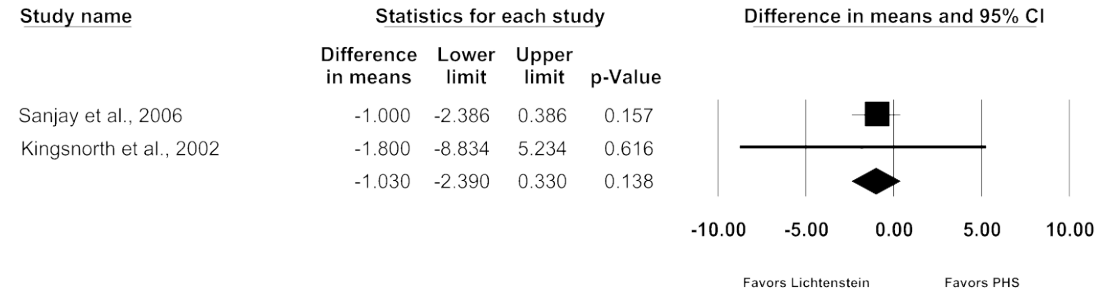
(I^2=0%, tau=0)

Figure 25. Key Question 3: Lichtenstein versus Prolene Hernia System, meta-analysis of short-term pain



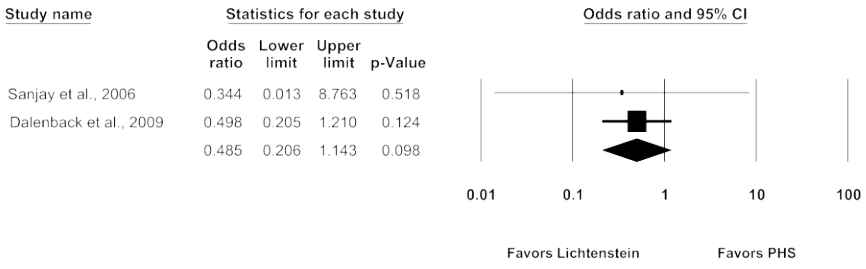
(I^2=0%, tau=0)

Figure 26. Key Question 3: Lichtenstein versus Prolene Hernia System, meta-analysis of intermediate-term pain



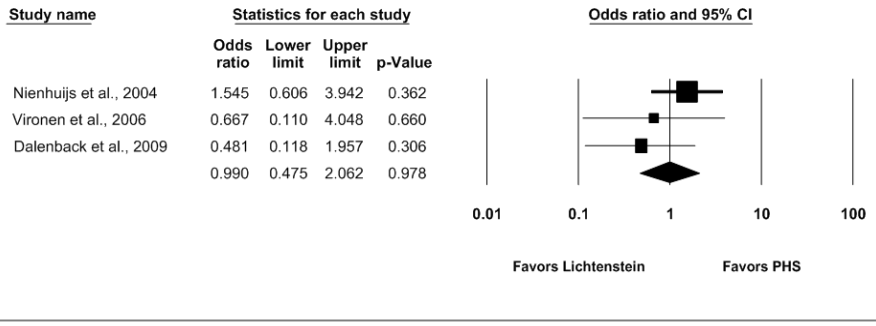
(I^2=0%, tau=0)

Figure 27. Key Question 3: Lichtenstein versus Prolene Hernia System, meta-analysis of hematoma



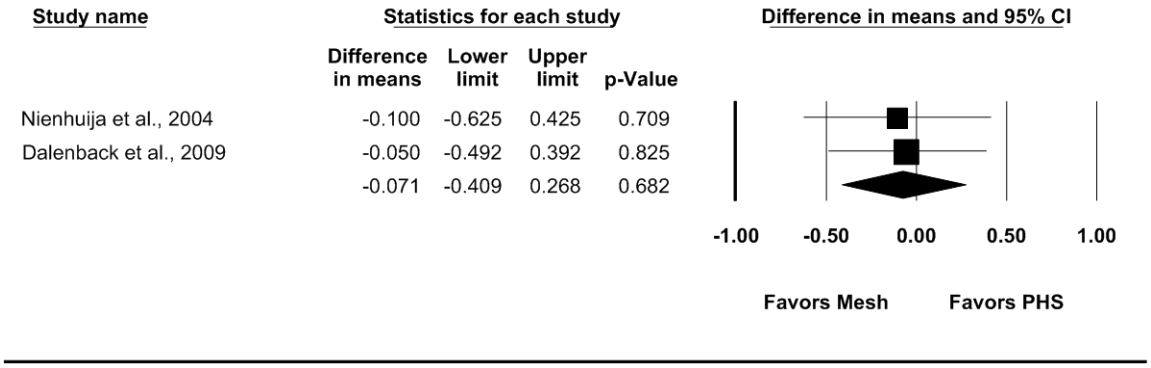
(I^2=0%, tau=0)

Figure 28. Key Question 3: Lichtenstein versus Prolene Hernia System, meta-analysis of infection



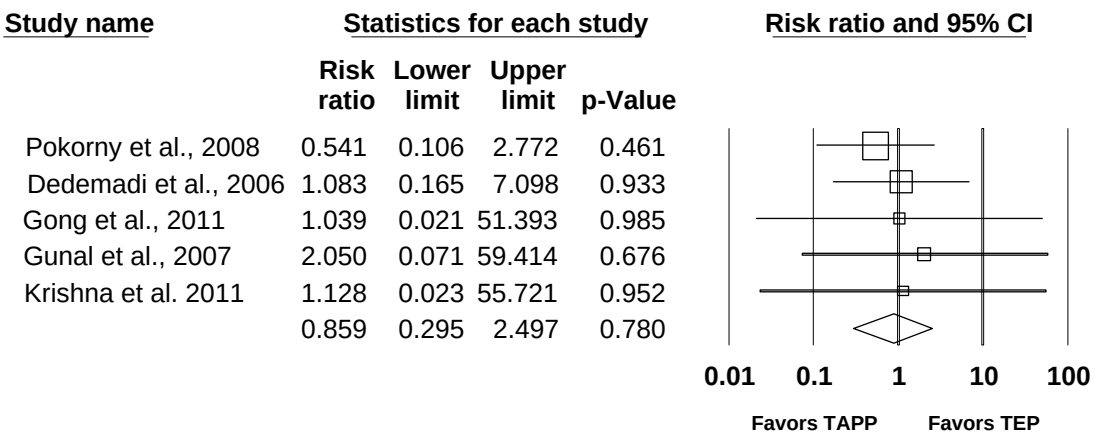
(I^2=3%, tau=0.02)

Figure 29. Key Question 3: Mesh plug versus Prolene Hernia System, meta-analysis of short-term pain



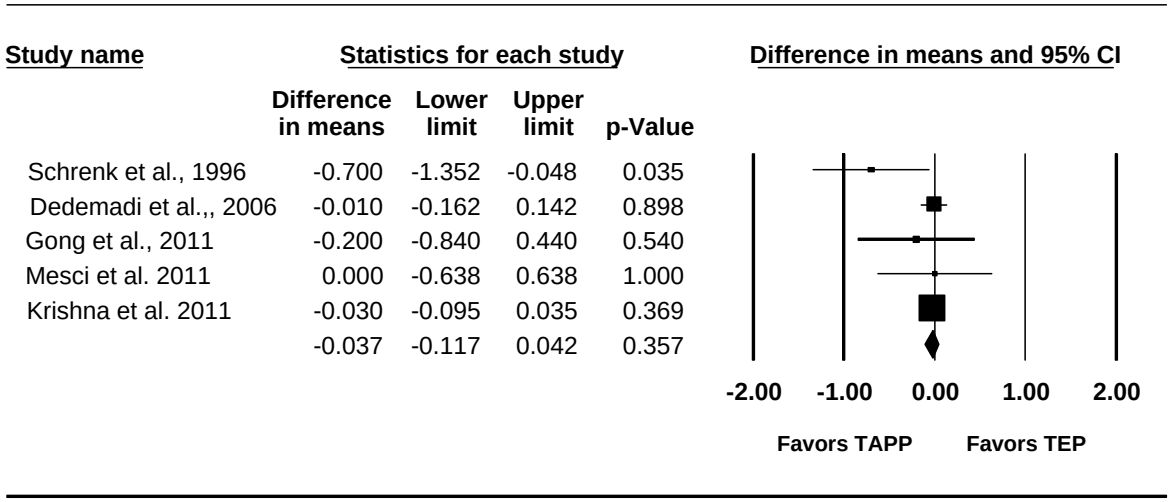
(I^2=0%, tau=0)

Figure 30. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of recurrence



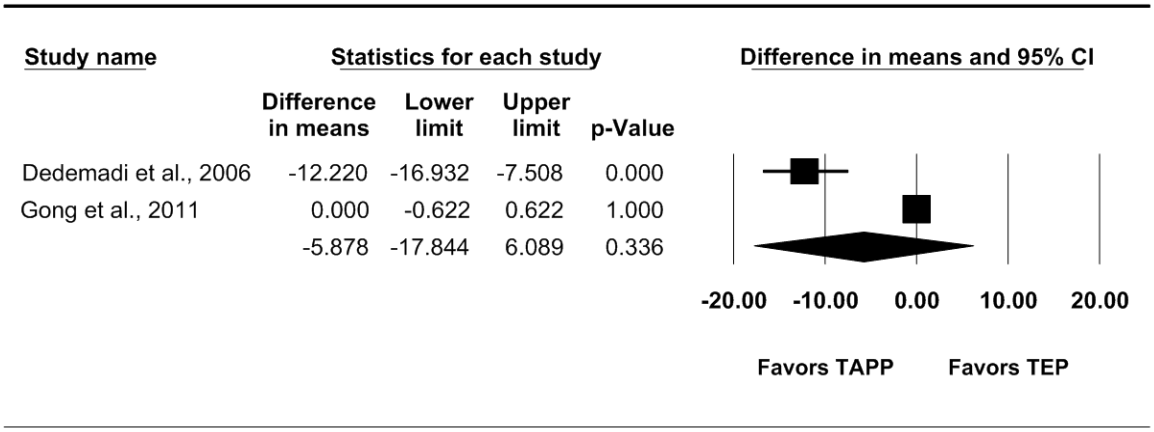
(I^2=0%, tau=0)

Figure 31. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of length of stay



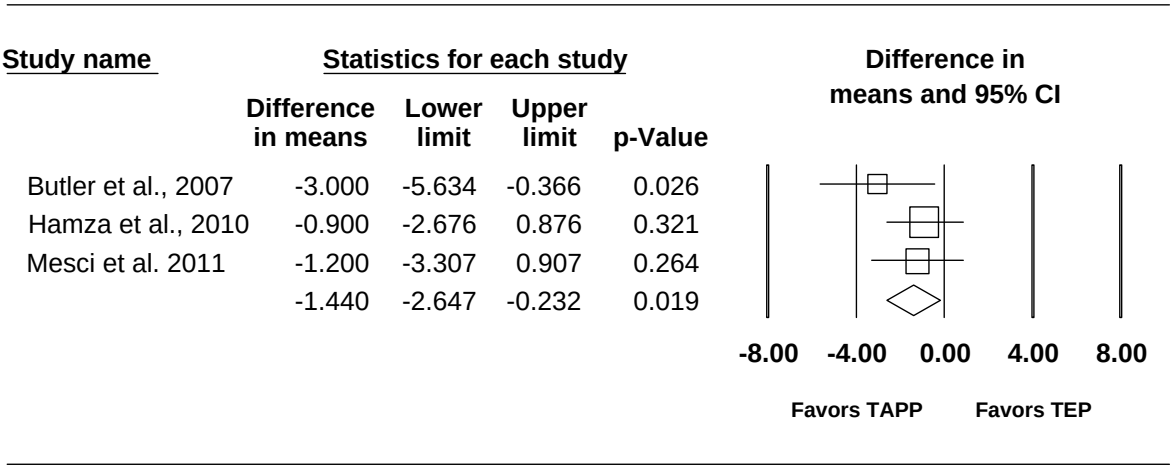
(I^2=8.76%, tau=0.03)

Figure 32. Key Question 4: TAPP versus TEPP, meta-analysis of return to activities of daily living



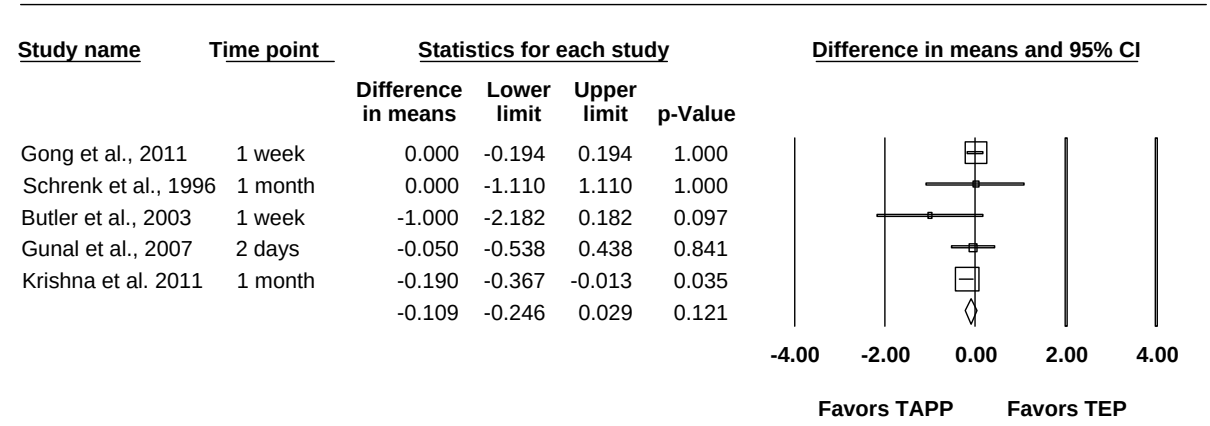
(I^2=93%, tau=0.98)

Figure 33. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of return to work



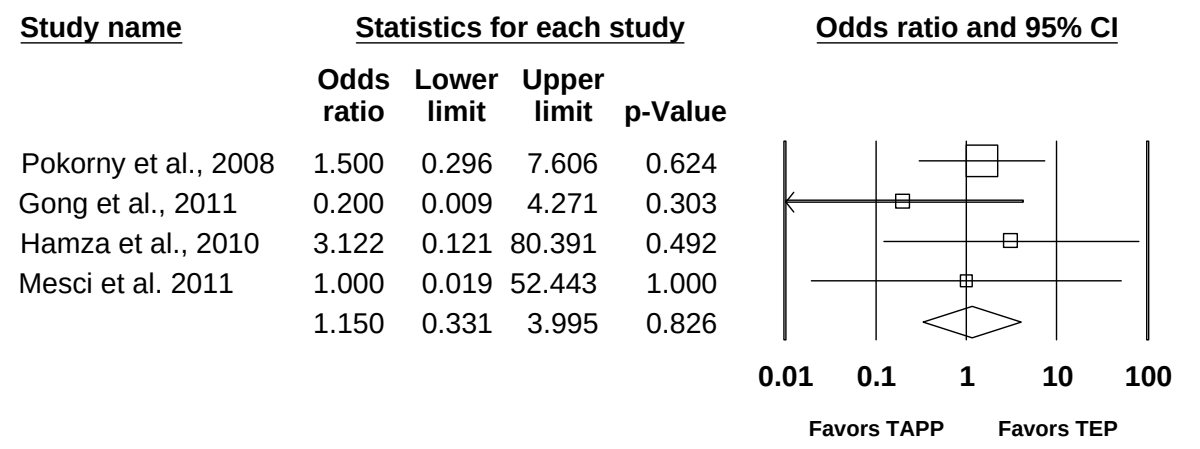
(I^2=0%, tau=0)

Figure 34. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of short-term pain



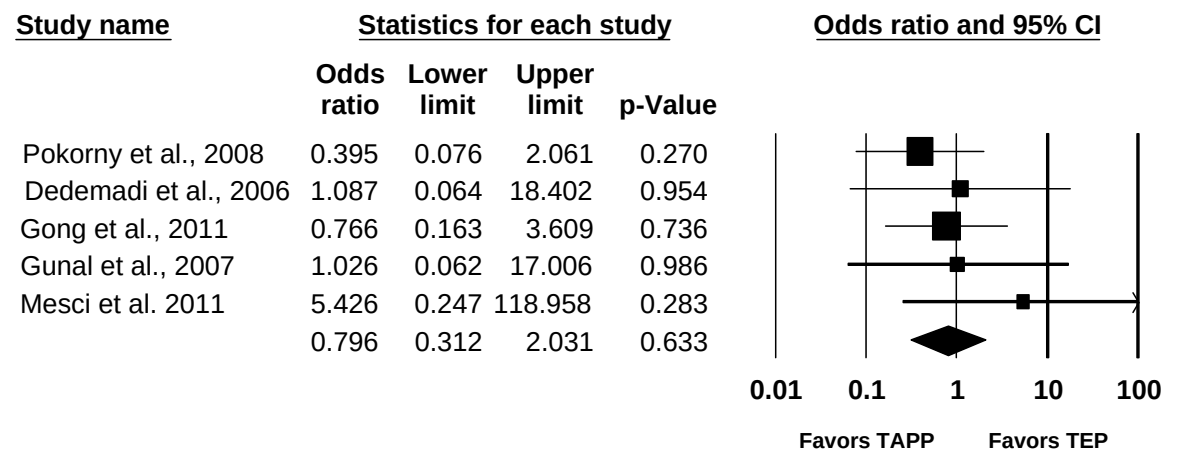
(I^2=6.87%, tau=0.05)

Figure 35. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of hematoma



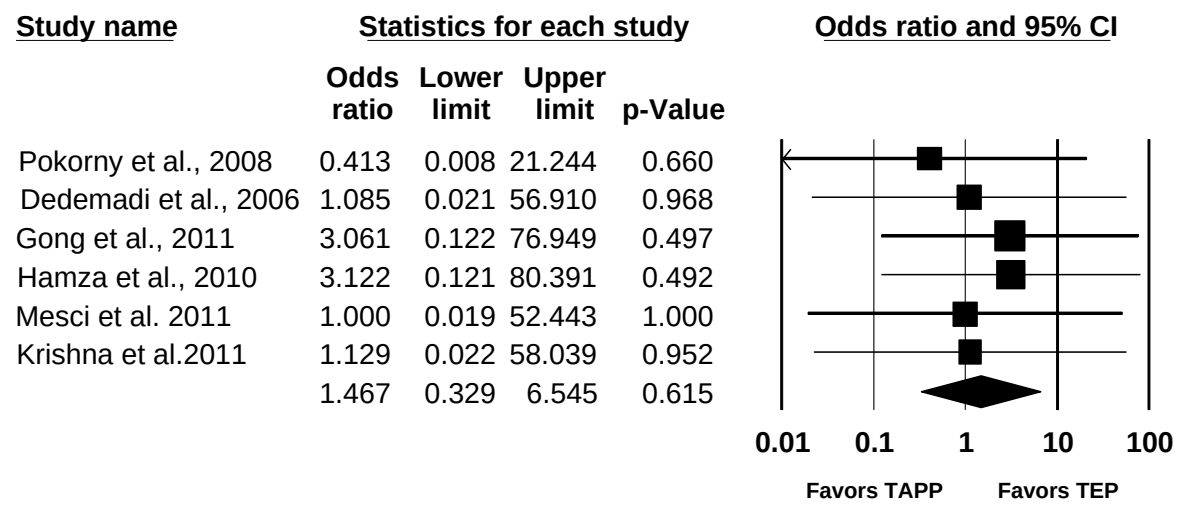
(I^2=0%, tau=0)

Figure 36. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of urinary retention



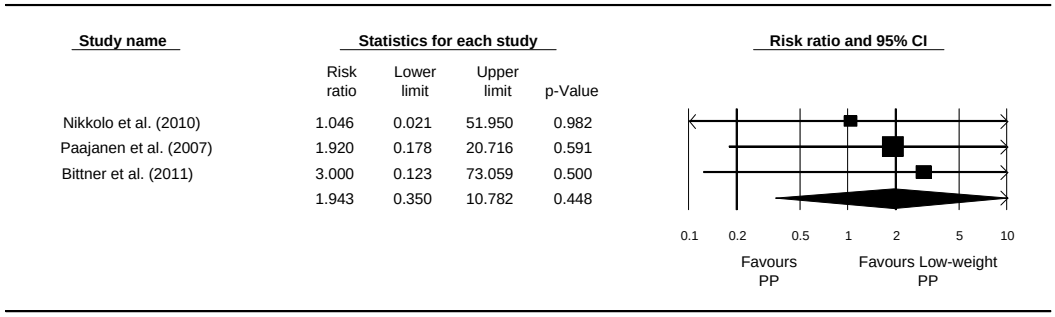
(I^2=0%, tau=0)

Figure 37. Key Question 4: Transabdominal preperitoneal repair versus totally extraperitoneal repair, meta-analysis of infection



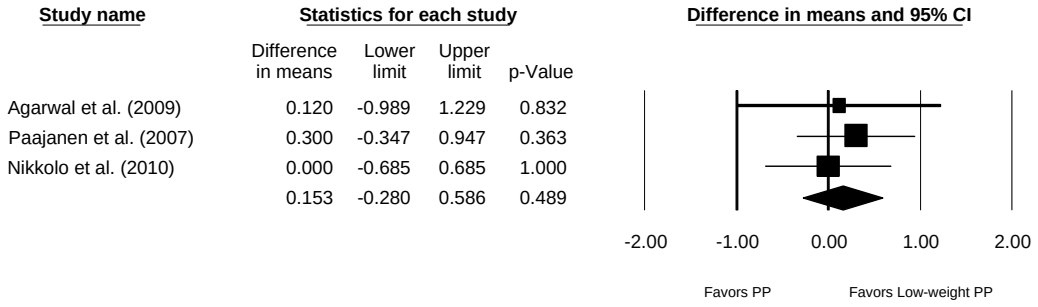
(I^2=0%, tau=0)

Figure 38. Key Question 5: Polypropylene versus low-weight polypropylene, meta-analysis of recurrence



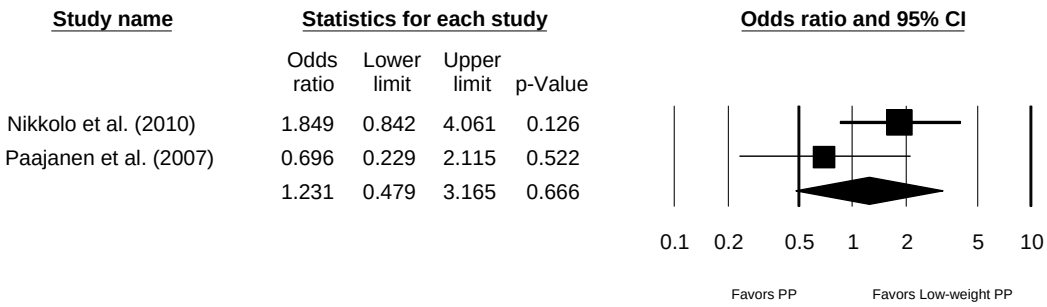
(I^2=0%, tau=0)

Figure 39. Key Question 5: Polypropylene versus low-weight polypropylene, meta-analysis of long-term pain



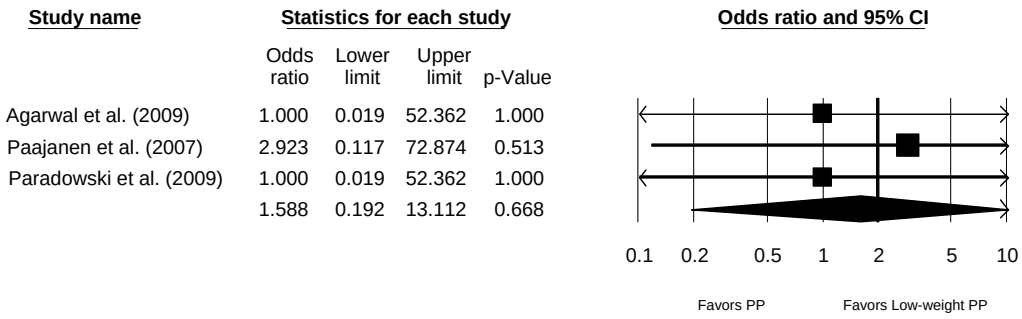
(I^2=0%, tau=0)

Figure 40. Key Question 5: Polypropylene versus low-weight polypropylene, meta-analysis of feeling of foreign body



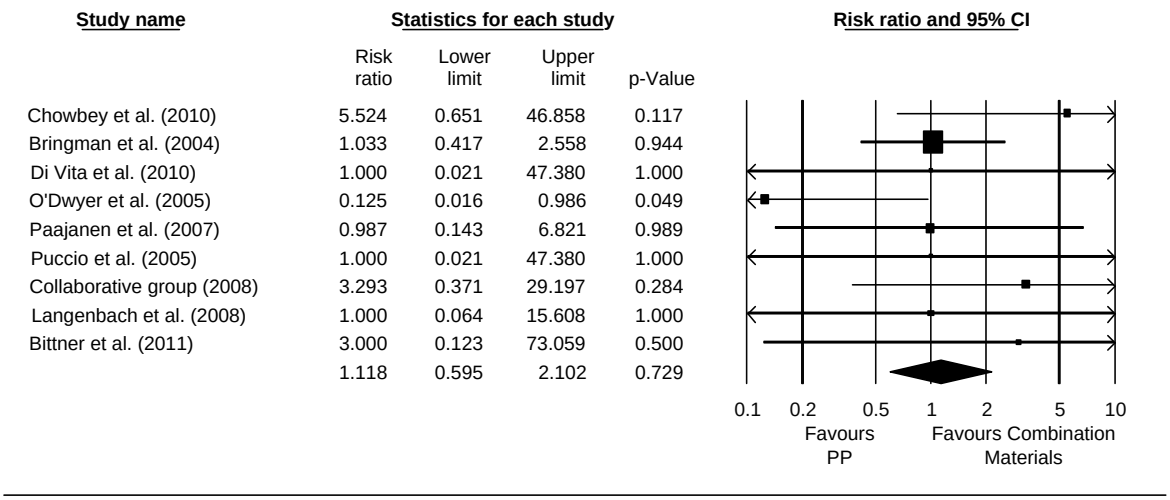
(I^2=50%, tau=0.49)

Figure 41. Key Question 5: Polypropylene versus low-weight polypropylene, meta-analysis of infection



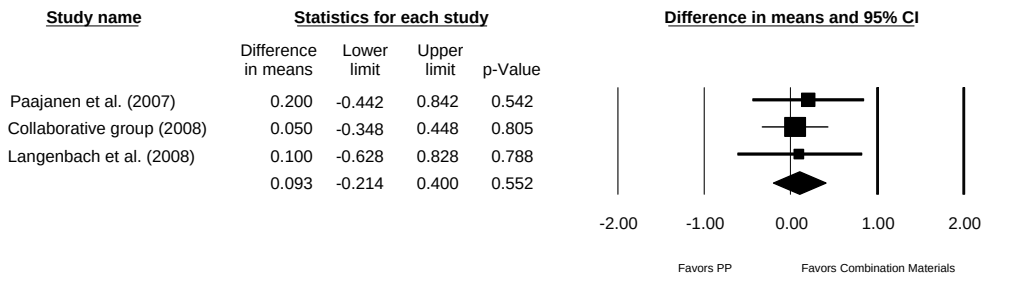
(I^2=0%, tau=0)

Figure 42. Key Question 5: Polypropylene versus combination material, meta-analysis of recurrence



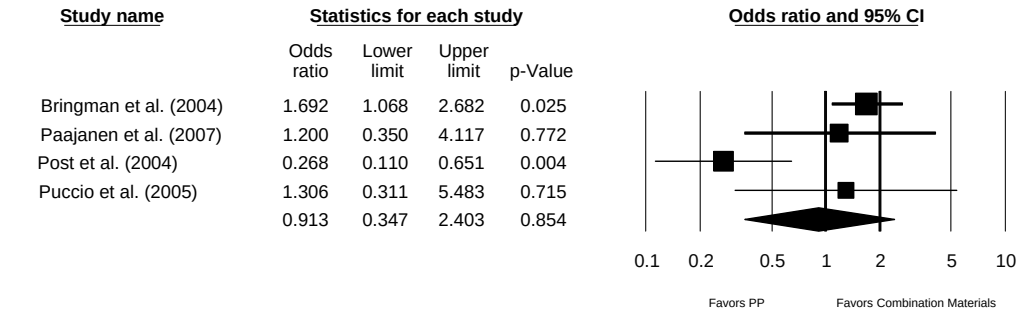
(I^2=0%, tau=0.00)

Figure 43. Key Question 5: Polypropylene versus combination material, meta-analysis of long-term pain



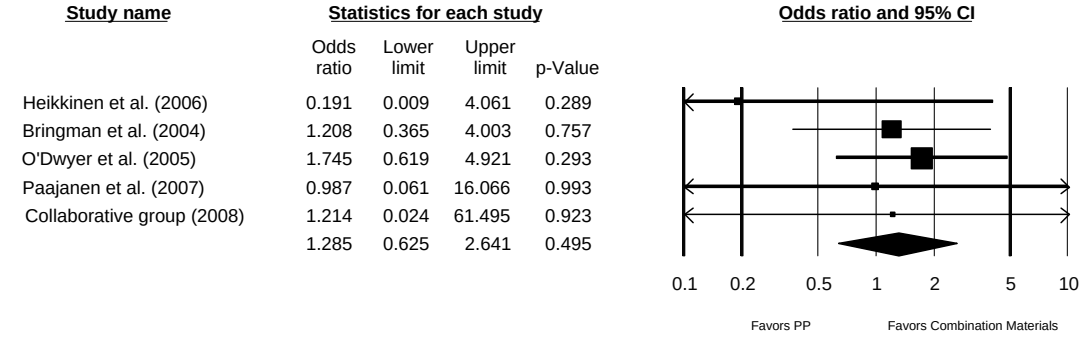
(I^2=0%, tau=0)

Figure 44. Key Question 5: Polypropylene versus combination material, meta-analysis of feeling of foreign body



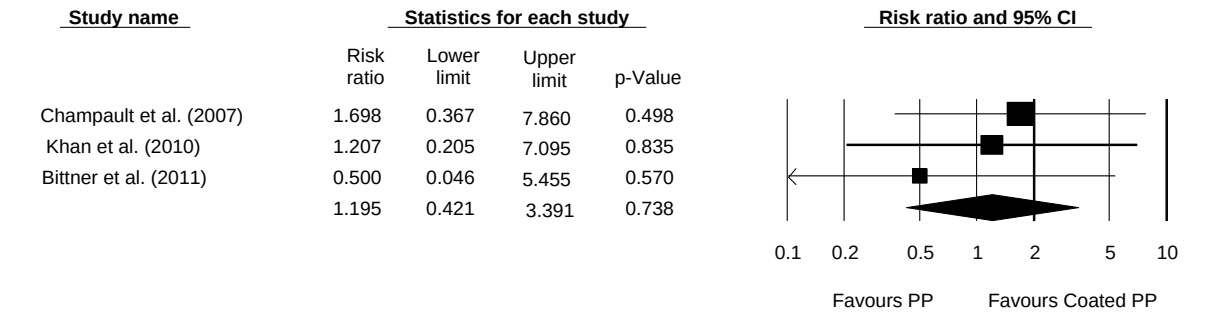
(I^2=77%, tau=0.84)

Figure 45. Key Question 5: Polypropylene versus combination material, meta-analysis of infection



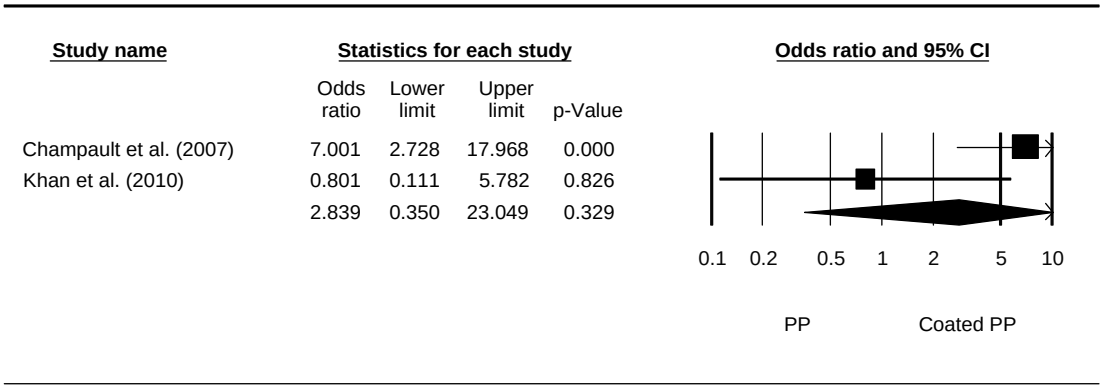
(I^2=0%, tau=0)

Figure 46. Key Question 5: Polypropylene versus coated polypropylene, meta-analysis of recurrence



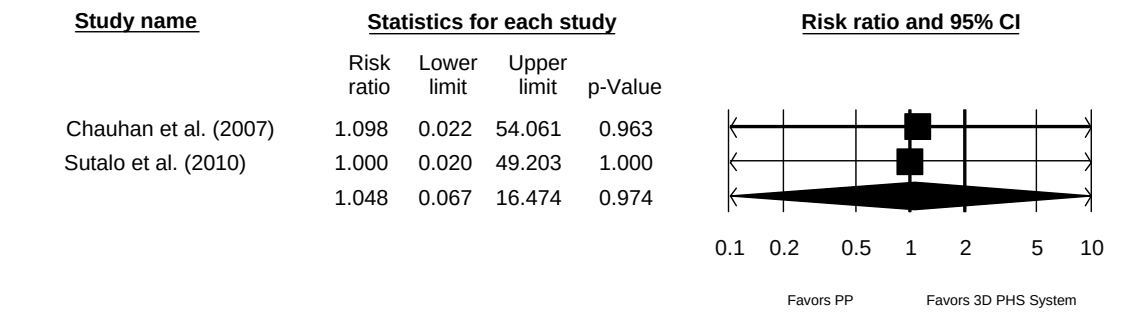
(I^2=0%, tau=0)

Figure 47. Key Question 5: Polypropylene versus coated polypropylene, meta-analysis of long-term pain



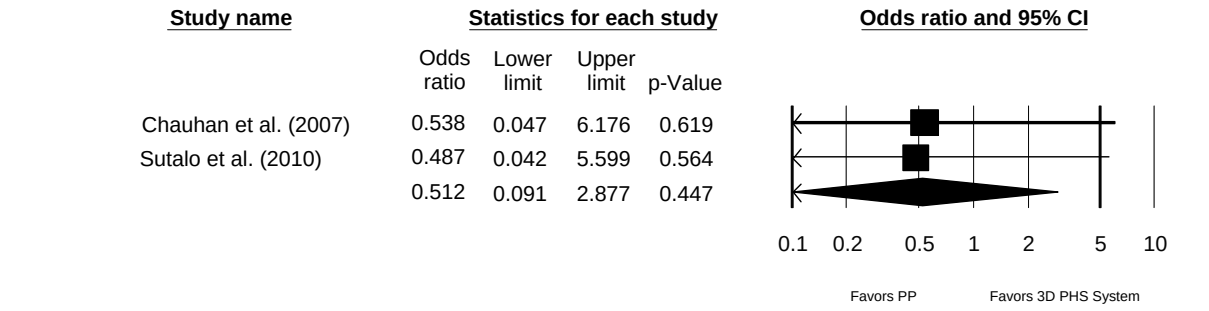
(I^2=73%, tau=1.3)

Figure 48. Key Question 5: Polypropylene versus 3D Prolene Hernia System, meta-analysis of recurrence



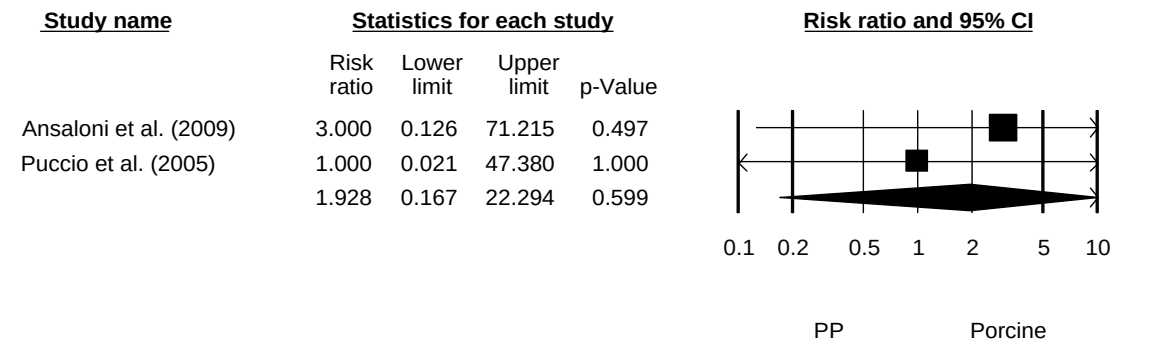
(I^2=0%, tau=0)

Figure 49. Key Question 5: Polypropylene versus 3D Prolene Hernia System, meta-analysis of infection



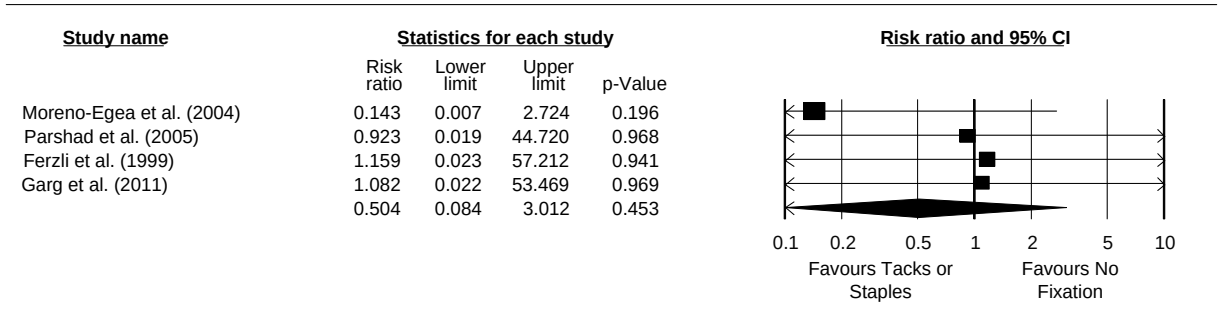
(I^2=0%, tau=0)

Figure 50. Key Question 5: Polypropylene versus porcine, meta-analysis of recurrence



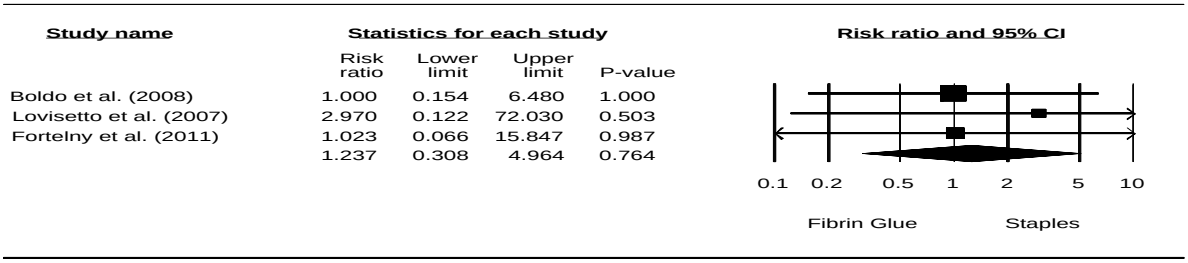
(I^2=0%, tau=0)

Figure 51. Key Question 6: Tacks or staples versus no fixation, meta-analysis of recurrence



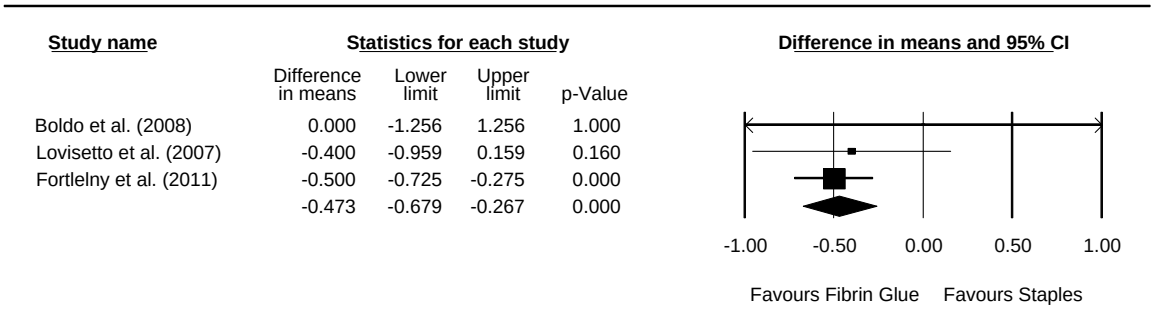
(I^2=0%, tau=0)

Figure 52. Key Question 6: Fibrin glue versus staples, meta-analysis of recurrence



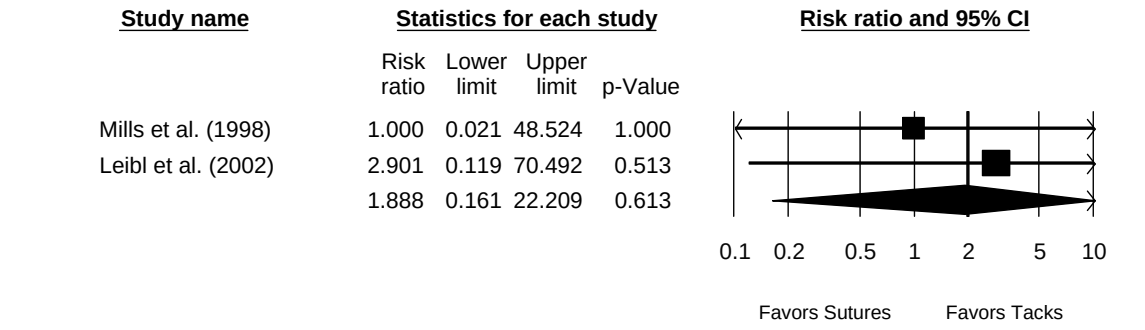
(I^2=0%, tau=0)

Figure 53. Key Question 6: Fibrin glue versus staples, meta-analysis of long-term pain



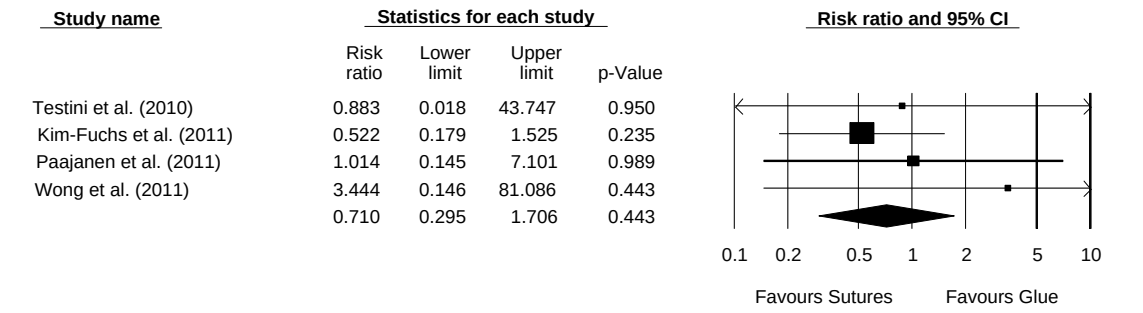
(I^2=0%, tau=0)

Figure 54. Key Question 6: Sutures versus tacks, meta-analysis of recurrence



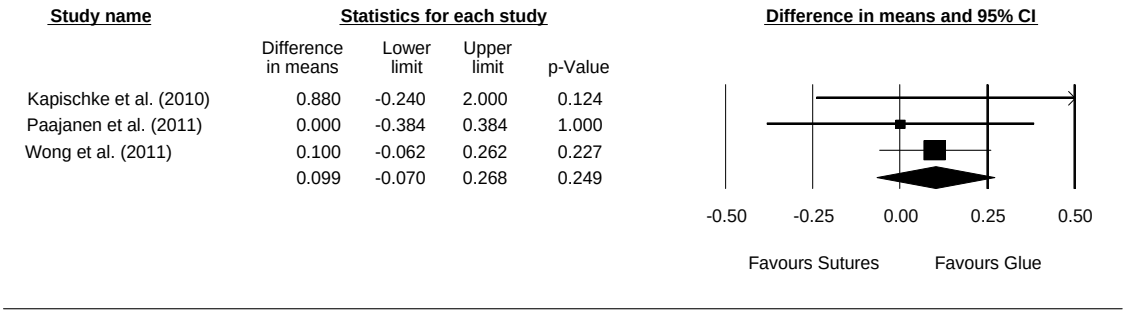
(I^2=0%, tau=0)

Figure 55. Key Question 6: Sutures versus glue, meta-analysis of recurrence



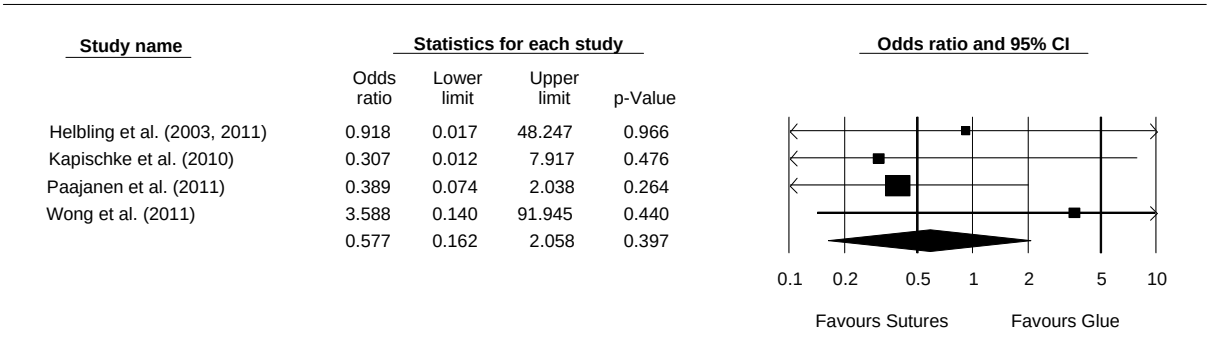
(I^2=0%, tau=0.00)

Figure 56. Key Question 6: Sutures versus glue, meta-analysis of long-term pain



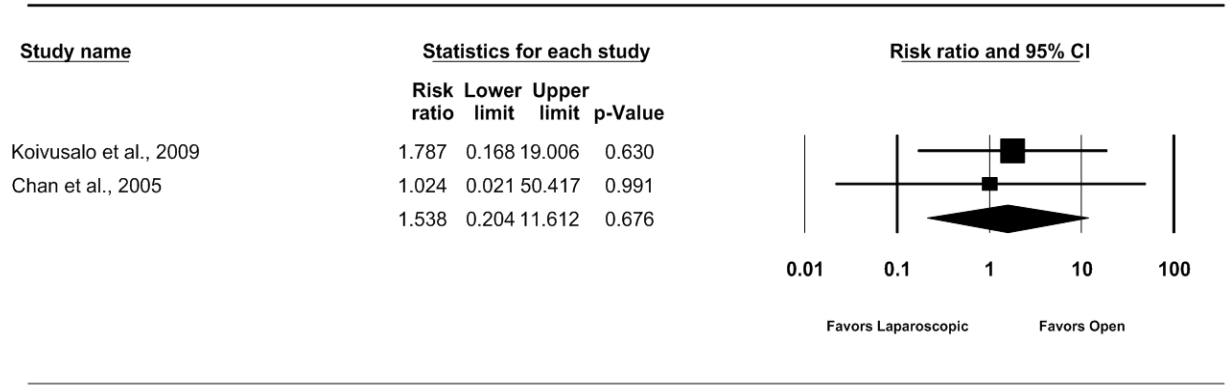
(I^2=5.76%, tau=0.00)

Figure 57. Key Question 6: Sutures versus glue, meta-analysis of infection



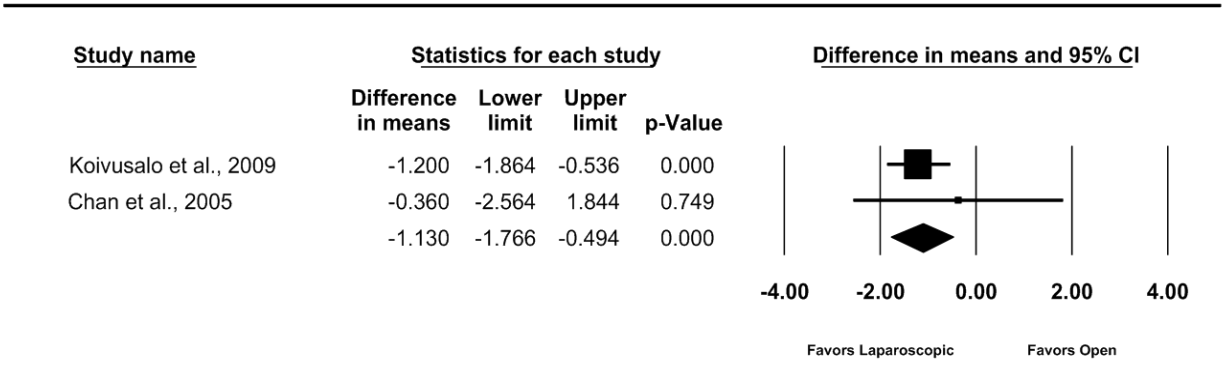
(I^2=0%, tau=0)

Figure 58. Key Question 9: Meta-analysis of recurrence



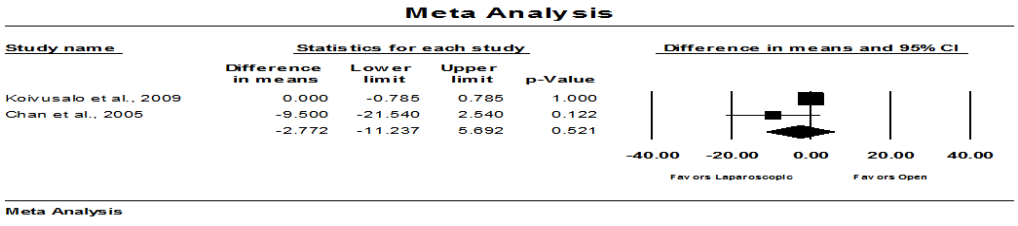
(I^2=0%, tau=0)

Figure 59. Key Question 9: Meta-analysis of length of stay



(I^2=0%, tau=0)

Figure 60. Key Question 9: Meta-analysis of return to daily activities



(I^2=58%, tau=26)

Discussion

Summary of Key Findings

A comprehensive list of our conclusions appears in Table 18 below. Clinically significant differences are boldfaced (see further discussion below). Data on other comparisons or other postsurgical outcomes were either insufficient to permit conclusions or were not considered major comparisons/outcomes.

For Key Question 1, the only conclusion permitted by the evidence was that QOL, which was reported as "overall change in health status in previous 12 months" at 1 year, was greater after repair than after WW. The evidence on long-term pain interfering with activities was inconclusive due to low precision of the estimate of the difference between groups (OR = 0.42, 95% CI, 0.17 to 1.04, which meant that the effect could be as much as OR = 0.17 in favor of the repair group or it could be 1.04 in favor of the WW group). The actual rates of long-term pain interfering with activities were 2.2 percent in the repair group and 5.1 percent in the WW group. The primary risk of WW is hernia strangulation, but the evidence was also inconclusive on this outcome. The primary benefit of WW is that one avoids (at least temporarily) the risks of surgery.

For Key Question 2, most outcomes favored laparoscopy over open repair, with the key exception of recurrence in the repair of primary hernia, which found slightly lower rates after open surgery (an estimated 2.5 percent for open surgery versus an estimated 3.6 percent for laparoscopic surgery). We considered this to be smaller than a clinically significant difference; however, some patients and clinicians may consider this an important difference. Another way to describe the difference, which may lead one to believe it is an important difference, is in relative terms: an estimated 43 percent higher risk after laparoscopic mesh repair than after open mesh repair in the context of primary hernia. The infrequency of the outcome is why the relative effect sounds larger than an absolute effect.

Most outcomes favoring laparoscopy involved short-term recovery (hospital stay, RTDA, RTW) and certain types of adverse events (lower rates of wound infection and hematoma). Several of these outcomes showed clinically significant differences. These findings are consistent with the typical reasons why laparoscopy is performed. Interestingly, for recurrent hernia, the risk of a second recurrence was actually lower with open surgery than with laparoscopy. Another interesting finding was that long-term pain was less likely after laparoscopy (also a clinically significant difference), which we found for both primary hernia and recurrent hernia.

For Key Question 3, comparing open mesh procedures, many believe that the Lichtenstein procedure is the best option, but we found that for most comparisons, its results are similar to other prominent open procedures such as mesh plug, PHS, open preperitoneal mesh, and the Kugel procedure. The two exceptions to this were when Lichtenstein had better outcomes than mesh plug regarding RTW (a clinically significant difference) and rates of seroma.

For Key Question 4, comparing laparoscopic mesh procedures, the most commonly performed comparison was between TAPP and TEP, and the evidence permitted four conclusions: that RTW is shorter after TAPP and that short-term, intermediate-term, and long-term pain rates are approximately equivalent.

For Key Question 5, comparing types of meshes, we found approximate equivalence for several outcomes of several comparisons. Standard PP mesh had similar rates of recurrence as

combination materials. Three types of mesh (standard PP, low-weight PP, and porcine) had approximately equivalent rates of long-term pain.

For Key Question 6, comparing fixation approaches, we found approximate equivalence in recurrence rates for tacks or staples versus no fixation and sutures versus glue. Also, long-term pain was approximately equivalent between sutures and glue and favored the fibrin glue group when compared to staple fixation.

For Key Question 7, many studies have reported that surgical experience lowers the risk of recurrence after laparoscopic repair, but the data were reported inconsistently and do not permit any estimate of the length of the learning curve.

For Key Question 8, no studies have compared surgical exploration to WW, and in a section below we discuss the pertinent issues.

For Key Question 9, comparing laparoscopy to open high ligation, we found that RTDA was similar for both groups. However, the length of stay was shorter after laparoscopy (as one would expect). Also, long-term patient SFN and long-term cosmesis were greater after laparoscopy, and this likely involves the smaller scar.

Table 18. Conclusions of this review

Population	Comparison	Outcome	Conclusion	Strength of Evidence
Adults with pain-free inguinal hernia	Repair vs. WW	Quality of life at 1 year	Favors repair Estimated difference on a 0-100 scale, 7 points (CI, 0.4 to 14.3)	Low
Adults with painful inguinal hernia, primary	Lap. vs. open	Recurrence	Favors open Relative risk, 1.43 (CI, 1.2 to 1.8)	Low
		Hospital stay	Approximate equivalence	Low
		Time to return to daily activities	Favors lap. 3.9 days earlier (CI, 2.2 to 5.6)	High
		Time to return to work	Favors lap. 4.6 days earlier (CI, 3.1 to 6.1)	High
		Long-term pain	Favors lap. Odds ratio, 0.61 (CI, 0.48 to 0.78)	Mod.
		Epigastric vessel injury	Favors open Odds ratio, 2.1 (CI, 1.1 to 3.9)	Low
		Hematoma	Favors lap. Odds ratio, 0.70 (CI, 0.55 to 0.88)	Low
		Wound infection	Favors lap. Odds ratio, 0.49 (CI, 0.33 to 0.71)	Mod.
Adults with painful inguinal hernia, bilateral	Lap. vs. open	Time to return to work	Favors lap. 14 days earlier (CI not calculable)	Low

Table 18. Conclusions of this review (continued)

Population	Comparison	Outcome	Conclusion	Strength of Evidence
Adults with painful inguinal hernia, recurrent	Lap. vs. open	Recurrence	Favors lap. Relative risk, 0.82 (CI, 0.70 to 0.96)	Low
		Time to return to daily activities	Favors lap. 7.4 days earlier (CI, 3.4 to 11.4)	High
		Long-term pain	Favors lap. Odds ratio, 0.24 (CI, 0.08 to 0.74)	Mod.
Adults with painful inguinal hernia	Lichtenstein vs. mesh plug	Recurrence	Approximate equivalence	Mod.
	Lichtenstein vs. mesh plug	Return to work	Favors Lich. 4 days earlier (CI, 1 to 7)	Mod.
	Lichtenstein vs. mesh plug	Seroma	Favors Lich. Odds ratio, 0.39 (CI, 0.16 to 0.94)	Mod.
	Lichtenstein vs. PHS	Short-term pain	Approximate equivalence	Mod.
	Lichtenstein vs. OPM	Short-term pain		Low
	Mesh plug vs. PHS	Short-term pain		Mod.
	Lichtenstein vs. Kugel	Short-term pain		Low
	Lichtenstein vs. Kugel	Intermediate-term pain		Low
	TAPP vs. TEP	Return to work	Favors TAPP 1.4 days earlier (CI, 0.2 to 2.7)	Mod.
		Short-term pain	Approximate equivalence	Mod.
		Intermediate-term pain		Low
		Long-term pain		Low
	PP vs. low-weight PP	Long-term pain (≥6 months)		Low
	PP vs. combination materials	Recurrence		Mod.
	PP vs. porcine	Long-term pain (≥6 months), VAS at rest		Low
		Long-term pain (≥6 months), VAS on movement		Low
	Tacks or staples vs. no fixation	Recurrence		Mod.
	Fibrin glue vs. staples	Long-term pain (≥6 months)	Favors fibrin glue Difference in means, -0.47 (CI, -0.68 to -0.27)	Low
	Sutures vs. glue	Recurrence	Approximate equivalence	Mod.
		Long-term pain (≥6 months)		Low

Table 18. Conclusions of this review (continued)

Population	Comparison	Outcome	Conclusion	Strength of Evidence
Adults with painful inguinal hernia	Sutures vs. glue	Long-term pain (≥6 months)	Approximate equivalence	Low
Pediatric patients with inguinal hernia	Lap. vs. open	Return to daily activities	Approximate equivalence	Low
Pediatric patients with inguinal hernia	Lap. vs. open	Length of stay	Favors Lap. 1.1 hours earlier (CI 0.5 to 1.8)	Mod.
Pediatric patients with inguinal hernia	Lap. vs. open	Long-term patient satisfaction	Favors Lap. Difference in satisfaction points 1.0 (CI: 0.5 to 1.5)	Low
Pediatric patients with inguinal hernia	Lap. vs. open	Long-term cosmesis	Favors Lap. Difference in satisfaction points 0.25 (CI: 0.12 to 0.38)	Low

CI = confidence interval; lap. = laparoscopy; OPM = open preperitoneal mesh; PHS = Prolene™ Hernia System; PP = polypropylene; TAPP = transabdominal preperitoneal repair; TEP = totally extraperitoneal repair; VAS = visual analog scale; WW = watchful waiting.
Note: Conclusions in boldface are those involving a clinically significant difference between treatment options.

Implications, Clinical Context, and Applicability

The typical adult in the included studies was a man in his mid-50s, of average weight, suffering from a primary unilateral hernia. About a quarter of the men worked in physically strenuous jobs; for these men, a durable repair is relatively important to prevent a recurrence. Our review can inform numerous treatment decisions these men face. These treatment decisions include:

- Whether to undergo surgery at an earlier time or wait. Our data was mostly inconclusive on this point; however, we did conclude that QOL 1 year later is better among those who received surgery than those who waited.
- Whether to choose open surgery or laparoscopic surgery. For primary hernia, we found that some outcomes favor open surgery, and others favor laparoscopy (see summary above). Laparoscopic hernia repair was introduced around 1990.[256] DeTurris and colleagues, 2002,[257] found that in 1999, the average surgical resident had performed only about 7 laparoscopic hernia repairs during the previous 5 years of residency, whereas the average number of open repairs in the same time frame was more than 50. This suggests that laparoscopic repair did not receive widespread adoption in the first decade after introduction. Furthermore, laparoscopy involves additional considerations including the universal use of general anesthesia and its associated risks, an increase in operation time, and extensive surgical training. These issues should be considered along with the patient outcomes that were the focus of this report.
- Which type of open surgery. For some outcomes, open procedures yielded approximately similar outcomes, whereas for other outcomes, the evidence favored the Lichtenstein procedure over other open procedures.
- Which type of laparoscopic surgery. Evidence generally favored TAPP over other laparoscopic procedures.
- Choosing among meshes or fixation approaches. These surgical aspects are generally chosen by the surgeon based on prior experience and beliefs. Thus, the clinical audience

for these questions is surgeons and manufacturers. Another audience would include materials management and purchasing departments. These professionals are often charged with the task of selecting cost-effective products for their facility. The ideal process for selecting mesh types and fixation methods would involve the input of clinicians, materials managers, and purchasing department professionals. We generally found equivalence among a variety of mesh types and fixation approaches. When comparing fibrin glue with staple fixation our results indicate a lower rate of long-term pain with fibrin glue.

- Consideration of expertise with laparoscopic hernia repair. We found numerous reports that the risk of RC decreases when a more experienced surgeon performs the procedure or when the surgical center has greater procedure volume.

The evidence-based conclusions listed in the previous section are only applicable to the types of patients enrolled in the studies underlying those conclusions. For example, for Key Questions 2 to 7, the large majority of enrolled patients were middle-aged men; therefore, the applicability to women or to older or younger men is unknown. Similarly, for Key Question 9 on pediatric hernia open versus laparoscopic high ligation, both studies excluded patients <3 months old, and so whether the conclusions apply to patients younger than 3 months old is uncertain.

The conclusions we drew for various outcomes, as follows, should be considered within the clinical context:

- Complications that may occur following surgery to repair an inguinal hernia include recurrence, damage to internal organs (nerves, blood vessels, bladder, and intestines), hematoma, and wound infection. Recurrence can occur up to several years after hernia surgery; this involves a second surgical repair and its corresponding risks of scar tissue, postoperative pain, and organ damage. Risk of wound infection is small and is more likely to occur in older patients or individuals following a more complex hernia procedure.
- Short-term outcomes such as hospital stay, RTDA, and RTW may be critical for some patients but relatively unimportant for other patients. For example, a man who needs to return to work quickly to support a family may prioritize these recovery outcomes, even at the expense of a somewhat higher risk of RC. By contrast, a retired man may place less emphasis on the short term and more emphasis on a secure repair with minimal chance of long-term pain.
- Long-term outcomes such as pain and the feeling of a foreign body are typically important for all patients undergoing inguinal hernia mesh repair and fixation. The main goal of mesh repair is to help strengthen the abdominal wall, while the fixation method used should keep the mesh secure. If an avid runner or cyclist has a mesh repair and experiences long-term pain and/or feels a foreign body or substance, exercise may become uncomfortable. Sedentary individuals may be less concerned with these outcomes. Therefore, some factors of importance for individuals undergoing mesh repair include the mesh material, the rigidity or flexibility of the mesh, whether the mesh allows tissue in-growth, and the method of mesh fixation.

Limitations

One limitation of this review is that we included only studies published in English. Many studies have been published in other languages, and the inclusion of those studies may have resulted in additional conclusions or may have contradicted some conclusions. To address this

possibility, we summarized the abstracts from non-English language publications that may have potentially been included for each Key Question. We also provided citations for these articles so that interested readers can obtain these articles and determine the possible impact had they been included.

Even though we required English-language publication, 76 percent of the studies we included were conducted in *countries whose primary language is not English*. Thus, many researchers probably chose to translate their work into English. It is unclear whether researchers perform English translation for all of their studies; if not, the translated studies may not fully represent the literature.

Another limitation of this review is that the evidence was inconclusive because of low precision for many outcomes. In general, the included studies were well-conducted but small. We maximized the power of the data by conducting meta-analyses wherever appropriate and possible. Nevertheless, the data often precluded conclusions because they suggested contradictory conclusions (i.e., that the evidence could favor option A or B by a clinically significant amount). The problem was insufficient enrollment, not a lack of followup of enrolled patients, because most studies reported data on at least 85 percent of enrolled patients.

A third limitation is that no studies met our inclusion criteria for Key Question 8 on pediatric contralateral hernia. No studies have compared surgical exploration with WW in this population. Therefore, in the next section, we describe informally some of the existing research in this area, such as the percentage of pediatric patients with a unilateral inguinal hernia who have a contralateral patent processus vaginalis (CPPV), which is a risk factor for inguinal hernia.

Pediatric Contralateral Hernias

As noted, our searches included no studies for Key Question 8, which involved pediatric inguinal hernia and whether to surgically explore for a contralateral hernia or use a wait-and-see approach. This section discusses the pertinent clinical issues.

Some pediatric patients with a unilateral hernia that requires surgical high ligation may develop hernia on the contralateral side later in life. Key Question 8 addressed whether same-operation exploration/high ligation differs from WW in health outcomes or adverse events among these patients. Some surgeons suggest performing routine contralateral groin exploration/high ligation during the operation for unilateral hernia.[258-260] The potential benefits of the same-operation exploration/high ligation include the elimination of the need for a second operation (as well as a second anesthesia) for high ligation of a contralateral inguinal hernia and minimization of the risk of incarcerated contralateral hernia (as well as its associated morbidity).[259,261]

Contralateral hernia exploration/high ligation can be achieved via open surgery or laparoscopic approaches (e.g., transinguinal via umbilical route or via hernia sac).[258,262] Laparoscopic approaches became increasingly popular in recent years due to their lesser invasiveness, which may help reduce the risk of damage to the spermatic cord structures.[259,261] Some clinicians also believe that laparoscopic approaches allow a more accurate evaluation of the presence of CPPV.[262]

During the contralateral groin exploration, a large percentage (more than 30 to 40 percent) of the patients were found to have patent processus vaginalis,[261,263] which is a risk factor for the development of inguinal hernia. This finding is one of the main reasons for some researchers to recommend routine same-operation contralateral hernia exploration/high ligation.[258,263] These

researchers also argue that the procedure is generally simple, quick, and safe, rarely causing severe complications.[258,263]

However, not all CPPV identified during the contralateral exploration will develop into a clinical hernia. Despite the high percentage of the CPPV identified, the incidence of contralateral hernia is fairly low, from 5.6 percent to 11.2 percent (followup of 2 to 29 years), according to several studies.[264-268] In addition, a small risk of complications is associated with the exploration/high ligation, including damage to vas deferens and spermatic vessels, recurrences of hernia, or iatrogenic cryptorchidism (undescended testes).[264,269,270] Because of the low incidence and potential risk of complications, more researchers believe, routine contralateral groin exploration is not justified and unnecessary.[258,259,264-268]

From the perspective of patients or families, the decision on whether WW or same-operation contralateral exploration should be chosen would always involve trade-offs among the benefits and risks that are potentially associated with the two treatment options. The ideal study design for addressing Key Question 8 is an RCT in which the researchers assign patients with unilateral hernia randomly into a same-operation exploration/high ligation group and a WW group, follow up the patients for a long period of time after the intervention, and then compare health outcomes that reflect the tradeoffs the patients have to make (e.g., QOL and patient or parent SFN). For this evidence review, we also accepted nonrandomized, prospective comparative studies that made appropriate adjustment on key baseline difference between the two treatment groups. However, our literature search did not identify any studies that met the inclusion criteria for Key Question 8. None of the clinical studies that we have scanned concurrently compared same-operation exploration with WW.

While RCTs are desirable for addressing Key Question 8, it could be technically challenging to conduct this type of study because of the extremely long period of followup that would be required and anticipated difficulty in patient recruitment. Studies examining the risk of developing contralateral hernia for patients by age, sex, and side of the symptomatic hernia would be helpful. Data on the incidence of various adverse events associated with either treatment option (e.g., incidence of strangulated or incarcerated hernia among patients on WW and the incidence of surgery-related complications among patients undergoing same-operation exploration) would also be required to assist patients and families make decisions.

Future Research

We identified several gaps in the evidence in the course of conducting this review. To characterize the gaps, we examined the 87 comparisons and outcomes for which the evidence was insufficient to permit a conclusion, and determine what were the primary reasons for the rating of Insufficient. In 31/87 cases (36%), the only component preventing a conclusion was imprecision. Thus, quite often, there were simply not enough studies and/or the studies had insufficient patient enrollment. In a further 51/87 cases (60%) of the cases, there was a problem with consistency as well as precision. Problems with consistency involved either the existence of only a single study (and therefore the inability to assess consistency) or conflicting results among multiple studies. In the remaining 4 cases, precision was sufficient, yet there were problems with both consistency and selective outcome reporting.

A large portion of the existing literature on inguinal hernia has been conducted outside the United States. The differences in health care systems and practice patterns between the United States and other regions might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. Future U.S. studies should define the unique needs of the

U.S. population, describe how its needs may differ from those of Europeans (who comprise the majority of patients in studies conducted outside the United States), and target research to these unique areas. Surgical registry may help define unique needs, but existing registries may be inadequate because they are voluntary. For example, an analysis of the voluntary Society of American Gastrointestinal and Endoscopic Surgeons database found that it contained only 1,607 inguinal hernia repairs in a 5.4 year period (September 1999 to February 2005).[271] This is about 300 per year, which is a very small portion of the annual U.S. repairs (which has been estimated at 770,000).[5]

A large registry might also help address the widespread problem of imprecision mentioned above. Many randomized trials have investigated important questions, but their modest size limits the usefulness of the data. Rare events such as RC require much larger sample sizes to permit clear inferences. Registry data require sophisticated analytic techniques, such as propensity scores or instrumental variables, to reduce selection bias. The registries that we assessed (e.g., Swedish Hernia Registry) were quite large (e.g., 174,000 hernias), but authors did not utilize these techniques; therefore, it was difficult to determine the potential impact of selection bias.

Another problem with registry data is the difficulty users would have in determining whether the assessment of RC involved a patient visiting a clinic or simply involved self-reporting via a telephone interview or questionnaire. Most of the studies we reviewed (i.e., not of registries) had patients come into the clinic for a physical assessment, rather than rely on patient reports of recurrence.

Another key focus of future research should be on recurrence rates in the *very long-term*. The typical patient was middle-aged, so he likely has a few decades of life ahead. Studies have not generally reported recurrence rates past 5 to 10 years, but conceivably patients and clinicians would be interested in much longer timeframes (e.g., 25 years). One surgeon[272] proposed projection factors to predict 25-year recurrence risk from specific short-term rates: to estimate the 25-year recurrence rates, multiply the 1-year rate by 5; multiply the 2-year rate by 2.5, multiply the 5-year rate by 1.5; and multiply the 10-year rate by 1.2. These projection factors reveal that a small difference in the short term can correspond to a large difference in the long term (e.g., 1 percent versus 2 percent risk at one year corresponds to 5 percent versus 10 percent risk at 25 years). These projections are a step in the right direction, but they have not been tested empirically. We also encourage greater focus on outcomes that matter most to patients, such as chronic pain, long-term QOL, SFN, and the feeling of a foreign body. These outcomes may be associated with the type of mesh or mesh fixation methods, but our evidence review neither revealed nor ruled out key components, due to low precision.

Some outcomes after hernia repair are defined and measured differently by different authors, and the field would advance more rapidly if more standardization were employed. For example, many studies reported the amount of time before returning to work, but rarely did studies describe how these data were collected. Some may have asked patients for their estimate of the time, and others may have clarified whether the return to work was unrestricted or involved some physical limitations (e.g., a person with a mixed manual/office job may have returned to work only for the office portion of the job and only later could perform the manual labor aspects). Similar comments apply to the outcome of RTDA; what was actually measured and how it was measured could be standardized so that different studies could be more easily compared.

Below, we summarize additional future research needs separately for each Key Question.

We identified only two studies that met the inclusion criteria for Key Question 1. Both studies compared mesh-based open surgery with WW. We identified no study comparing laparoscopic repair with WW. In regards to the two studies included for review, the strength of the evidence on the outcomes reported is rated as either Insufficient or Low. One of the studies reported outcomes only up to 12 months, which is barely sufficient for comparing the two interventions. A need exists for future high-quality studies that compare hernia repair—particularly laparoscopic repair—with WW. These studies should place more emphasis on the outcomes not reported in existing literature or that were insufficient to permit conclusions, such as long-term pain limiting daily activities.

For comparing open and laparoscopic hernia repair, future studies would be easier to interpret if surgeons' prior experience with the study procedures were similar. Long-term recurrence rates would be expected to be higher for procedures performed with less prior experience. For primary hernia comparing open repair versus laparoscopy, the evidence was sufficient to permit conclusions for several outcomes, but for bilateral hernia and recurrent hernia there was far less evidence and therefore fewer conclusions. Recurrence data has often been reported at median followup (e.g., *x* percent recurrence, patients had been followed for a median of 2 years with a range from 1 month to 7 years), but given the wide range of followup, this is more difficult to interpret than recurrence data at specific time points (i.e., *x* percent recurrence at 2 years after surgery).

Another issue for open and laparoscopic repair concerns the mode of anesthesia (local or general). Laparoscopic repair invariably involves general anesthesia, whereas open mesh repair can involve any type of anesthesia. This difference could potentially explain any short-term differences in postoperative pain, if the anesthesia mode has any lingering effects. Future studies should consider comparing modes of anesthesia to determine its impact.

We identified 21 studies that met the inclusion criteria for Key Question 3. Only one of the studies was conducted in the United States (see discussion above). Meanwhile, given that the strength of the evidence on most of the outcomes reported is rated as Insufficient or Low, future studies should be conducted to address the uncertainty with the evidence on these outcomes, particularly recurrence, long-term pain, and severe adverse events.

Only 1 of the 11 studies included for review for Key Question 4 was conducted in the United States. Again, the differences in health care systems and practice patterns between the United Sates and other regions might have an impact on the applicability of the evidence from the perspectives of U.S. stakeholders. There is a need for more studies conducted in the United States. Meanwhile, the strength of the evidence on most of the outcomes reported in the evidence base is rated as Insufficient or Low; future studies should be conducted to address the uncertainty with the evidence on these outcomes, particularly recurrence, long-term pain, RTDA, RTW, and severe adverse events.

The largest literature base for Key Question 5 was found for the comparisons of PP mesh with combination material mesh (17 studies), and for the comparisons of tacks or staples versus no fixation (7 studies) and sutures versus glue (7 studies) for Key Question 6. One of the issues with the literature base for these Key Questions that prevented all studies from being combined in a meta-analysis for a specific outcome was how the data were reported. Outcomes of interest for these comparisons include recurrence, the feeling of foreign body, infection, and pain assessed long-term; however only a few studies reported these outcomes. The size and severity of the patient's hernia have some bearing on the outcomes of the procedure, such as recurrence. Of the 56 studies identified for Key Question 5 and Key Question 6, only 12 studies reported the

hernia size for the included patients. Also, not all studies reported data in a similar format (e.g., number of patients versus number of hernias treated). Meta-analysis was based on the ability to combine the reported data. Theoretically, some meta-analyses might have changed if all data had been reported in a similar format. Future research should work to report data in a consistent manner and continue to assess differences in mesh materials and fixation methods.

Regarding Key Question 7, future studies of the relationship between laparoscopic surgical experience and subsequent RC should control for a possible time confound (see discussion of this point above) by reporting recurrence data at a specific time point (e.g., the 2-year recurrence rate was *x* percent for hernias repaired in the first half of the series and was *y* percent for hernias repaired in the second half of the series). Studies that investigate surgical experience by comparing different centers or comparing different surgeons need to ensure that RC is measured in the same way across centers or surgeons and that the case mix is similar (to rule out the possibility that more experienced surgeons had lower recurrence rates because they operated on lower-risk patients).

We did not identify any studies that met the inclusion criteria for Key Question 8, WW versus surgery in pediatric populations. The ideal study design for addressing Key Question 8 is an RCT in which the researchers randomly assign patients with unilateral hernia into a same-operation exploration/high ligation pair group and a WW group, follow up the patients for a long period of time after the intervention, and compare health outcomes that reflect the tradeoffs the patients have to make (e.g., QOL, patient or parent SFN). While RCTs are desirable for addressing Key Question 8, it could be technically challenging to conduct this type of study because of the required extremely long period of followup and anticipated difficulty in patient recruitment. In the near future, non-RCT studies are welcome. These studies should focus on the identification of the subpopulation (by age, sex, and left or right side of the unilateral hernia) at high risk for developing contralateral hernia. Future studies should also further investigate the incidences of severe adverse events associated with either same-operation exploration/high ligation (e.g., surgery-related complications) or WW (e.g., strangulated or incarcerated hernia). The findings of these studies would provide crucial information that patients need for making the choice between the two treatment options.

We identified only two studies that met the inclusion criteria for Key Question 9: does open hernia repair without a mesh differ from laparoscopic hernia repair without a mesh in pediatric patients? Both studies enrolled fewer than 100 patients, and both were conducted outside the United States. Only five health outcomes of interest were reported in the two studies, and the SOE for most of these outcomes is rated as either Insufficient or Low. There is a need for future U.S. studies with larger enrollment that address the uncertainty in the evidence on these outcomes. Studies are also needed to address the outcomes that were not reported in the evidence base (e.g., QOL, patient/parent SFN).

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Glossary of Procedures

Open mesh procedures:

- Kugel patch repair: a hernia repair procedure wherein an oval-shaped mesh that is held open by a memory recoil ring is inserted behind the hernia defect and held in place with a single absorbable suture.
- Lichtenstein technique: a tension-free open hernia repair procedure wherein mesh is sutured in front of the hernia defect (anteriorly)
- Mesh plug technique: a hernia repair procedure wherein a preshaped mesh plug is introduced into the hernia weakness during open surgery and a piece of flat mesh is positioned on top of the hernia defect.
- Open preperitoneal mesh (OPM) technique: a tension-free open hernia repair procedure wherein mesh is sutured posteriorly.
- Prolene Hernia System (PHS): a one-piece mesh device constructed of an onlay patch connected to a circular underlay patch by a mesh cylinder.
- Read-Rives repair: a tension-free hernia repair procedure where in mesh is placed just over the peritoneum.
- Stoppa technique: a hernia repair wherein a large polyester mesh is interposed in the preperitoneal connective tissue between the peritoneum and transversalis fascia to prevent visceral sac extension through the myopectineal orifice.
- Trabucco technique: a hernia repair procedure that involves placing a single preshaped mesh without using sutures.

Laparoscopic mesh procedures:

- Intraperitoneal onlay mesh (IPOM) technique: a hernia repair procedure wherein a mesh is placed over the hernia defect intra-abdominally to circumvent a groin dissection.
- Totally extraperitoneal (TEP) technique: a laparoscopic hernia repair procedure wherein peritoneal cavity is not entered and a mesh is used to cover the hernia from the outside of the peritoneum.
- Transabdominal preperitoneal (TAPP) technique: a laparoscopic hernia repair procedure that involves entering the peritoneal cavity to place a mesh through an incision over likely hernia sites.

Abbreviations

AAS	Activity assessment scale
ADV	Adverse event
AHRQ	Agency for Healthcare Research and Quality
ASA	American Society of Anesthesiologists
BMI	Body mass index
CI	Confidence interval
CPPV	Contralateral patent processus vaginalis
EPC	Evidence-based Practice Center
FDA	U.S. Food and Drug Administration
HOSP	Hospital-related outcomes
INSUFF	Insufficient evidence SOE rating
IPOM	Intraperitoneal onlay mesh
IQR	Interquartile range
KQ	Key Question
Lich.	Lichtenstein procedure
MCSD	Minimum clinically significant difference
N	Number of patients
NR	Not reported
OPM	Open preperitoneal mesh
OR	Odds ratio
PCS	Physical Component Summary
PHS	Prolene Hernia System
PP	Polypropylene
PTFE	Polytetrafluoroethylene
PVDF	Polyvinylidene fluoride
QALYs	Quality adjusted life years
QOL	Quality of life
RC	Hernia recurrence
RCT	Randomized controlled trial
RR	Relative risk
RTDA	Return to daily activities
RTW	Return to work
SD	Standard deviation
SF-36	Short Form 36 quality of life instrument
SFN	Satisfaction
SOE	Strength of evidence
TAPP	Transabdominal preperitoneal repair (laparoscopic)
TEP	Totally extraperitoneal repair (laparoscopic)
TOO	Task Order Officer
VAS	Visual analog scale
WW	Watchful waiting

Appendix A. Search Strategy

Electronic Database Searches

The following databases have been searched for relevant information:

Name	Date Limits	Platform/Provider
ClinicalTrials.gov	Searched October 29, 2010	www.clinicaltrials.gov
The Cochrane Central Register of Controlled Trials (CENTRAL)	Through 2010, Issue 10	www.thecochranelibrary.com
The Cochrane Database of Methodology Reviews (Methodology Reviews)	Through 2010, Issue 10	www.thecochranelibrary.com
The Cochrane Database of Systematic Reviews (Cochrane Reviews)	Through 2010, Issue 10	www.thecochranelibrary.com
Database of Abstracts of Reviews of Effects (DARE)	Through 2010, Issue 10	www.thecochranelibrary.com
EMBASE (Excerpta Medica)	1990 through November 4, 2011	OVID SP
Health Technology Assessment Database (HTA)	Through 2010, Issue 10	www.thecochranelibrary.com
MEDLINE and PreMEDLINE	1999 through November 4, 2011	OVID SP
PubMed	Searched November 17, 2011	http://www.ncbi.nlm.nih.gov/pubmed
U.K. National Health Service Economic Evaluation Database (NHS EED)	Through 2010, Issue 10	www.thecochranelibrary.com

Hand Searches of Journal and Nonjournal Literature

Journals and supplements maintained in ECRI Institute's collections were routinely reviewed. Nonjournal publications and conference proceedings from professional organizations, private agencies, and government agencies were also screened. Other mechanisms used to retrieve additional relevant information included review of bibliographies/reference lists from peer-reviewed and gray literature. (Gray literature consists of reports, studies, articles, and monographs produced by federal and local government agencies, private organizations, educational facilities, consulting firms, and corporations. These documents do not appear in the peer-reviewed journal literature.)

The search strategies employed combinations of freetext keywords as well as controlled vocabulary terms including (but not limited to) the following concepts. The strategy below is presented in OVID syntax; the search was simultaneously conducted across EMBASE and MEDLINE. A parallel strategy was used to search the databases comprising the Cochrane Library.

Medical Subject Headings (MeSH), EMTREE, PsycINFO and Keywords

Conventions:

OVID

$	=	truncation character (wildcard)
exp	=	"explodes" controlled vocabulary term (e.g., expands search to all more specific related terms in the vocabulary's hierarchy)
.de. or /	=	limit controlled vocabulary heading
.fs.	=	floating subheading
.hw.	=	limit to heading word
.md.	=	type of methodology (PsycINFO)
.mp.	=	combined search fields (default if no fields are specified)
.pt.	=	publication type
.ti.	=	limit to title
.tw.	=	limit to title and abstract fields

PubMed

[mh]	=	MeSH heading
[majr]	=	MeSH heading designated as major topic
[pt]	=	publication type
[sb]	=	subset of PubMed database (In Process, Publisher, Systematic)
[sh]	=	MeSH subheading (qualifiers used in conjunction with MeSH headings)
[tiab]	=	keyword in title or abstract

Topic-Specific Search Terms – Alphabetical Listing

Concept	Controlled Vocabulary	Keywords
Adverse effects	Laparoscopy/ae Patient safety/	Adverse effect$ Adverse event$ Bowel Bladder Complication$ Injur$ Numbness Patient and safety Recurrence Vascular Visceral
Costs	Cost-benefit analysis/ Cost and cost analysis/ Cost effectiveness analysis/ Laparoscopy/economics	Cost$ Cost benefit analysis Cost?effectiveness
Hernia	Hernia, inguinal/ Inguinal canal Inguinal hernia/ Inguinal region/	Abdominal Direct Fascia Groin Hernia Hernias Indirect Inguinal
Surgical device	Fibrin glue/ad Laparoscope/ Polypropylenes/ Surgical equipment/ Surgical mesh	Bassini Composix Fibrin glue Hernia Implant$ Intra?peritoneal onlay mesh IPOM Kugel McVay Mesh Mesh plug Polypropylene Prolene PTFE Shouldice Stoppa Suture Synthetic mesh Total extra?peritoneal Transabdominal pre?peritoneal Ugahary

Concept	Controlled Vocabulary	Keywords
Surgical experience	Inguinal hernia/su Laparoscopic surgery/me Surgery/me	Education Experience Expert$ Knowledge Learning curve Training Volume adj outcome$
Surgical technique	Exp surgical approach/ Exp surgical equipment/ Exp surgical technique/ Hernioplasty/ Herniorrhaphy/ Laparoscopy/me Laparoscopic surgery/ Su.fs.	Extra adj peritoneal Intra adj peritoneal Hernioplast$ Herniorrhaph$ Intraperitoneal onlay mesh IPOM Laparoscop$ Lichtenstein Mesh plug Minimal access laparoscop$ Minimally invasive Open mesh Open and surg$ Preperitoneal TAPP TEP Total extraperitoneal Transabdominal Transperitoneal
Treatment outcome	Clinical effectiveness/ Convalescence/ Length of stay/ Operation duration/ Pain, postoperative/ Pain measurement/ Postoperative complications/ Postoperative pain/ Recurrence/pc Treatment outcome/	Heal$ Outcome$ Pain Painful

EMBASE/MEDLINE

Remove overlap, 1990-current

Set Number	Concept	Search Statement
1	Hernia	Hernia, inguinal/ or inguinal hernia/ or inguinal canal/ or inguinal region/
2		((hernia or hernias) and (groin or inguinal or direct or indirect or fascia or abdominal)).ti,ab.
3	Combine sets	or/1-2
4	Surgical technique	Laparoscopy/me or laparoscopic surgery/ or hernioplasty/ or herniorrhaphy/
5		Exp surgical approach/ or exp surgical technique/ or exp surgical equipment/ or su.fs.
6		(Lichtenstein or open mesh or laparscop$ or extra?peritoneal or intra?peritoneal or pre?peritoneal or hernioplast$ or herniorrhaph$ or (minimal adj (access or invasive)) or transabdominal or transperitoneal or mesh plug).mp. or ((open and surg$) or (extra adj peritoneal) or (intra adj peritoneal)).ti,ab.
7	Combine sets	or/4-6
8	Surgical experience	Laparoscopic surgery/ or inguinal hernia/su or surgery/me or laparoscopy/
9		(educat$ or train$ or knowledge or experience or expert$ or learning curve or (volume adj2 outcome$)).mp.
10	Combine sets	8 and 9
11	Surgical device	Surgical mesh/ or polypropylene/ or surgical equipment/ or laparoscope/ or fibrin glue/ad
12		(mesh or plug or polypropylene or prolene or synthetic or PTFE or prosthesis or prostheses or fibrin glue or suture$ or implant$).mp.
13		(Prolene hernia system or mesh plug or composix or kugel or bassini or shouldice or Lichtenstein or mcvay or stoppa or ugahary or “transabdominal pre?peritoneal” or “TAPP” or “TEP” or total extra?peritoneal or “IPOM” or “intra?peritoneal onlay mesh”).mp.
14	Combine sets	or/11-13
15	Treatment outcome	Pain, postoperative/ or pain measurement/ or postoperative complications/ or recurrence/pc or treatment outcome/ or convalescence/ or length of stay/ or operation duration/ or (pain and (adverse events or complications)).fs.
16		(pain or painful or outcome$ or heal$).mp.
17	Adverse effects	Laparoscopy/ae or patient safety or ((injur$ and (vascular or visceral or bladder or bowel)) or adverse effect$ or adverse event$ or complication$ or (patient and safety) or recurrence or numbness).mp.
18		Treatment outcome/ or clinical effectiveness
19	Combine sets	or/15-18
20	Cost	Cost analysis/ or cost-benefit analysis/ or laparoscopy/ec or cost effectiveness analysis/ or cost benefit analysis.mp. or cost$.mp. or cost?effective$.mp.
21	Combine sets: Hernia, surgical technique or device	3 and (7 or 14)
22	Combine sets: Hernia and surgical experience	3 and 10

Set Number	Concept	Search Statement
23	Combine sets: Surgical experience and costs, outcomes, adverse effects	22 and (19 or 20)
24	Combine sets: Hernia, surgical technique, device, costs, outcomes, adverse effects	21 and (19 or 20)
25	Combine sets:	23 or 24
26	Limit by date	Limit 25 to yr="1990-2011"
27	Eliminate overlap	Remove duplicates from 25
28	Eliminate pub types	27 not (letter/ or editorial/ or news/ or comment/ or case report.mp. or case reports/ or note/ or conference paper/ or (letter or editorial or news or comment or case reports).pt.)
29	Apply trials hedge	28 and (Randomized controlled trial/ or random allocation/ or double-blind method/ or single-blind method/ or placebos/ or cross-over studies/ or crossover procedure/ or cross over studies/ or double blind procedure/ or single blind procedure/ or placebo/ or latin square design/ or crossover design/ or double-blind studies/ or single-blind studies/ or tripleblind studies/ or random assignment/ or exp controlled study/ or exp clinical trial/ or exp comparative study/ or cohort analysis.mp. or follow-up studies/ or intermethod comparison/ or parallel design/ or control group/ or prospective study/ or retrospective study/ or case control study/ or major clinical study/ or evaluation studies/ or follow-up studies/ or random$.hw. or random$.ti. or placebo$.mp. or ((singl$ or doubl$ or tripl$ or trebl$) and (dummy or blind or sham)).mp. or latin square.mp. or ISRCTN$.mp. or ACTRN$.mp. or (NCT$ not NCT).mp.)
30	Apply systematic review hedge	28 and ((research synthesis or pooled).mp. or systematic review/ or meta analysis/ or metaanalysis/ or ((evidence base$ or methodol$ or systematic or quantitative$ or studies or search$).mp. and (review/ or review.pt.)))
31	Combine	29 or 30

Appendix B. Excluded Studies

Table 1. Excluded studies

Study	Reason for Exclusion
Aasbo et al., 2002[1]	Anesthesia
Aasvang et al., 2005[2]	Review
Aeberhard et al., 1999[3]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Agarwal et al., 2010[4]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Agresta et al., 2009[5]	Did not address any Key Question
Aigner et al., 2011[6]	Abstract only
Aitola et al., 1998[7]	Did not focus sufficiently on a patient population of interest; 18% (9/49) had recurrent hernia
Akbulut et al., 2003[8]	Did not report any outcomes of interest
Akcaboy et al., 2009[9]	Anesthesia
Akhtar et al., 1998[10]	Did not address any Key Question
Akolekar et al., 2008[11]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Alani et al., 2006[12]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Albright et al., 2011[13]	Nonconcurrent enrollment
Alfieri et al., 2006[14]	Neurectomy
Altinli et al., 2011[15]	Abstract only
Amato et al., 2009[16]	Review
Amid et al., 1994[17]	Clinical comment
Amid et al., 1996[18]	Did not address any Key Question
Anadol et al., 2011[19]	Nonrandomized study that did not attempt to control for selection bias
Anderson et al., 1980[20]	Antibiotics
Andrew et al., 1994[21]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Antao et al., 2004[22]	Nonconcurrent enrollment
Arregui et al., 2005[23]	Case series
Arvidsson et al., 2000[24]	Narrative review
Arvidsson et al., 2005[25]	Did not address any Key Question
Atkinson et al., 2004[26]	Did not address any Key Question
Aufenacker et al., 2004[27]	Antibiotics
Awad et al., 2007[28]	Nonconcurrent enrollment
Aydede et al., 2003[29]	Did not report any outcomes of interest
Aytac et al., 2004[30]	Did not address any Key Question
Babineau et al., 2004[31]	Surgical experience information not specific to laparoscopic hernia repair
Baca et al., 1995[32]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Baca et al., 2000[33]	Unable to obtain
Balakrishnan et al., 2008[34]	Case series

Study	Reason for Exclusion
Ballantyne et al., 2001[35]	Case series
Baltazar et al., 1976[36]	Did not address any Key Question
Bar-Dayan et al., 2004[37]	Anesthesia
Baris et al., 2003[38]	Anesthesia
Barkun et al., 1995[39]	Did not address any Key Question
Barkun et al., 1999[40]	Only half of the open repairs used a mesh; data on these repairs was not reported separately
Barrat et al., 2003[41]	Did report any post-treatment outcomes
Barth et al., 1998[42]	Did not address any Key Question
Batorfi et al., 1995[43]	Did not report any outcomes comparing procedures
Bay-Nielsen et al., 1999[44]	Anesthesia
Beddy et al., 2006[45]	Did not report any outcomes of interest
Beets et al., 1997[46]	Did not address any Key Question
Bell et al., 2003[47]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Bemdsen et al., 2002[48]	Did not address any Key Question
Bencini et al., 2004[49]	Incisional hernia
Ben-David et al., 1995[50]	Anesthesia
Ben-Haim et al., 2002[51]	Incisional hernia
Benizri et al., 2006[52]	Nonconcurrent enrollment
Berndsen et al., 2002[53]	Did not address any Key Question
Berndsen et al., 2002[54]	Did not address any Key Question
Berndsen et al., 2007[55]	Did not address any Key Question
Bessell et al., 1996[56]	Did not address any Key Question
Bhattacharya et al., 2010[57]	Anesthesia
Biemans et al., 1998[58]	Did not address any Key Question
Bilgin et al., 1997[59]	Abstract only
Billingham et al., 2010[60]	Review
Birk et al., 1998[61]	Case series
Bisgaard et al., 2010[62]	Did not address any Key Question
Bittner et al., 2005[63]	Review
Bittner et al., 2010[64]	Case series
Blaser et al., 2011[65]	Abstract only
Borenstein et al., 2005[66]	Did not address any Key Question
Bozuk et al., 2003[67]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Brandt et al., 2008[68]	Background
Bright et al., 2010[69]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Bringman et al., 2001[70]	Did not address any Key Question
Bringman et al., 2001[71]	Did not address any Key Question
Brooks et al., 1994[72]	Nonrandomized study that did not attempt to control for possible baseline differences between groups

Study	Reason for Exclusion
Brunner et al., 2011[73]	Abstract only
Burney et al., 2004[74]	Anesthesia
Cahil et al., 1989[75]	Did not address any Key Question
Callesen et al., 1998[76]	Did not address any Key Question
Callesen et al., 1998[77]	Case series
Callesen et al., 1999[78]	Did not address any Key Question
Callesen et al., 1999[79]	Confounding by indication
Calliskan et al., 2010[80]	Neurectomy
Campanelli et al., 2008[81]	Trial protocol
Canonico et al., 2003[82]	Review
Casati et al., 2004[83]	Anesthesia
Castoro et al., 1996[84]	Did not address any Key Question
Ceccarelli et al., 2008[85]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Celdran et al., 2004[86]	Antibiotics
Cesana et al., 2011[87]	Abstract only
Champault et al., 2007[88]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Champault et al., 2011[89]	Case series
Chan et al., 2004[90]	Case series
Chan et al., 2004[91]	Did not address any Key Question
Chan et al., 2011[92]	Did not address any Key Question
Chawla et al., 2005[93]	Novel technique
Cheek et al., 1998[94]	Review
Chowbey et al., 2003[95]	Case series
Chu et al., 1993[96]	Case series
Chung et al., 1999[97]	Review
Cingi et al., 2005[98]	Did not address any Key Question
Cocks et al., 1998[99]	Nonconcurrent enrollment
Cohen et al., 1998[100]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Cohen et al., 1998[101]	Case series
Collaborative group et al., 2000[102]	Review
Collage et al., 2010[103]	Clinical comment
Connelly et al., 1997[104]	Anesthesia
Conroy et al., 1993[105]	Anesthesia
Corbitt et al., 1991[106]	Case series
Cornell et al., 1994[107]	Did not address any Key Question
Courtney et al., 2002[108]	Did not address any Key Question
Cox et al., 2011[109]	Abstract only
Craven et al., 2009[110]	Review
Cunningham et al., 1996[111]	Did not address any Key Question
Czudek et al., 2009[112]	Case series

Study	Reason for Exclusion
Dallas et al., 2011[113]	Abstract only
Damamme et al., 1998[114]	Not English
Daniel et al., 1997[115]	Case series
Danielsson et al., 1999[116]	Did not address any Key Question
Dasari et al., 2009[117]	Retrospective questionnaire data relying on memory
Davenport et al., 2003[118]	Clinical comment
Davis et al., 1994[119]	Anesthesia
de Jonge et al., 2008[120]	Review
de Sa Ribeiro et al., 2010[121]	Case series
de Vries et al., 2007[122]	Did not address any Key Question
Decker et al., 1998[123]	Did not address any Key Question
Dedemadi et al., 2010[124]	Review
Demiraran et al., 2006[125]	Anesthesia
Demirbas et al., 2003[126]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
DeTurris et al., 2002[127]	Review
Deysine et al., 1991[128]	Did not address any Key Question
Deysine et al., 2006[129]	Did not address any Key Question
Di Filippo et al., 2006[130]	Anesthesia
Di Vita et al., 2000[131]	Did not address any Key Question
Di Vita et al., 2001[132]	Did not address any Key Question
Di Vita et al., 2005[133]	Did not address any Key Question
Dick et al., 1996[134]	Case series
Dickinson et al., 2008[135]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Dierking et al., 1992[136]	Anesthesia
Dilek et al., 2005[137]	Did not report any outcomes of interest
Dion et al., 1996[138]	Data were considering for the surgical experience question, however of the 158 patients undergoing laparoscopic repair, data related to surgical experience were only reported for 118 of them, and the reason for this selection was not reported.
Dorflinger et al., 1984[139]	Did not address any Key Question
DuBois et al., 1997[140]	Case series
Dueholm et al., 1989[141]	Anesthesia
Duff et al., 2007[142]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Edelman et al., 2001[143]	Did not report any outcomes of interest
Edelman et al., 2002[144]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Edelman et al., 2008[145]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Eker et al., 2011[146]	Abstract only
Eller et al., 2002[147]	Case series
El-Radaideh et al., 2006[148]	Anesthesia

Study	Reason for Exclusion
emedicine et al., 2010[149]	Background
Eno et al., 2000[150]	Did not report whether mesh was used for open hernia repair
epocrates et al., 2010[151]	Background
Erhan et al., 2008[152]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Erichsen et al., 1995[153]	Anesthesia
Erol et al., 2009[154]	Anesthesia
Ersin et al., 2006[155]	Did not report any outcomes of interest
EU et al., 2000[156]	Review
EU Hernia Trialists Collaboration et al., 2002[157]	Review
Evans et al., 1973[158]	Antibiotics
Evans et al., 2002[159]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Fallas et al., 1994[160]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Farooq et al., 2007[161]	Unable to obtain
Feliu et al., 2004[162]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Feliu et al., 2004[163]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Felix et al., 1995[164]	Nonconcurrent enrollment
Felix et al., 1995[165]	Did not report any outcomes comparing procedures
Felix et al., 1996[166]	Did not report any outcomes comparing procedures
Felix et al., 1997[167]	Case series
Felix et al., 1999[168]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Fell et al., 1988[169]	Anesthesia
Ferzli et al., 2004[170]	Did not address any Key Question
Ferzli et al., 2006[171]	Case series
Fielding et al., 1995[172]	Case series
Filipi et al., 1996[173]	Did not focus sufficiently on a patient population of interest; 18% (9/53) had recurrent hernia.
Fine et al., 2006[174]	Case series
Fischer et al., 1999[175]	Narrative review bilateral
Fischer et al., 2000[176]	Anesthesia
Fitzgibbone et al., 1995[177]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Fleming et al., 2001[178]	Did not address any Key Question
Forte et al., 2003[179]	Case series
Friis et al., 1996[180]	Did not address any Key Question
Fuenfer et al., 1996[181]	Case series
Fujita et al., 2004[182]	Confounding by indication
Gao et al., 2010[183]	Review

Study	Reason for Exclusion
Garg et al., 2009[184]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Gholghesaei et al., 2005[185]	Review
Gianetta et al., 2000[186]	Did not address any Key Question
Gilbert et al., 2004[187]	Did not address any Key Question
Gilbert et al., 2006[188]	Combined narrative review and original data; original data comparing surgeons was not specific to laparoscopy
Gillion et al., 1999[189]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Girao et al., unpublished[190]	Did not address any Key Question
Go et al., 1998[191]	Narrative review
Godfrey et al., 1981[192]	Anesthesia
Gokcora et al., 1996[193]	Did not address any Key Question
Golash et al., 2011[194]	Abstract only
Gontarz et al., 1998[195]	Abstract only
Gonullu et al., 2002[196]	Anesthesia
Goodwin et al., 1995[197]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Gramke et al., 2006[198]	Anesthesia
Grant et al., 2002[199]	Review
Grant et al., 2002[200]	Review
Grossmann et al., 1995[201]	Case series
Grunwaldt et al., 2005[202]	Narrative review
Gultekin et al., 2007[203]	Anesthesia
Gunes et al., 2004[204]	Anesthesia
Gupta et al., 2003[205]	Anesthesia
Gurleyik et al., 1998[206]	Did not address any Key Question
Gursoy et al., 1997[207]	Case series
Guzman-Valdivia et al., 2003[208]	Did not address any Key Question
Hadzic et al., 2006[209]	Anesthesia
Hair et al., 2000[210]	Data for different procedures not reported separately
Haitian et al., 2009[211]	TEP procedure did not use a mesh, thus the study did not address any Key Question
Hakeem et al., 2010[212]	Review protocol
Halm et al., 2005[213]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Harjai et al., 2007[214]	Did not address any Key Question
Hatch et al., 1994[215]	Case series
Hawasli et al., 2002[216]	Did not address any Key Question
Hay et al., 1995[217]	Did not address any Key Question
Hernandez-Granados et al., 2000[218]	Did not address any Key Question
Hetzer et al., 1993[219]	Did not address any Key Question

Study	Reason for Exclusion
Hidalgo et al., 2005[220]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Hilgert et al., 1999[221]	Did not address any Key Question
Himpens et al., 1993[222]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Himpens et al., 1997[223]	TEP procedure did not use a mesh, thus the study did not address any Key Question
Hindmarsh et al., 2003[224]	Did not report whether mesh was used for open hernia repair
Holcomb et al., 1996[225]	Case series
Hon et al., 2009[226]	Anesthesia
Hong et al., 2010[227]	Anesthesia
Horgan et al., 1996[228]	Animal research
Horharin et al., 2006[229]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Horstmann et al., 2006[230]	Nonconcurrent enrollment
Horton et al., 1993[231]	Case series
Horzia et al., 2006[232]	Did not address any Key Question
Huang et al., 2005[233]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Hussein et al., 1998[234]	Case series
Ismail et al., 2009[235]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Jacobs et al., 2004[236]	Background
Jain et al., 2008[237]	Antibiotics
Jain et al., 2009[238]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Jani et al., 2005[239]	Did not address any Key Question
Jansson et al., 2000[240]	Did not address any Key Question
Janu et al., 1997[241]	Did not address any Key Question
Janu et al., 1998[242]	Did not address any Key Question
Jarhult et al., 1999[243]	Nonconcurrent enrollment
Jeans et al., 2007[244]	Narrative review
Jenkins et al., 2008[245]	Background
Jenkinson et al., 1995[246]	Did not address any Key Question
Jess et al., 2000[247]	Antibiotics
Joshi et al., 1999[248]	Anesthesia
Juang et al., 2011[249]	Case series
Juul et al., 1999[250]	Did not address any Key Question
Kald et al., 1997[251]	Did not address any Key Question
Kald et al., 1997[252]	Nonconcurrent enrollment
Kalman et al., 1995[253]	Anesthesia
Karakayali et al., 2007[254]	Did not address any Key Question
Kark et al., 1995[255]	Case series
Karthikesalingam et al., 2010[256]	Review

Study	Reason for Exclusion
Kaufman et al., 1996[257]	Case series
Kawji et al., 1999[258]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Kaynak et al., 2007[259]	Did not address any Key Question
Khajanchee et al., 2001[260]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Khajanchee et al., 2004[261]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Khan et al., 2006[262]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Khan et al., 2010[263]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Khoury et al., 1995[264]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Kimura et al., 1998[265]	Nonconcurrent enrollment
Kingsley et al., 1998[266]	Did not address any Key Question
Kingsnorth et al., 1992[267]	Did not address any Key Question
Kingsnorth et al., 1999[268]	Clinical comment
Kingsnorth et al., 2000[269]	Unable to locate
Kingsnorth et al., 2002[270]	Anesthesia
Kiruparan et al., 1998[271]	Nonconcurrent enrollment
Klein et al., 2002[272]	Anesthesia
Klin et al., 2010[273]	Background
Knapp et al., 1976[274]	Anesthesia
Knock et al., 1999[275]	Case series
Kocijan et al., 2010[276]	Case series
Koinig et al., 2000[277]	Anesthesia
Koning et al., 2010[278]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Korenstein et al., 2008[279]	Did not address any Key Question
Korman et al., 1997[280]	Did not address any Key Question
Koukourou et al., 2001[281]	Did not address any Key Question
Kovacs et al., 1997[282]	Did not address any Key Question
Kozol et al., 1997[283]	Did not address any Key Question
Krahenbuhl et al., 1997[284]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Krahenbuhl et al., 1998[285]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Krane et al., 1995[286]	Anesthesia
Krupinski et al., 1997[287]	Did not address any Key Question
Kucuk et al., 2010[288]	Did not address any Key Question
Kuhry et al., 2007[289]	Review
Kumar et al., 1997[290]	Anesthesia
Kumar et al., 2002[291]	Nonrandomized study that did not attempt to control for possible baseline differences between groups

Study	Reason for Exclusion
Kunz et al., 1993[292]	Did not address any Key Question
Kux et al., 1994[293]	Did not address any Key Question
Kuzu et al., 2005[294]	Antibiotics
Lai et al., 1998[295]	Did not address any Key Question
Lange et al., 2005[296]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Lange et al., 2011[297]	Review
Lau et al., 2000[298]	Did not focus sufficiently on a patient population of interest (44% of the TEP group, 14/32, had recurrent hernia, and the other 56% had primary hernia).
Lau et al., 2001[299]	Did not address any Key Question
Lau et al., 2002[300]	Anesthesia
Lau et al., 2002[301]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Lau et al., 2002[302]	Nonrandomized study that did not attempt to control for possible baseline differences between groups (only controlled for age)
Lau et al., 2003[303]	Case series
Lau et al., 2003[304]	Review
Lau et al., 2003[305]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Lau et al., 2003[306]	Confounding by indication: patient clinical factors decided treatment assignment
Lau et al., 2005[307]	Only included females
Lauscher et al., 2008[308]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Lauscher et al., 2008[309]	Nonconcurrent enrollment
Lawrence et al., 1995[310]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Lawrence et al., 1996[311]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Lawrence et al., 1997[312]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Lazorthes et al., 1992[313]	Antibiotics
Lee et al., 2002[314]	Did not address any Key Question
Lee et al., 2010[315]	Case series
Leibl et al., 2000[316]	Did not address any Key Question
Leibl et al., 2005[317]	Narrative review
Lepere et al., 2000[318]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Lepere et al., 2008[319]	Did not address any Key Question
Lerut et al., 1998[320]	Narrative review
Liebl et al., 1999[321]	Review
Lin et al., 1993[322]	Anesthesia
Lin et al., 1998[323]	Anesthesia
Lin et al., 2011[324]	Nonrandomized study that did not attempt to control for possible baseline differences between groups

Study	Reason for Exclusion
Litwin et al., 1994[325]	Data were considering for the surgical experience question, however of the 317 patients undergoing laparoscopic repair, data related to surgical experience were only reported for 40 of them, and the reason for this selection was not reported.
Liu et al., 1992[326]	Did not address any Key Question
Liu et al., 1994[327]	Case series
Ljem et al., 1997[328]	Did not address any Key Question
Lobe et al., 1992[329]	Case series
Lorenz et al., 2000[330]	Did not address any Key Question
Lotan et al., 2004[331]	Case series
Lowham et al., 1997[332]	Narrative review
Lugo Vicente et al., 1995[333]	Case series
Lukaszczyk et al., 1996[334]	Confounding by indication: patient clinical factors decided treatment assignment
Machotta et al., 2003[335]	Anesthesia
Maddern et al., 1993[336]	Did not address any Key Question
Maddern et al., 1994[337]	Did not address any Key Question
Maddox et al., 2008[338]	Case series
Maggiore et al., 2001[339]	Did not address any Key Question
Mahon et al., 2003[340]	Considered for the comparison of laparoscopic and open repair for bilateral and recurrent hernia, however the data were not reported separately for these two conditions. Overall 79% of hernias were bilateral (156/198, and 14 of the 156 were also recurrent). Overall, 28% of hernias were recurrent (56/198, and 14 of the 56 were also bilateral).
Malviya et al., 1992[341]	Anesthesia
Mann et al., 1998[342]	Narrative review
Mann et al., 1998[343]	Did not focus sufficiently on a patient population of interest (24% or 12/51 had recurrent hernia, and the other 76% had primary hernia)
Marappan et al., 1996[344]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Markar et al., 2010[345]	Review
Markey et al., 1997[346]	Anesthesia
Massaron et al., 2007[347]	Nonconcurrent enrollment
Massaron et al., 2008[348]	Nonconcurrent enrollment
Matsota et al., 2007[349]	Anesthesia
Matyja et al., 2010[350]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Mayagoitia et al., 2004[351]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Mayagoitia et al., 2006[352]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
McCormack et al., 2005[353]	Review
McCormack et al., 2005[354]	Review
McCormack et al., 2008[355]	Review
McGillicuddy et al., 1998[356]	Did not address any Key Question
McIntosh et al., 1998[357]	Comment on cost measurement

Study	Reason for Exclusion
McIntosh et al., 2000[358]	Did not address any Key Question
McNally et al., 2009[359]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Mellinger et al., 2004[360]	Clinical comment
Memon et al., 1999[361]	Did not report data comparing the procedures
Memon et al., 2003[362]	Review
Menakuru et al., 2006[363]	Case series
Merello et al., 1997[364]	Abstract only
Merhav et al., 1993[365]	Anesthesia
Metzger et al., 2001[366]	Did not address any Key Question
Miedema et al., 2004[367]	Did not address any Key Question
Miguel et al., 1998[368]	Case series
Mikkelsen et al., 1996[369]	Anesthesia
Millikan et al., 1994[370]	Did not address any Key Question
Miltenberg et al., 1998[371]	Review
Miyazaki et al., 2001[372]	Did not address any Key Question
Mok et al., 1998[373]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Mokete et al., 2001[374]	Did not address any Key Question
Mollen et al., 2007[375]	Narrative review contralateral
Montupet et al., 2011[376]	Case series
Moores et al., 1990[377]	Anesthesia
Morgan et al., 1991[378]	Did not address any Key Question
Muller-Riemenschneider et al., 2007[379]	Incisional hernia
Mulroy et al., 1999[380]	Anesthesia
Murat et al., 2005[381]	Anesthesia
Muzio et al., 2006[382]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Naguib et al., 1991[383]	Anesthesia
Naguib et al., 1995[384]	Anesthesia
Naja et al., 2005[385]	Anesthesia
Nathanson et al., 1996[386]	Did not address any Key Question
Nazir et al., 1996[387]	Case series
Neagu et al., 2000[388]	Unable to verify
Negro et al., 2011[389]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Newman et al., 1993[390]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Nicholson et al., 1999[391]	Did not address any Key Question
Nienhuijs et al., 2005[392]	Case series
Nienhuijs et al., 2007[393]	Review
Nishimura et al., 2000[394]	Did not address any Key Question

Study	Reason for Exclusion
Nixon et al., 2009[395]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Niyogi et al., 2010[396]	Did not address any Key Question
Nordin et al., 2002[397]	Did not address any Key Question
Nordin et al., 2003[398]	Anesthesia
Nordin et al., 2004[399]	Anesthesia
Nordin et al., 2007[400]	Anesthesia
Nordin et al., unpublished[401]	Did not address any Key Question
Nyhus et al., 1993[402]	Background
Oberg et al., 2005[403]	Case series
Obrist et al., 2011[404]	Abstract only
O'Dwyer et al., 2003[405]	Anesthesia
Oehlenschlager et al., 2010[406]	Did not address any Key Question
Ohana et al., 2006[407]	Did not address any Key Question
O'Hanlon et al., 1996[408]	Anesthesia
O'Riordain et al., 1998[409]	Anesthesia
Osuigwe et al., 2006[410]	Antibiotics
Ozcengiz et al., 2001[411]	Anesthesia
Ozgediz et al., 2007[412]	Did not address any Key Question
Ozgun et al., 2002[413]	Anesthesia
Ozkan et al., 2009[414]	Anesthesia
Ozmen et al., 2011[415]	Abstract only
Paajanen, 2003[416]	Did not address any Key Question
Paajanen et al., 2010[417]	Nonrandomized study with a multivariate analysis but it did not specifically address any Key Questions (e.g., the open vs laparoscopic comparison in the multivariate analysis included many non-mesh procedures).
Page et al., 2002[418]	Did not address any Key Question
Paily et al., 2009[419]	Case series
Pala et al., 2009[420]	Anesthesia
Panos et al., 1992[421]	Did not address any Key Question
Panton et al., 1994[422]	Case series
Papachristou et al., 2002[423]	Confounding by indication
Papaziogas et al., 2004[424]	Did not address any Key Question
Pappalardo et al., 1999[425]	Case series
Pardieck et al., 1998[426]	Case series
Passariello et al., 2004[427]	Anesthesia
Paul et al., 1994[428]	Did not address any Key Question
Pawanindra et al., 2010[429]	Did not address any Key Question
Payne et al., 1992[430]	Anesthesia
Payne et al., 1996[431]	Abstract only
Peiper et al., 1994[432]	Anesthesia
Pelissier et al., 2006[433]	Case series
Perez et al., 2005[434]	Antibiotics

Study	Reason for Exclusion
Perko et al., 2011[435]	Did not address any Key Question
Pessaux et al., 2006[436]	Antibiotics
Pet≤hßzi et al., 1999[437]	Case series
Picchio et al., 2004[438]	Neurectomy
Pierides et al., 2011[439]	Duplicate of already included article
Platt et al., 1990[440]	Antibiotics
Podolsky et al., 2010[441]	Did not address any Key Question
Polat et al., 2003[442]	Did not report any outcomes of interest
Poobalan et al., 2001[443]	Did not address any Key Question
Poobalan et al., 2003[444]	Review
Pradhan et al., 2008[445]	Anesthesia
Praveen et al., 2009[446]	Antibiotics
Prieto-Díaz-Chávez et al., 2005[447]	Did not address any Key Question
Prieto-Diaz-Chavez et al., 2009[448]	Did not address any Key Question
Prior et al., 1998[449]	Did not address any Key Question
Pullyblank et al., 2002[450]	Case series
Purkayastha et al., 2008[451]	Review
Quilici et al., 1993[452]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Quilici et al., 1996[453]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Quilici et al., 2000[454]	Did not report data comparing the procedures
Rahr et al., 2006[455]	Did not report any outcomes of interest
Rajapandian et al., 2010[456]	Case series
Ramon et al., 1998[457]	Abstract only
Ramshaw et al., 1995[458]	Nonconcurrent enrollment
Ramshaw et al., 1996[459]	Nonconcurrent enrollment
Ramshaw et al., 1996[460]	Case series
Ramshaw et al., 1996[461]	Nonconcurrent enrollment
Ravichandran et al., 2000[462]	Neurectomy
Richards et al., 2004[463]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Rizk et al., 1994[464]	Did not address any Key Question
Rogers et al., 1998[465]	Fewer than 10 patients enrolled in at least one of the relevant groups
Romsing et al., 2001[466]	Anesthesia
Ron et al., 2007[467]	Risk of developing pediatric contralateral hernia
Rose et al., 1999[468]	Case series
Rosen et al., 2001[469]	Did not report any outcomes of interest
Rosenberg et al., 2008[470]	Background
Rowbotham et al., 1998[471]	Anesthesia
Rudkin et al., 1995[472]	Did not address any Key Question
Ruhanen et al., 1994[473]	Anesthesia
Rukas et al., 2000[474]	Unable to verify

Study	Reason for Exclusion
Rulli et al., 1998[475]	Did not address any Key Question
Rutkow et al., 1993[476]	Did not address any Key Question
Rutkow et al., 1995[477]	Case series
Rutkow et al., 2003[478]	Not an empirical study
Saad et al., 1999[479]	Case series
Saad et al., 2011[480]	Case series
Saadawy et al., 2009[481]	Anesthesia
Saggar et al., 2008[482]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Salameh et al., 2002[483]	Did not report how many open repairs involved a mesh
Sale et al., 2006[484]	Did not address any Key Question
Sanabria et al., 2007[485]	Review
Sanchez-Manuel et al., 2009[486]	Review
Sandbichler et al., 1996[487]	Case series
Sandenaa et al., 2001[488]	Did not address any Key Question
Santoro et al., 2007[489]	Nonconcurrent enrollment
Saranga Bharathi et al., 2008[490]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Saranga Bharathi et al., 2008[491]	Background
Sarli et al., 2001[492]	Simultaneous cholecystectomy
Savarise et al., 2001[493]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Schafer et al., 2010[494]	Review
Schindler et al., 1991[495]	Anesthesia
Schmedt et al., 2002[496]	Review
Schmedt et al., 2005[497]	Review
Schmidt et al., 2006[498]	Nonconcurrent enrollment
Schneider et al., 2003[499]	Did not focus sufficiently on a patient population of interest (21% of patients, 12/56, had recurrent hernia, and the other 79% had primary hernia, and data were not reported separately)
Schrenk et al., 1996[500]	Did not address any Key Question
Schroder et al., 2004[501]	Did not address any Key Question
Schultz et al., 1995[502]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Schurz et al., 1995[503]	Did not report whether mesh was used for open hernia repair
Schwab et al., 2004[504]	Did not address any Key Question
Schwab et al., 2006[505]	Nonconcurrent enrollment
Schwab et al., 2008[506]	Simulated hernia repair
Schwobel et al., 1999[507]	Case series
Scott et al., 1989[508]	Anesthesia
Scott et al., 2008[509]	Review
Shah et al., 2009[510]	Nonrandomized study that did not attempt to control for possible baseline differences between groups

Study	Reason for Exclusion
Shah et al., 2011[511]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Shamim et al., 2006[512]	Did not address any Key Question
She et al., 2011[513]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Shehata et al., 2011[514]	Abstract only
Sherwinter et al., 2010[515]	Nonconcurrent enrollment
Simons et al., 1996[516]	Did not address any Key Question
Sinclair et al., 1988[517]	Anesthesia
Sinha et al., 2006[518]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Smedburg et al., 1984[519]	Did not address any Key Question
Smeds et al., 2010[520]	Did not address any Key Question
Smith et al., 2001[521]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Somri et al., 1998[522]	Anesthesia
Sondenaa et al., 2001[488]	Did not address any Key Question
Song et al., 2000[523]	Anesthesia
Sosa et al., 1994[524]	Case series
Spittal et al., 1992[525]	Anesthesia
Splinter et al., 1995[526]	Anesthesia
Srsen et al., 2008[527]	Did not focus sufficiently on a patient population of interest (17% of patients, 36/216, had recurrent hernia, and the other 83% had primary hernia, and data were not reported separately)
Staerkle et al., 2009[528]	Case series
Stark et al., 1999[529]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Steinau et al., 1999[530]	Case series
Stengel et al., 2004[531]	Review
Stoker et al., 1994[532]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Stoppa et al., 1998[533]	Background
Stylopoulos et al., 2003[534]	Cost-effectiveness analysis
Subwongcharoen et al., 2002[535]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Sucullu et al., 2010[536]	Did not report any outcomes of interest
Surana et al., 1993[537]	Case series
Tagaya et al., 1995[538]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Tai et al., 2011[539]	Nonrandomized study that did not attempt to control for selection bias
Takahara et al., 1995[540]	Did not address any Key Question
Tammadon et al., 2005[541]	Case series
Tamme et al., 2005[542]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Tanovia et al., 2005[543]	Did not address any Key Question

Study	Reason for Exclusion
Tanphiphat et al., 1998[544]	Did not address any Key Question
Tantia et al., 2009[545]	Did not report any outcomes comparing procedures
Taylor et al., 1997[546]	Antibiotics
Teasdale et al., 1982[547]	Anesthesia
Terzi et al., 2005[548]	Antibiotics
Tetik et al., 1994[549]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Thaha et al., 2008[550]	Review
Thapar et al., 2000[551]	Did not address any Key Question
Thill et al., 1994[552]	Did not address any Key Question
Topal et al., 1997[553]	Case series
Topart et al., 2005[554]	Nonconcurrent enrollment
Toufique et al., 2009[555]	Case series
Toy et al., 1996[556]	Case series
Tran et al., 1992[557]	Did not address any Key Question
Triantafyllidis et al., 2011[558]	Abstract only
Tsai et al., 2010[559]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Tsakayannis et al., 2004[560]	Neurectomy
Tschudi et al., 1996[561]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Tucker et al., 1995[562]	Case series
Turial et al., 2011[563]	Case series
Twersky et al., 1995[564]	Anesthesia
Tzovaras et al., 2007[565]	Antibiotics
Ulman et al., 1995[566]	Case series
Unknown author et al., 2004[567]	Trial synopsis
Ure et al., 2000[568]	Did not address any Key Question
Vale et al., 2003[569]	Review
Vale et al., 2004[570]	Did not address any Key Question
Vallribrera et al., 1997[571]	Did not address any Key Question
van den Heuvel et al., 2011[572]	Narrative review
Van Den Tol et al., 1996[573]	Did not address any Key Question
van der Pool et al., 2010[574]	Case series
van der Zwaal et al., 2008[575]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Van Hee et al., 1998[576]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
van Veen et al., 2007[577]	Did not address any Key Question
van Veen et al., 2007[578]	Did not address any Key Question
van Veen et al., 2008[579]	Anesthesia
Varshney et al., 1995[580]	Did not address any Key Question
Velanovich et al., 2000[581]	Confounding by indication

Study	Reason for Exclusion
Velanovich et al., 2006[582]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Velasco et al., 1996[583]	Nonconcurrent enrollment
Velasco et al., 1998[584]	Case series
Vidovic et al., 2007[585]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Vincent et al., 2003[586]	Did not address any Key Question
Vogt et al., 1996[587]	Did not address any Key Question
Voyles et al., 2002[588]	Review
Vrijland et al., 2002[589]	Did not address any Key Question
Waechter et al., 2001[590]	Anesthesia
Wake et al., 2008[591]	Review
Wassef et al., 1998[592]	Anesthesia
Webb et al., 1999[593]	Review protocol
Weiland et al., 1998[594]	Wound closure
Welborn et al., 1990[595]	Anesthesia
Weldon et al., 2004[596]	Anesthesia
Wennstrom et al., 2004[597]	Did not address any Key Question
Weyhe et al., 2007[598]	Narrative review
Weyhe et al., 2007[599]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Wheeler et al., 1993[600]	Case series
Willaert et al., 2009[601]	Review protocol
Williams et al., 1999[602]	Survey of beliefs
Williams et al., 2001[603]	Anesthesia
Wilson et al., 1995[604]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Wilson et al., 2010[605]	Did not address any Key Question
Winslow et al., 2004[606]	Surgical experience data not on hernia recurrence but on other outcomes such as operation time or other complications
Witkowski et al., 2000[607]	Unable to verify
Woods et al., 2008[608]	Narrative review
Wulkan et al., 1996[609]	Case series
Yamamoto et al., 2002[610]	Nonrandomized study that did not attempt to control for possible baseline differences between groups
Yerdel et al., 2001[611]	Antibiotics
Zampieri et al., 2008[612]	Case series
Zeybek et al., 2008[613]	Did not address any Key Question
Zhao et al., 2009[614]	Review
Zhu et al., 2009[615]	Did not report any outcomes of interest
Zib et al., 2002[616]	Review
Zieren et al., 2003[617]	Case series
Zigman et al., 1998[618]	Case series
Zollinger et al., 2003[619]	Background

Study	Reason for Exclusion
Zwaal et al., 2008[620]	Nonrandomized study that did not attempt to control for possible baseline differences between groups

Appendix C. Evidence Tables

Table 2. Key Questions addressed by included studies

Study	1	2a	2b	2c	3	4	5	6	7	8	9
Total # studies addressing this KQ	**2**	**38**	**6**	**8**	**21**	**11**	**32**	**23**	**32**	**0**	**2**
Abu-Own et al., 2000[621]					x						
Adamonis et al., 2006[622]					x						
Agarwal et al., 2009[623]							x				
Anadol et al., 2004[624]		x									
Andersson et al., 2003[625,626]		x									
Ansaloni et al., 2009[627,628]							x				
Beets et al., 1999[629]				x							
Bender et al., 2009[630]		x									
Bittner et al., 2002[631-635]									x		
Bittner et al., 2011[636,637]							x				
Bobrzynski et al., 2001[638]									x		
Boldo et al., 2008[639]								x			
Bostanci et al., 1998[640]		x									
Bringman et al., 2003[641]		x			x						
Bringman et al., 2004[642-644]							x				
Bringman et al., 2005[645]							x				
Bueno et al., 2004[646]		x									
Butler et al., 2007[647]		x				x					
Butters et al., 2007[648,649]		x									
Canonico et al., 1999[650]								x			
Champault et al., 1997[651-654]		x	x	x					x		
Champault et al., 2007[88,655,656]							x				
Chan et al., 2005[657]											x
Chauhan et al., 2007[658]							x				
Cheah et al., 2004[659]									x		
Chowbey et al., 2010[660]							x				
Chui et al., 2010[661]							x				
Colak et al., 2003[662]		x									
Collaborative group, 2008[663]							x				
Coskun et al., 2005[664]					x						
Dalenback et al., 2009[665]					x						
Davies et al., 1995[666,667]									x		
DeBord et al., 1999[668]							x				
Dedemadi et al., 2006[669]				x		x					
Di Vita et al., 2010[670]							x				
Dirksen et al., 1998[671,672]									x		
Dogru et al., 2006[673]					x						
Douek et al., 2003[674,675]		x	x								

Study	1	2a	2b	2c	3	4	5	6	7	8	9
Douglas et al., 2002[676]								x			
Dulucq et al., 2009[677]									x		
Edwards et al., 2000[678]									x		
Eklund et al., 2006[679-682]		x									
Eklund et al., 2007[683]				x							
Feliu-Pala et al., 2001[684]									x		
Felix et al., 1998[685]									x		
Ferzli et al., 1995[686]									x		
Ferzli et al., 1999[687]								x			
Fitzgibbons et al., 2006[688-694]	x										
Fortelny et al., 2011[695]								x			
Freudenberg et al., 2006[696]							x				
Frey et al., 2007[697]					x						
Garg et al., 2011[698]								x			
Geis et al., 1993[699]									x		
Gokalp et al., 2003[700]		x									
Gong et al., 2011[701]		x				x					
Gunal et al., 2007[702]		x			x	x					
Gundre et al. (2011)[703]							x				
Hamza et al., 2010[704]		x			x	x					
Heikkinen et al., 1997[705,706]		x									
Heikkinen et al., 1998[706,707]		x									
Heikkinen et al., 1998[706,708]		x									
Heikkinen et al., 2006[709]							x				
Helbling et al., 2003[710,711]								x			
Johansson et al., 1999[712,713]		x									
Kanakala et al., 2010[714]									x		
Kapiris et al., 2001[715]									x		
Kapischke et al., 2010[716]							x				
Khan et al., 2010[717]							x				
Khoury et al., 1998[718]		x									
Kieturakis et al., 1994[719]									x		
Kingsnorth et al., 2000[269,720]					x						
Kingsnorth et al., 2002[721]					x						
Koc et al., 2004[722]					x						
Koch et al., 2006[723]								x			
Koch et al., 2008[724]							x				
Koivusalo et al., 2009[725]											x
Koninger et al., 2004[726]		x									
Kouhia et al., 2009[727]				x							
Krishna et al., 2011[728]						x					
Lal et al., 2003[729]		x									

Study	1	2a	2b	2c	3	4	5	6	7	8	9
Lal et al., 2004[730]									x		
Lamb et al., 2006[731,732]									x		
Langenbach et al., 2003[733]							x				
Langenbach et al., 2006[734]							x				
Langenbach et al., 2008[735]							x				
Langeveld et al., 2010[736]		x							x		
Lau et al., 2002[737]									x		
Lau et al., 2005[738]								x			
Lau et al., 2006[739]		x									
Leibl et al., 2002[740]								x			
Liem et al., 1997[741-747]									x		
Lovisetto et al., 2007[748]									x		
Lovisetto et al., 2007[749]								x			
Mesci et al., 2011[750]						x					
Mills et al., 1998[751]								x			
Moreno-Egea et al., 2004[752]								x			
MRC et al., 1999[747,753-760]		x							x		
Muldoon et al., 2004[761]					x						
Neumayer et al., 2004[762-768]		x		x					x		
Nienhuijs et al., 2005[769-771]					x						
Nienhuijs et al., 2007[772]					x						
Nikkolo et al., 2010[773]							x				
Nowobilski et al., 2004[774]								x			
O'Dwyer et al., 2005[775]							x				
O'Dwyer et al., 2006[776,777]	x										
Olmi et al., 2007[778]								x			
Ozmen et al., 2010[779]			x								
Paajanen, 2002[780]								x			
Paajanen, 2007[781]							x				
Paajanen et al., 2011[782]								x			
Paganini et al., 1998[783]		x									
Paradowski et al., 2009[784]							x				
Parshad et al., 2005[785]								x			
Pavlidis et al., 2002[786]		x			x						
Payne et al., 1994[787]		x									
Peters et al., 2010[788]							x				
Picchio et al., 1999[789]		x									
Pikoulis et al., 2002[790]									x		
Pokorny et al., 2008[791,792]		x				x					
Post et al., 2004[793]							x				
Puccio et al., 2005[794]							x				
Ramshaw et al., 2001[795]									x		

Study	1	2a	2b	2c	3	4	5	6	7	8	9
Ridings et al., 2000[796]									x		
Sadowski et al., 2011[797]							x				
Sanders et al., 2009[798]					x						
Sanjay et al., 2006[799]					x						
Sarli et al., 1997[800]						x					
Sarli et al., 2001[801]			x								
Schopf et al., 2011[802]							x				
Schrenk et al., 1996[803]						x					
Schultz et al., 2000[804]									x		
Sevonius et al., 2009[535,805-813]		x		x	x			x			
Simmermacher et al., 2000[814]		x									
Singh et al., 2011[815]		x									
Smith et al., 1999[816]								x			
Staarink et al., 2008[817]									x		
Sutalo et al., 2010[818]							x				
Suter et al., 2002[819,820]			x								
Swadia et al., 2011[821]									x		
Tamme et al., 2003[822]									x		
Taylor et al., 2008[823]								x			
Testini et al., 2010[824]								x			
Torcivia et al., 2010[825]							x				
Vatansev et al., 2002[826]		x			x						
Vironen et al., 2006[439,827]					x						
Voitk et al., 1998[828]									x		
Wara et al., 2005[829-834]		x	X	x							
Wong et al., 2011[835]							x	x			
Zendejas et al., 2011[836]									x		
Zhang et al., 2009[837]						x					
Zieren et al., 1998[838,839]		x									

Key Question 1 Tables

Table 3. Key Question 1: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Fitzgibbons et al., 2006[688-694]	USA and Canada	Creighton University, Omaha VA Medical Center, University of Nebraska, Omaha; McGill University, Montreal, Quebec; Marshfield Clinic, Marshfield, Wis; University of Texas Southwestern Medical Center, Dallas VA Medical Center, Dallas;and Lovelace Clinic, Albuquerque, NM	5 (4 in the USA and 1 in Canada)	Randomized trial	Watchful waiting vs. Lichtenstein	720	1/1/199 to 12/31/2004	3 University hospitals and 2 Community clinics	Davol (manufacturerer of mesh plug), TyRx Pharma Inc (developers of an antibiotic mesh for tension-free repair of hernia)
O'Dwyer et al., 2006[776,777]	UK	University Department of Surgery, Western Infirmary, Glasgow, UK	1	Randomized trial	Watchful waiting vs. "tension-free mesh repair"	160	NR	University hospital	NR

Table 4. Key Question 1: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Fitzgibbons et al., 2006[688-694]					x	x	x		x							
O'Dwyer et al., 2006[776,777]					x	x	x		x							

Table 5. Key Question 1: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Fitzgibbons et al., 2006[688-694]	18+	x				3+						x			
O'Dwyer et al., 2006[776,777]	55+				x										

Table 6. Key Question 1: Patient enrollment criteria, other

Study	Other Enrollment Criteria
Fitzgibbons et al., 2006[688-694]	Men with minimally symptomatic chronically incarcerated hernias were included provided there was no intererfence with normal activities. Exclusion criteria also included participation in another clinical trial, presence of pain that limits usual activities, and a history of recent onset (within 6 weeks) of difficulty in reducuing a hernia that was previously reducible.
O'Dwyer et al., 2006[776,777]	No other criteria

Table 7. Key Question 1: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Fitzgibbons et al., 2006[688-694]	Standardized Lichtenstein open tension-free repair as described by Amid. According to the study authors, "local anesthesia is recommended but not required."	Watchful waiting patients were instructed to watch for hernia symptoms and were told to contact their physician if problem developed.	NA	NA	General anesthesia was used in 51%, spinal anesthesia in 10%, and local anesthesia in 37%. Fourteen percent of patients receiving surgical repair had bilateral repair.
O'Dwyer et al., 2006[776,777]	Patients randomized to operation had a tension free mesh repair under local or general anesthesia.	Patients in the observation arm were given contact number to telephone should their hernia become symptomatic or complicated.	NA	NA	

Table 8. Key Question 1: Baseline characteristics

Study	Characteristic	Group A	Group B
Fitzgibbons et al., 2006[688-694]	% bilateral	13% (48/356)	15% (53/364)
	% hernia duration <6 wks	16% (56/356)	15% (55/364)
	% hernia duration >6 wks	72% (256/356)	73% (267/364)
	% hernia duration do not know	12% (44/356)	12% (42/364)
	% hernia enlarged in past 6 wks	10% (34/356)	15% (56/364)
	% hernia findings extends into scrotum	6% (21/356)	5% (20/364)
	% hernia findings palpable on impulse	42% (151/356)	39% (142/364)
	% hernia findings visible when standing	52% (184/356)	55% (202/364)
	% hernia reducibility easily	30% (108/356)	33% (120/364)
	% hernia reducibility spontaneously	65% (232/356)	65% (235/364)
	% hernia reducibility with difficulty	4% (15/356)	2% (6/364)
	% irreducible	0% (1/356)	1% (3/364)
	% primary	90% (322/356)	88% (321/364)
	% recurrent	10% (34/356)	12% (43/364)
	% unilateral	87% (308/356)	85% (311/364)
	% age <40	12% (41/356)	11% (41/364)

Study	Characteristic	Group A	Group B
	% age >65	32% (114/356)	34% (125/364)
Fitzgibbons et al., 2006[688-694] (continued)	% age 40-65	56% (200/356)	54% (198/364)
	% alcohol consumption >2 drinks/day	11% (38/356)	13% (48/364)
	% private health insurance	78% (279/356)	78% (285/364)
	% race asian	1% (3/356)	1% (3/364)
	% race black	5% (17/356)	4% (16/364)
	% race multiracial	3% (12/356)	6% (23/364)
	% race no response	4% (13/356)	3% (11/364)
	% race white	87% (311/356)	85% (311/364)
	% smoking	19% (67/356)	18% (65/364)
	% work any	62% (221/356)	59% (213/364)
	% work disabled/unemployed	5% (18/356)	6% (22/364)
	% work retired	33% (117/356)	37% (133/364)
	Age	57.5 (SD: 13.9) (N=356)	57.5 (SD: 14.1) (N=364)
	BMI (kg/m^2)	26.6 (SD: 3.8) (N=356)	25.8 (SD: 3.4) (N=364)
	Years of education	13.9 (SD: 2.7) (N=356)	14.2 (SD: 2.7) (N=364)

Study	Characteristic	Group A	Group B
	% ASA score 1	64% (227/356)	68% (246/364)
Fitzgibbons et al., 2006[688-694] (continued)	% ASA score 2	32% (113/356)	27% (100/364)
	% ASA score 3	4% (15/356)	5% (18/364)
	% chronic cough	3% (11/356)	4% (15/364)
	% chronic obstructive pulmonary disease	1% (5/356)	1% (2/364)
	% congestive heart failure (CHF)	1% (2/356)	0% (1/364)
	% diabetes	5% (17/356)	4% (16/364)
	% hypertension	27% (95/356)	28% (102/364)
	% prior myocardial infarction (MI)	0% (1/356)	0% (1/364)
	% prostatism	10% (35/356)	12% (42/364)
	Activity Assessment Scale (AAS) ambulatory	95.5 (SD: 9.8) (N=356)	97.1 (SD: 8) (N=364)
	Activity Assessment Scale (AAS) score sedentary	94.3 (SD: 9.6) (N=356)	95.7 (SD: 9) (N=364)
	Activity Assessment Scale (AAS) Total	95.2 (SD: 8.4) (N=356)	96.5 (SD: 6.7) (N=364)
	Activity Assessment Scale (AAS) work/exercise	92.1 (SD: 12.8) (N=356)	93.3 (SD: 11.9) (N=364)
	Physical component summary (PCS)	52.2 (SD: 7.9) (N=356)	51.5 (SD: 7.7) (N=364)

Study	Characteristic	Group A	Group B
	Surgical pain normal activities	10.3 (SD: 14.9) (N=356)	10.4 (SD: 14.9) (N=364)
Fitzgibbons et al., 2006[688-694] (continued)	Surgical pain score at rest	8.2 (SD: 13.1) (N=356)	8.2 (SD: 15.6) (N=364)
	Surgical pain score pain unpleasantness	12.9 (SD: 19.5) (N=356)	10.9 (SD: 17.9) (N=364)
	Surgical pain work/exercise	17.1 (SD: 24.6) (N=356)	14.6 (SD: 20.7) (N=364)
O'Dwyer et al., 2006[776,777]	% bilateral	10% (8/80)	6% (5/80)
	% primary	99% (79/80)	96% (77/80)
	% recurrent	1% (1/80)	4% (3/80)
	Duration of hernia (yr)	3.04 (SD: 2.58) (N=80)	3.46 (SD: 2.5) (N=80)
	Hernia size (cm)	3.23 (SD: 1.22) (N=80)	3.39 (SD: 1.31) (N=80)
	Age	71.9 (SD: 7.5) (N=80)	70.9 (SD: 8.6) (N=80)
	% at maximum Barthel index	99% (79/80)	96% (77/80)
	% with maximum score on the International activities of daily living (IADL)	98% (78/80)	96% (77/80)
	SF-36 bodily pain	80 (SD: 21) (N=80)	73 (SD: 25) (N=80)
	SF-36 change in the past 12 months before surgery	50 (SD: 17) (N=80)	48 (SD: 11) (N=80)

Study	Characteristic	Group A	Group B
	SF-36 emotional role	78 (SD: 37) (N=80)	70.9 (SD: 39) (N=80)
O'Dwyer et al., 2006[776,777] (continued)	SF-36 general health	72 (SD: 18) (N=80)	67 (SD: 19) (N=80)
	SF-36 mental health	81 (SD: 15) (N=80)	79 (SD: 16) (N=80)
	SF-36 physical functioning	79 (SD: 18) (N=80)	72 (SD: 24) (N=80)
	SF-36 physical role	58 (SD: 19) (N=80)	50 (SD: 22) (N=80)
	SF-36 social functioning	88 (SD: 20) (N=80)	83 (SD: 22) (N=80)
	SF-36 vitality	68 (SD: 17) (N=80)	64 (SD: 20) (N=80)
	VAS pain scores (0-100) at movement	2.3 (SD: 3) (N=80)	2.4 (SD: 3.1) (N=80)
	VAS pain scores (0-100) at rest	2 (SD: 3) (N=80)	2 (SD: 2.9) (N=80)

Table 9. Key Question 1: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Fitzgibbons et al., 2006[688-694]	Recurrence	At final follow up beyond 2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	Health-care use HOSPITAL days	1 year to 2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	Health-care use HOSPITAL days (same study as [688] using different N)	Up to 6 months, 6 months to 1 year	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	TOTAL Health-care use HOSPITAL days	At 1 year	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	TOTAL Health-care use HOSPITAL days	At 2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	Physical component score (as-treated) [Difference/95% CI]	2-year change from baseline	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Physical component score (crossed over) [Difference/95% CI]	2-year change from baseline	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Physical component score (intention-to-treat) [Difference/95% CI]	2-year change from baseline	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Physical component score on the SF-36 version 2	2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Pain component score on the SF-36 version 2	2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Pain interfering with activities (as-treated) [Risk difference/ 95% CI]	2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain interfering with activities (crossed over) [Risk difference/ 95% CI]	2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
Fitzgibbons et al., 2006[688-694] (continued)	Pain interfering with activities (intention-to-treat) [Risk difference/ 95% CI]	2 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Acute hernia incarceration without strangulation	4 months after enrollment	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	Complications	2 year	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	Serious adverse events	NR	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
	Serious adverse events	Within 2 years, at 4 years	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Low
O'Dwyer et al., 2006[776,777]	SF-36 Gen health, physical function, physical role, emotional role, social function, bodily pain, vitality, mental health	6 months & 12 months	Y	N	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.
	VAS pain scores (0-10) at rest & at movement	6 months & 12 months	Y	N	Y	Y	Y	Y	-	Y	Y	Y	N	N	Y	Y	Y	Mod.

Table 10. Key Question 1: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test Result
Fitzgibbons et al., 2006[688-694]	Mesh repair vs. watchful waiting	HOSP	Health-care use HOSPITAL DAYS	Up to 6 months	0.95 (SD: 95) (N=317)	0.39 (SD: 1.83) (N=324)	p<0.001, Wilcoxon rank-sum
	Mesh repair vs. watchful waiting	HOSP	Health-care use HOSPITAL DAYS	6 months to 1 year	0.22 (SD: 1.09) (N=317)	0.38 (SD: 1.88) (N=324)	p=0.15, Wilcoxon rank-sum
	Mesh repair vs. watchful waiting	HOSP	TOTAL Health-care use HOSPITAL DAYS	At 1 year	1.09 (SD: 1.22) (N=317)	0.73 (SD: 2.53) (N=324)	p<0.001, Wilcoxon rank-sum
	Mesh repair vs. watchful waiting	HOSP	Health-care use HOSPITAL DAYS	1 year to 2 years	0.22 (SD: 1.05) (N=317)	0.65 (SD: 2.77) (N=324)	p=0.002, Wilcoxon rank-sum
	Mesh repair vs. watchful waiting	HOSP	TOTAL Health-care use HOSPITAL DAYS	At 2 years	1.18 (SD: 1.37) (N=317)	1.1 (SD: 2.97) (N=324)	p<0.001, Wilcoxon rank-sum
	Mesh repair vs. watchful waiting	QOL	Physical component score (as-treated) [Difference/ 95% CI] (higher number is better)	2-year change from baseline	0.66 (SD: 0.44 / (N=317)	-0.62 (SD: 0.46 / (N=336)	Group Difference 95% CI: -1.27 (-2.98 to 0.44)
	Mesh repair vs. watchful waiting	QOL	Physical component score (crossed over) [Difference/ 95% CI] (higher number is better)	2-year change from baseline	3.16 (SD: 0.81 / 95% CI: 2.50 [0.01 to 4.99]) (N=317)	-3.22 (SD: 1.10 / 95% CI: -3.87 [-7.10 to -0.65]) (N=336)	NR
	Mesh repair vs. watchful waiting	QOL	Physical component score (intention-to-treat) [Difference/ 95% CI] (higher number is better)	2-year change from baseline	0.13 (SD: 0.42 / (N=317)	0.29 (SD: 0.4 / (N=336)	Group difference 95% CI: 0.16 (-1.19 to 1.50)
	Mesh repair vs. watchful waiting	Pain	Pain interfering with activities (as-treated) [Risk difference/ 95% CI]	2 years	1% (4/317)	3% (10/336)	Group risk difference 95% CI: 2.86 (-0.98 to 5.94)

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test Result
Fitzgibbons et al., 2006[688-694] (continued)	Mesh repair vs. watchful waiting	Pain	Pain interfering with activities (crossed over) [Risk difference/ 95% CI]	2 years	2% (7/317), 95% CI: 7.18 (0.63 to 14.99)	1% (3/336), 95% CI: 5.52 (-4.12 to 15.15)	NR
	Mesh repair vs. watchful waiting	Pain	Pain interfering with activities (intention-to-treat) [Risk difference/ 95% CI]	2 years	2% (7/317)	5% (17/336)	Group risk difference 95% CI: 2.86 (-0.04 to 5.77)
	Mesh repair vs. watchful waiting	ADV	Orchitis	postop	2% (6/356)	0% (0/364)	n.s. based on OR=13.52 (95% CI: 0.76 to 240.89)[@]
	Mesh repair vs. watchful waiting	ADV	Other minor complications	Postop	6% (22/356)	0% (0/364)	p<0.05 based on OR=49.04 (95% CI: 2.96 to 811.57)[@]
	Mesh repair vs. watchful waiting	ADV	Scrotal hematomas	Postop	5% (17/356)	0% (0/364)	p<0.05 based on OR=37.58 (95% CI: 2.25 to 627.32)[@]
	Mesh repair vs. watchful waiting	ADV	Seromas	Postop	2% (6/356)	0% (0/364)	n.s. based on OR=13.52 (95% CI: 0.76 to 240.89)[@]
	Mesh repair vs. watchful waiting	ADV	Urinary retention	Postop	0% (1/356)	0% (0/364)	n.s. based on OR=3.08 (95% CI: 0.12 to 75.76)[@]
	Mesh repair vs. watchful waiting	ADV	Urinary tract infections	Postop	2% (8/356)	0% (0/364)	p<0.05 based on OR=17.78 (95% CI: 1.02 to 309.23)[@]
	Mesh repair vs. watchful waiting	ADV	Wound hematomas	Postop	6% (23/356)	0% (0/364)	p<0.05 based on OR=51.37 (95% CI: 3.11 to 849.08)[@]
	Mesh repair vs. watchful waiting	ADV	Wound infections	Postop	2% (7/356)	0% (0/364)	n.s. based on OR=15.64 (95% CI: 0.89 to 274.95)[@]
	Mesh repair vs. watchful waiting	ADV	Acute hernia incarceration without strangulation	4 months after enrollment	0% (0/356)	0% (1/364)	n.s. based on OR=0.34 (95% CI: 0.01 to 8.37)[@]
	Mesh repair vs. watchful waiting	ADV	Serious adverse events - acute hernia incaceration	Within 2 years	0% (0/317)	0% (1/336)	n.s. based on OR=0.35 (95% CI: 0.01 to 8.68)[@]
	Mesh repair vs. watchful waiting	ADV	Serious adverse events - acute hernia incaceration with bowel obstruction	At 4 years	0% (0/317)	0% (1/336)	n.s. based on OR=0.35 (95% CI: 0.01 to 8.68)[@]

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test Result
O'Dwyer et al., 2006[776,777]	Mesh repair vs. watchful waiting	RC	Recurrence (of the 143 inguinal hernias repair)	Median follow-up 7.5 years (range 6.2-8.2)	2 (N=NR)	1 (N=NR)	
	Mesh repair vs. watchful waiting	QOL	SF-36 Bodily pain (higher number is better)	6 months	-10.1 (SD: 22.5) (N=78)	-1.6 (SD: 25.2) (N=79)	p=0.14, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Emotional role (higher number is better)	6 months	-8.5 (SD: 45.7) (N=78)	-3.4 (SD: 40.2) (N=79)	p=0.89, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 General health (higher number is better)	6 months	-10.1 (SD: 18.3) (N=77)	-5.3 (SD: 16.7) (N=79)	p=0.097, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Mental health (higher number is better)	6 months	-8.5 (SD: 15.9) (N=78)	-2.6 (SD: 17.9) (N=79)	p=0.063, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Physical functioning (higher number is better)	6 months	-11.7 (SD: 20.4) (N=78)	-4.7 (SD: 22.3) (N=79)	p=0.15, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Physical role (higher number is better)	6 months	-12.7 (SD: 21.9) (N=78)	-3.3 (SD: 22.5) (N=79)	p=0.069, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Social functioning (higher number is better)	6 months	-11.4 (SD: 23.3) (N=78)	-4.4 (SD: 23.5) (N=79)	p=0.14, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Vitality (higher number is better)	6 months	-9.9 (SD: 17.3) (N=78)	-3.3 (SD: 21) (N=79)	p=0.093, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Change in 6 months (higher number is better)	6 months	-3.5 (SD: 22) (N=78)	7.3 (SD: 20.5) (N=79)	p=0.0016, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Bodily pain (higher number is better)	12 months	-11.1 (SD: 23.8) (N=77)	-3 (SD: 24.8) (N=79)	p=0.16, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Emotional role (higher number is better)	12 months	-5.8 (SD: 45.3) (N=77)	-4.2 (SD: 46.9) (N=79)	p=0.6, linear model adjusting for baseline measure on this outcome

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test Result
O'Dwyer et al., 2006[776,777] (continued)	Mesh repair vs. watchful waiting	QOL	SF-36 General health (higher number is better)	12 months	-10.3 (SD: 18.9) (N=78)	-3.4 (SD: 17.6) (N=79)	p=0.046, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Mental health (higher number is better)	12 months	-5 (SD: 14.4) (N=77)	-2.4 (SD: 17.2) (N=79)	p=0.51, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Physical functioning (higher number is better)	12 months	-12.9 (SD: 17.7) (N=77)	-7.2 (SD: 22.5) (N=79)	p=0.17, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Physical role (higher number is better)	12 months	-12.8 (SD: 22) (N=77)	-6.8 (SD: 23.3) (N=79)	p=0.36, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Social functioning (higher number is better)	12 months	-9 (SD: 21.4) (N=77)	-4.2 (SD: 21.8) (N=79)	p=0.33, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Vitality (higher number is better)	12 months	-6.6 (SD: 16.4) (N=77)	-4.7 (SD: 18.2) (N=79)	p=0.98, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	QOL	SF-36 Change in 12 months (higher number is better)	12 months	-0.3 (SD: 23.4) (N=77)	8.5 (SD: 25.6) (N=79)	p=0.045, linear model adjusting for baseline measure on this outcome
	Mesh repair vs. watchful waiting	Pain	VAS pain scores (0-100) at rest	6 months	8 (SD: 14) (N=78)	4.8 (SD: 10.7) (N=79)	Adjusing for baseline pain: p=0.11; Adjusting for analygesia use and other baseline covariates: p=0.062 (linear models)
	Mesh repair vs. watchful waiting	Pain	VAS pain scores (0-100) at rest	12 months	3.7 (SD: 8.2) (N=75)	5.2 (SD: 12.3) (N=79)	Adjusing for baseline pain: p=0.34; Adjusting for analygesia use and other baseline covariates: p=0.38 (linear models)
	Mesh repair vs. watchful waiting	Pain	Pain at rest (crossover from observation to surgery)	Median follow-up of 5 years	Median 1 (Range 0-44) (N=NA)	Median 1.5 (Range 0-46) (N=NA)	NR

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test Result
O'Dwyer et al., 2006[776,777] (continued)	Mesh repair vs. watchful waiting	Pain	VAS pain scores (0-100) at movement	6 months	10.9 (SD: 16) (N=78)	6.1 (SD: 11.9) (N=79)	Adjusing for baseline pain: p=0.036; Adjusting for analygesia use and other baseline covariates: p=0.018 (linear models)
	Mesh repair vs. watchful waiting	Pain	VAS pain scores (0-100) at movement	12 months	7.6 (SD: 15) (N=77)	5.7 (SD: 11.5) (N=79)	Adjusing for baseline pain: p=0.39; Adjusting for analygesia use and other baseline covariates: p=0.25 (linear models)
	Mesh repair vs. watchful waiting	Pain	Pain on movement (crossover from observation to surgery)	Median follow-up of 5 years	Median 1 (Range 0-30) (N=NA)	Median 1.5 (Range 0-62) (N=NA)	NR
	Mesh repair vs. watchful waiting	ADV	Serious adverse events - acute hernia	postop	1% (1/77)	0% (0/79)	n.s. based on OR=3.12 (95% CI: 0.13 to 77.72)[@]
	Mesh repair vs. watchful waiting	ADV	Serious adverse events – myocardial infarction and died postoperatively	postop	1% (1/77)	0% (0/79)	n.s. based on OR=3.12 (95% CI: 0.13 to 77.72)[@]
	Mesh repair vs. watchful waiting	ADV	Serious adverse events – postoperative stroke	postop	1% (1/77)	0% (0/79)	n.s. based on OR=3.12 (95% CI: 0.13 to 77.72)[@]

Table Note:
[@] Calculated by evidence reviewer

Key Question 2a Tables

Table 11. Key Question 2a: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Anadol et al., 2004[624]	Turkey	Gazi University School of Medicine	1	RCT	Lichtenstein vs. TAPP	50	NR	University hospital	NR
Andersson et al., 2003[625,626]	Sweden	Department of Surgery, Lund University Hospital	1	RCT	Lichtenstein vs. TEP	185	1996 to 1997	University hospital	NR
Bender et al., 2009[630]	Turkey	S. B. Okmeydany Training and Research Hospital	1	RCT	Kugel patch vs. TEP	40	12/2007 to 5/2008	University hospital	NR
Bostanci et al., 1998[640]	Turkey	Pamukkale University and Kasimpassa Naval Hospital	2	RCT	Open mesh preperitoneal vs. TEP	64	9/1995 to 8/1997	One university hospital and one non-university hospital	NR
Bringman et al., 2003[641]	Sweden	Karolinska Institutet at Huddinge University Hospital and Sodertalje Hospital	2	RCT	Lichtenstein vs. mesh plug vs. TEP	299	9/1997 to 3/2000	One university hospital and one non-university hospital	NR
Bueno et al., 2004[646]	Spain	Servicio de Cirugı´a general y del Aparato Digestivo, Hospital Universitario “La Fe,” Valencia	1	RCT	Lichtenstein vs. TAPP	400	7/1997 to 12/2000	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Butler et al., 2007[647]	USA	Navy Medical Center, Portsmouth, Virginia	1	RCT	Lichtenstein vs. TAPP vs. TEP	66	NR	Tertiary teaching hospital	"This study was sponsored by the Chief, Navy Bureau of Medicine and Surgery, Washington, DC, Clinical Investigation Program (CIP #P01-0019). The views expressed in this article are those of the authors, and do not reflect the official policy or position of the Department of the Navy, the Department of Defense, or the United States Government."
Butters et al., 2007[648,649]	Germany	Krankenhaus Bietigheim and University of Heidelberg	1	RCT	Lichtenstein vs. TAPP	280	7/1995 to 6/1996	Non-university hospital	NR
Champault et al., 1997[651-654]	France	Paris University Hospital	1	RCT	Stoppa vs. TEP	50	7/1991 to 3/1995	University hospital	NR
Colak et al., 2003[662]	Turkey	Department of general Surgery at Mersin University	1	RCT	Lichtenstein vs. TEP	132	4/2000 to 8/2001	University hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Douek et al., 2003[674,675]	United Kingdom	North Middlesex University Hospital and Whipps Cross University Hospital	2	RCT	Lichtenstein vs. TAPP	403	5/1995 to 12/1996	University hospital	Medical Research Council, Frank Taylor Memorial Trust, and National Health Service Research and Development grants
Eklund et al., 2006[679-682]	Sweden	11 hospitals in Sweden	11	RCT	Lichtenstein vs. TEP	1513	11/1996 to 8/2000	Two university hospitals, six regional hospitals, and three county hospitals	Stig and Ragna Gorthon Foundation, and Tyco Healthcare. "Tyco Healthcare did not have any involvement in the design and conduct of the study or data analysis."
Gokalp et al., 2003[700]	Turkey	Nizip State Hospital and Gaziantep University Hospital	2	RCT	Lichtenstein vs. TEP	140	10/2000 to 4/2001	Hospital	NR
Gong et al., 2011[701]	China	NR	NR	RCT	Mesh plug vs. TAPP vs. TEP	164	NR	NR	Study funding source not reported. However authors stated that they "have no conflicts of interest or financial ties to disclose"
Gunal et al., 2007[702]	Turkey	NR	NR	RCT	Lichtenstein vs. Nyhus vs. TAPP vs. TEP	160	2/1997 to 2/2001	NR	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Hamza et al., 2010[704]	Egypt	Department of Surgery, Faculty of Medicine, University of Alexandria, Egypt	1	RCT	Lichtenstein vs. TAPP vs. TEP vs. open pro-peritoneal mesh	100	NR	University hospital	Study was funded by the University of Alexandria.
Heikkinen et al., 1997[705,706]	Finland	Keski-Pohjanmaa Central Hospital	1	RCT	Lichtenstein vs. TAPP	38	2/1994 to 8/1994	Hospital	NR
Heikkinen et al., 1998[706,707]	Finland	Keski-Pohjanmaa Central Hospital	1	RCT	Lichtenstein vs. TEP	45	1/1996 to 9/1996	Hospital	NR
Heikkinen et al., 1998[706,708]	Finland	Keski-Pohjanmaa Central Hospital	1	RCT	Lichtenstein vs. TAPP	40	12/1994 to 6/1995	Hospital	NR
Khoury et al., 1998[718]	Canada	Jean-Talon Hospital	1	RCT	Mesh plug vs. TEP	292	9/1994 to 9/1997	Hospital	NR
Lal et al., 2003[729]	India	Lok Nayak Hospital	1	RCT	Lichtenstein vs. TEP	50	5/2000 to 12/2001	University hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Langeveld et al., 2010[736]	The Netherlands	Six hospitals in the Netherlands; specific hospitals not reported	6	RCT	Lichtenstein vs. TEP	670	8/2000 to 3/2004	5 non-university hospital and one university hospital	Erasmus Medical Center Healthcare Efficiency research program. "The Healthcare Efficiency research program did not play a role in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication"
Lau et al., 2006[739]	China	NR	NR	RCT	Lichtenstein vs. TEP	200	1/2002 to 1/2004	NR	NR
MRC et al., 1999[747,753-760]	United Kingdom and Ireland	26 hospitals in the UK and Ireland	26	RCT	Lichtenstein /Stoppa /non-mesh vs. TAPP/TEP	928	1/1994 to 3/1997	general nonspecialist hospitals	Medical Research Council
Neumayer et al., 2004[762-768]	USA	14 VA medical centers	14	RCT	Lichtenstein vs. TAPP/TEP	2164	1/1999 to 11/2001	Non-university hospitals	Cooperative Studies Program of the Department of Veterans Affairs Office of Research and Development
Paganini et al., 1998[783]	Italy	Several centers in Italy; specific centers not reported	>1	RCT	Lichtenstein vs. TAPP	108	4/1994 to 3/1996	NR	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Pavlidis et al., 2002[786]	Greece	Medical Faculty of the Aristoles University of Thessaloniki, Second Surgical Department, Thessaloniki, Greece	1	RCT	Patch vs. patch+plug vs. TAPP	299	11/1998 to 10/2000	University hospital	NR
Payne et al., 1994[787]	USA	Hawaii Permanente Medical Group in Honolulu	1	RCT	Lichtenstein vs. TAPP	100	9/1992 to 10/1993	Non-university hospital	Study funding source not reported. However authors, stated that "None of the authors has sought or accepted support from any of the manufacturers cited in this article"
Picchio et al., 1999[789]	Latvia	7th Clinical Hospital in Riga	1	RCT	Lichtenstein vs. TAPP	105	11/1996 to 12/1997	University hospital	NR
Simmermacher et al., 2000[814]	The Netherlands	NR	NR	RCT	Ugahary vs. TEP	162	2/1998 to 12/1999	NR	NR
Singh et al., 2011[815]	India	All India Institute of Medical Sciences	1	RCT	TAPP/TEP vs. Lichtenstein	120	2/2009 to 9/2010	Tertiary care referral hospital	NR, however the authors had "no conflicts of interests or financial ties to disclose"

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Sevonius et al., 2009[535,805-813]	Sweden	95% of all hospitals in Sweden	NR	Non-randomized comparative study	Numerous comparisons	174,527 hernias in the registry; approximately 127,535 patients' data included for this Key Question, basedon 142,578 primary repairs)	1992 to 2008	57% of repairs performed in medium-sized non-teaching hospitals; 32% performed in small-sized non-teaching hospitals; 11% performed in teaching hospitals	Sweden's National Board of Health and Welfare, the Swedish Association of Local Authorities, and by the County Council of Jämtland
Zieren et al., 1998[838,839]	Germany	Surgical Department of the Charite	1	RCT	Mesh plug vs. TAPP	240	4/1994 to 4/1996	University hospital	NR
Koninger et al., 2004[726]	Germany	NR	NR	RCT	Lichtenstein vs. TAPP vs. Shouldice	280	NR	NR	NR
Pokorny et al., 2008[791,792]	Austria	12 centers in the Netherlands; specific centers not reported	12	RCT	Lichtenstein vs. TAPP vs. TEP vs. Shouldice vs. Bassini	365	1998 to 2002	general surgery clinics	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Johansson et al., 1999[712,713]	Sweden	10 in Sweden	10	RCT	TAPP vs. open mesh preperitoneal vs. surgeon's preferred method of open sutured repair	613	11/1993 to 6/1996	Hospitals	County of Alvsborg Research and Development Foundation, the Broderna Eriksson Research Fund, Ethicon, and Astra Pain Control AB.
Vatansev et al., 2002[826] See Table Note.	Turkey	University of Selcuk	1	RCT	Lichtenstein vs. Nyhus vs. Bassini vs. TEP	84	NR	University hospital	NR
Wara et al., 2005[829-834]	Denmark	78 throughout Denmark	78	Non-randomized comparative study	Lichtenstein vs. TAPP/TEP	67,306 repairs in the registry; 40,854 patients' data included for this Key Question	1/1/1998 to 12/31/2005	76% hospital departments, 24% private clinics	Danish Institute for Health Technology Assessment and the Danish Research Council. SWEDISH: National Board of Health and Welfare and the Federation of County Councils in Sweden

Table Note:
For Vatansev et al., 2002[826] Of the 84 patients enrolled, 65 provided data related to one of the Key Questions (those who received Lichtenstein, Nyhus, or TEP). For Zieren et al., 1998[838,839], of the 240 patients enrolled, 160 provided data related to one of the Key Questions. For Koninger et al., 2004[726], of the 280 patients enrolled, 187 provided data related to one of the Key Questions (those who received either Lichtenstein or TAPP) For Pokorny et al., 2008[791,792], of the 365 patients enrolled, 198 provided data related to one of the Key Questions (those who received either Lichtenstein, TAPP, or TEP). For Johansson et al., 1999[712,713], of the 613 patients enrolled, 406 provided data related to one of the Key Questions.

Table 12. Key Question 2a: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Anadol et al., 2004[624]			x	x		x										
Andersson et al., 2003[625,626]					x											
Bender et al., 2009[630]			x	x	x											
Bostanci et al., 1998[640]																
Bringman et al., 2003[641]				x												
Bueno et al., 2004[646]				x					x							
Butler et al., 2007[647]			x	x												
Butters et al., 2007[648,649]			x	x												
Champault et al., 1997[651-654]					x		x		x						x	
Colak et al., 2003[662]					x											
Douek et al., 2003[674,675]									x							
Eklund et al., 2006[679-682]			x	x										x		
Gokalp et al., 2003[700]			x	x	x				x		x				x	
Gong et al., 2011[701]			x	x	x	x							x			
Gunal et al., 2007[702]			x	x												
Hamza et al., 2010[704]			x		x	x										
Heikkinen et al., 1997[705,706]					x	x										

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Heikkinen et al., 1998[706,707]			x	x	x											
Heikkinen et al., 1998[706,708]			x	x	x											
Johansson et al., 1999[712,713]				x	x	x							x			
Khoury et al., 1998[718]																
Koninger et al., 2004[726]			x													
Lal et al., 2003[729]			x	x			x							x		
Langeveld et al., 2010[736]														x		
Lau et al., 2006[739]			x	x												
MRC et al., 1999[747,753-760]					x									x		
Neumayer et al., 2004[762-768]							x									
Paganini et al., 1998[783]					x					x		x			x	
Pavlidis et al., 2002[786]																
Payne et al., 1994[787]					x				x							x
Picchio et al., 1999[789]			x													x
Pokorny et al., 2008[791,792]			x	x	x				x							
Sevonius et al., 2009[535,805-813]																
Simmermacher et al., 2000[814]			x	x												

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Singh et al., 2011[815]			x													
Vatansev et al., 2002[826]			x	x												
Wara, 2008[829-834]																
Zieren et al., 1998[838,839]			x		x											

Table 13. Key Question 2a: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Anadol et al., 2004[624]	Adults	x			x		x								
Andersson et al., 2003[625,626]	Adults	x			x	3+	x				x		x		
Bender et al., 2009[630]	Adults									x					
Bostanci et al., 1998[640]	Adults														
Bringman et al., 2003[641]	30-75	x			x		x								
Bueno et al., 2004[646]	Adults	x													
Butler et al., 2007[647]	Adults	x													
Butters et al., 2007[648,649]	Adults	x													
Champault et al., 1997[651-654]	40-75	x			x		x	x			x	x			
Colak et al., 2003[662]	Adults				x		x								
Douek et al., 2003[674,675]	18+				x					x					
Eklund et al., 2006[679-682]	30-70	x				4+	x								x
Gokalp et al., 2003[700]	Adults	x	x		x	3+	x				x	x			
Gong et al., 2011[701]	30-70				x	3+	x								
Gunal et al., 2007[702]	Adults				x	3+									
Hamza et al., 2010[704]	Adults	x					x				x				
Heikkinen et al., 1997[705,706]	Adults				x					x		x			

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Heikkinen et al., 1998[706,707]	18+		x		x		x			x		x			
Heikkinen et al., 1998[706,708]	Adults				x							x			
Johansson et al., 1999[712,713]	40-75	x			x			x							
Khoury et al., 1998[718]	18+				x		x			x					
Koninger et al., 2004[726]	Adults	x													
Lal et al., 2003[729]	Adults	x			x		x								
Langeveld et al., 2010[736]	18+									x					
Lau et al., 2006[739]	18+	x			x	3+									
MRC et al., 1999[747,753-760]	Adults						x			x	x				
Neumayer et al., 2004[762-768]	18+	x			x	4+	x	x							
Paganini et al., 1998[783]	18+			x	x	3+				x	x				
Pavlidis et al., 2002[786]	30+														
Payne et al., 1994[787]	20-70				x		x								
Picchio et al., 1999[789]	Adults				x		x								
Pokorny et al., 2008[791,792]	18+														
Sevonius et al., 2009[535,805-813]	15+														
Simmermacher et al., 2000[814]	Adults														

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Singh et al., 2011[815]	Adults	x			x	3+	x								
Vatansev et al., 2002[826]	Adults														
Wara, 2008[829-834]	Adults														
Zieren et al., 1998[838,839]	18+				x						x				

Table 14. Key Question 2a: Patient enrollment criteria, other

Study	Other enrollment criteria
Anadol et al., 2004[624]	Stated that "we tried to select patients who would cooperate in terms of expressing the level of pain and in postoperative follow-up." Excluded those with other systemic illnesses or prior operations.
Andersson et al., 2003[625,626]	Excluded history of surgery to the lower abdomen (but prior inguinal hernia surgeries were included), acute abdominal disease
Bender et al., 2009[630]	No other criteria
Bostanci et al., 1998[640]	No other criteria
Bringman et al., 2003[641]	Appendectomy was not an exclusion. Excluded cancer, immune deficiency.
Bueno et al., 2004[646]	Excluded any laparoscopic surgery that required conversion to open surgery
Butler et al., 2007[647]	No other criteria
Butters et al., 2007[648,649]	No other criteria
Champault et al., 1997[651-654]	Excluded poor cardiorespiratory status, cirrhosis, coagulopathy, glaucoma, pelvic irradiation, body mass index more than 30 (however this stated criterion was not applied uniformly because 31% of patients (31/100) had a body mass index greater than 30). Appendectomy was not an exclusion
Colak et al., 2003[662]	No other criteria
Douek et al., 2003[674,675]	Excluded those with psychological complaints, or had a poor understanding of English
Eklund et al., 2006[679-682]	Excluded those unable to participate in the postoperative follow-up owing to drug misuse, psychiatric disorders and language difficulties
Gokalp et al., 2003[700]	Excluded known adherences, complicating disease resulting in ASA group 3 or 4
Gong et al., 2011[701]	At least three years of postoperative data
Gunal et al., 2007[702]	Excluded those with "unsatisfactory data" (not defined by the authors), and those that could not be reached at their last follow-up, Nyhus IIIc or IV
Hamza et al., 2010[704]	Appendectomy was not an exclusion. Excluded obstructive airwary disease, constipation, or obstructive uropathy
Heikkinen et al., 1997[705,706]	Excluded patient refused to give consent.
Heikkinen et al., 1998[706,707]	Excluded those not considered suitable for day-case surgery
Heikkinen et al., 1998[706,708]	Considered suitable for day-case surgery. Excluded patient refusal to give consent, or anethetic risk due to a deteriorated heart condition
Johansson et al., 1999[712,713]	Excluded recurrences only if they were 2nd or more recurrence or if there was an earlier surgery with mesh in the same groin, complicating diseases, any contraindications to laparoscopic hernia repair such as known adherences, former major abdominal surgery, or giant hernia
Khoury et al., 1998[718]	No other criteria
Koninger et al., 2004[726]	No other criteria

Study	Other enrollment criteria
Lal et al., 2003[729]	Excluded any laparoscopic surgery that required conversion to open surgery, history of radiotherapy.
Langeveld et al., 2010[736]	Excluded those with communicative or cognitive limitation that prevented informed consent, medical history of prostatectomy, abdominal bladder operation.
Lau et al., 2006[739]	Excluded adverse anesthetic history, lived more than one hour's travel from the hospital, no competent adult to accompany the patient home and look after the patient for 24 hours, patient choice of local anesthesia, any concomitatnt procedures for other pathologies
MRC et al., 1999[747,753-760]	Excluded those who had a previous midline or paramedian incision, incarcerated hernia
Neumayer et al., 2004[762-768]	Excluded hernia undetected on physical examination, presence of bowel obstruction/strangulation/peritonitis/perforation, contraindications to pelvic laparoscopy such as previous pelvic surgical procedures, previous mesh hernia repair, life expectancy less than two years, participation in another clinical trial.
Paganini et al., 1998[783]	Excluded multiple recurrent hernias, presence of other abdominal disease amenable to surgical treatment that could be performed laparoscopically during the same operation such as cholelithiasis, or anyone who had been referred from their general practitioner to receive a specific type of procedure
Pavlidis et al., 2002[786]	No other criteria
Payne et al., 1994[787]	Appendectomy was not an exclusion. Excluded those unable to tolerate a pneumoperitoneum.
Picchio et al., 1999[789]	Excluded complicated hernia, those unsuitable for pneumoperitoneum
Pokorny et al., 2008[791,792]	No other criteria
Sevonius et al., 2009[535,805-813]	Groin repairs in Sweden. One of the publications excluded those without recurrent hernia,[805] and another excluded those with recurrent or bilateral hernia.[808]
Simmermacher et al., 2000[814]	No other criteria
Singh et al., 2011[815]	Excluded "complicated hernia," hydrocele, epididymitis, history of orchiectomy, "significant comorbidities"
Vatansev et al., 2002[826]	Excluded any laparoscopic surgery that required conversion to open surgery
Wara, 2008[829-834]	Authors included all repairs that were in the database, which represents 98% of all hernia repairs performed in Denmark
Zieren et al., 1998[838,839]	Excluded cardiac insufficiency as defined by New York Heart Association III or IV)

Table 15. Key Question 2a: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D
Anadol et al., 2004[624]	TAPP, general anesthesia, "the surgeons were not only skilled in open surgery but also capable of performing all kinds of advanced laparoscopic procedures…." Did not report the number of prior laparoscopic hernia repairs these surgeons had performed, nor the number of prior TAPPs. Carbon dioxide pneumoperitoneum established. Rolled piece of polypropylene mesh (10x8 cm) covering the entire inguinal area. First staple on the pubic tubercle followed by Cooper's ligament. No staple below or lateral to the inguinal ring to avoid vascular or nerve injury. Peritoneal flap closed back to cover the mesh completely.	Lichtenstein, general anesthesia, "the surgeons were not only skilled in open surgery but also capable of performing all kinds of advanced laparoscopic procedures…." Did not report the number of prior laparoscopic hernia repairs these surgeons had performed, nor the number of prior TAPPs. If hernia is indirect, the sac is ligated and excised, and the posterior wall is repaired using polypropylene mesh as described by Lichtenstein.	NA	NA
Andersson et al., 2003[625,626]	TEP. All surgeons had prior experience with laparoscopic surgery (did not report what procedure or the extent of prior experience). Single dose low–molecular-weight heparin subcutaneously. general anesthesia, Dissectin balloon (OMS-PDB 1000, Origin, California). 10x15cm polypropylene mesh (Marlex, CR Bard, Chelmsford MA) fixed to the abdominal wall and the ligament of Cooper with a screwstapler (OMS-TTS, Origin).	Lichtenstein. All surgeons had prior experience with laparoscopic surgery (did not report what procedure or the extent of prior experience). 10x15 cm polypropylene mesh (Marlex, CR Bard, Chelmsford MA) fixed to the abdominal wall with a 2/0 polypropylene suture; externus oblique fascia was sutured with 3/0 polyglactin. Regional or general anesthesia, depending on prefence of the anesthesiologist or on patient preference	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Bender et al., 2009[630]	TEP, 15x15 cm mesh (Atrium prolite mesh, Atrium medical corporation).	Kugel patch, small oval mesh (Bard Kugel Hernia Patch, Davol Inc.)	NA	NA
Bostanci et al., 1998[640]	TEP, 6 to 8 cm square polypropylene mesh. For hernia, two meshes were used.	No simple label was used, but it was open mesh preperitoneal. 6 to 8 cm square polypropylene mesh, fixated with interrupted 2/0 polypropylene sutures. For bilateral hernia, two meshes were used.	NA	NA
Bringman et al., 2003[641]	TEP, 5 surgeons, all were "experienced" in TEP. Of the 92 operations, 7 were performed by surgeons in training, assisted by one of the experienced surgeons, general anesthesia, CO2 insufflation. 10x15cm polypropylene mesh (Prolene, Ethicon GmbH). Anterior rectus sheath closed with 2-0 polyglactin (Vicryl, Ethicon GmbH).	Lichtenstein, 10 surgeons, all were "experienced" in Lichtenstein. Of the 103 operations, 9 were performed by surgeons in training, assisted by one of the experienced surgeons. 97% had spinal or epidural anesthesia. 7.5x15 cm polypropylene mesh (Bard) that was trimmed to match the size of the inguinal floor if necessary. Fixation with 2-0 polypropylene (Prolene)	Mesh plug, 10 surgeons, all were "experienced" in mesh plug. Of the 104 operations, 7 were performed by surgeons in training, assisted by one of the experienced surgeons. 94% had spinal or epidural anesthesia. Procedure perfomred as described by Robbins and Rutkow using a large Bard Perfix plug and patch (CR Bard). Interrupted sutures with 2-0 polypropylene to secure the plug, but the patch was not fixed with sutures.	NA
Bueno et al., 2004[646]	TAPP, 8x12 cm polypropylene mesh, anchored with 5-10 staples along Cooper's ligament and along the iliopubic tract and lateral at the upper half of the mesh. "Trained surgeons."	Lichtenstein, 8x12cm polypropylene mesh, fixated with polypropylene stitches to pubis, inguinal ligament, and conjoint tendon. "Trained surgeons."	NA	NA
Butler et al., 2007[647]	TAPP, all operations were either performed or were supervised by a surgeon experienced in laparoscopic repairs (did not report what level of experience or whether this experience was for hernia repair or for other clinical conditions), polypropylene mesh, other mesh details not reported	TEP, all operations were either performed or were supervised by a surgeon experienced in laparoscopic repairs (did not report what level of experience or whether this experience was for hernia repair or for other clinical conditions), polypropylene mesh, other mesh details not reported	Lichtenstein, all operations were either performed or were supervised by a surgeon experienced in laparoscopic repairs (did not report what level of experience or whether this experience was for hernia repair or for other clinical conditions), polypropylene mesh, other mesh details not reported	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Butters et al., 2007[648,649]	TAPP, no other details provided.	Lichtenstein, all surgeons were "experienced" in all techniques used in the study. Lichtenstein procedure as described by Amid.	NA	NA
Champault et al., 1997[651-654]	TEP, prior experience with TEP of this surgeon was 50 cases (to confirm feasibility and serve as a training period for the members of the surgical team). general anesthesia, direct inflation of the Retzius space using carbon dioxide with a Veress needle. One mesh if unilateral, two if bilateral. Mesh was polypropylene (Ethicon) slit on the lower edge to allow passage of the spermatic cord, mesh not fixed. First 11 patients had 11 x 6 cm mesh, last 89 patients had 15x13cm mesh.	Stoppa (prior Stoppa experience of surgeons not reported), general anesthesia, dissection of the preperitoneal space from one psoas muscle to the other, Dacron mesh (Ethicon) 30 x 15 cm with a lower edge slit to allow passage of the spermatic cord, mesh not fixed.	NA	NA
Colak et al., 2003[662]	TEP, general anesthesia, balloon dissector (Auto Suture, Istanbul, Turkey), 7 x 12 cm polypropylene mesh (Surgipro, Auto Suture, Istanbul, Turkey), Fixation with a hernia tacker (Proteck, Auto Suture, Istanbul, Turkey) to Cooper's ligament and the abdominal wall, No slit was made in the mesh to accomodate the spermatic cord.	Lichtenstein, general anesthesia, 7 x 12 cm polypropylene mesh (Surgipro, Auto Suture, Istanbul, Turkey)	NA	NA
Douek et al., 2003[674,675]	TAPP, general anesthesia, 10 x 15 cm polypropylene mesh (Prolene, Ethicon), stapled in position with the EMS multifeed staple gun. Peritoneum was replaced to exclude the mesh from the cavity and stapled in position. For bilateral cases, either two meshes were used, or a single 28 x 10 cm mesh.	Lichtenstein, local anesthesia, no other details reported	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Eklund et al., 2006[679-682]	TEP, 22 surgeons, all experienced in general laparoscopy (cholecystectomy, appendectomy, fundoplication) and had performed at least 25 TEPs before the study. Balloon dissection (PBD100, Origin Medsystem). general anesthesia in 99.7% of cases. Downward and medial dissection was extended several centimeters below the pubic bone and Cooper's ligament, exposing the spermatic vessels and the vas deferens, as far as the anterior-superior iliac spine. Polypropylene mesh 12 x 15 cm (Atrium Medical, Hudson NH) covered the hernial orifice and the inside of Hesselbach's triangle. Mesh fixed with staples (Origin-Tacker 5mm, Origin Medsystem) to Cooper's ligament and the abdominal wall above the iliopubic tract.	Lichtenstein, 26 surgeons, all were "experienced" with the Lichtenstein technique (did not report minimum number of prior Lichtensteins). general anesthesia in 70.4% of cases. Cremaster muscle together with external spermatic vessels and the genital branch of the genitofemoral nerve were divided at the internal ring. A dilated internal ring or a bulging posterior wall of the inguinal canal was reconstructed to facilitate placement of the mesh. Polypropylene mesh (Atrium Medical) 7.5 cm on one side and between 12 and 15 cm on the other side was anchored with a running 2/0 polypropylene suture overlapping the pubic tubercle and then extending along the inguinal ligament inferiorly. Interrupted sutures placed medically and superiorly. Slit made laterally in the mesh to permit passage of the spermatic cord and the ilioinguinal nerve	NA	NA
Gokalp et al., 2003[700]	TEP, general anesthesia, balloon expander PDB1000 into the extraperitoneal space, 10 x 15 cm polypropylene mesh (Prolene, Ethicon), mesh attached to Cooper's ligament and the transvers fascia with staples (EMS Hernia stapler, Ethicon). No slit was made on the mesh at the lateral end of the mesh to accomodate the spermatic cord.	Lichtenstein, spinal anesthesia, 8 x 12 cm polypropylene mesh (Prolene, Ethicon), mesh sutured to the aponeuretic tissue over the pubic bone, to the shelving edge of the inguinal ligament, and to the internal oblique aponeurosis with 2-0 polypropylene. A slit was made on the mesh to accomodate the spermatic cord.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Gong et al., 2011[701]	TAPP, four surgeons, all were "experienced with both open and laparoscopic hernioplasty" (did not report the number of prior operations these surgeons had performed), general anesthesia. Large Bard polypropylene mesh (Davol) 8.5 cm x 15 cm was placed preperitoneally and attached to Cooper's ligament and the transverse fascia with the 5mm tacker (Auto Suture Protack, Tyco Inc). Peritoneum closed with running 3-0 Vicryl Plus suture.	TEP, four surgeons, all were "experienced with both open and laparoscopic hernioplasty" (did not report the number of prior operations these surgeons had performed), general anesthesia. Blunt digital dissection made in the preperitoneal space through the ipsilateral anterior rectus sheath. Dissection of hte preperitoneal space was perfomed medially across the midline and laterally cranial to the anterosuperior iliac spine. Hernia sac was reduced and a 8.5 x 13.7 cm Bard 3DMax mesh (preformed knitted polypropylene) placed in the preperitoneal space, covering the inguinal floor. Anterior rectus sheath then closed with a 3-0 Vicryl suture	Mesh plug, four surgeons, all were "experienced with both open and laparoscopic hernioplasty" (did not report the number of prior operations these surgeons had performed), regional anesthesia. Procedure as described by Rutkow and Robbins using a large Bard mesh Perfix plug (monofilament knitted polypropylene, Davol Inc.). Plug was secured and the patch fixed with interrupted sutures using 2-0 Prolene (polypropylene, Ethicon). Closure of the external oblique and Scarpa's fascia with a running 3-0 Vicryl Plus (polyglactin, Ethicon) suture.	NA
Gunal et al., 2007[702]	TAPP, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). Carbon dioxide insufflation. 6 x 12 cm Prolene mesh fixed to the posterior abdominal wall using a hernia stapler.	TEP, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). Balloon trocar expansion of the preperitoneal space and carbon dioxide insufflation. 6 x 12 cm Prolene mesh fixed to the posterior inguinal wall using a hernia stapler.	Lichtenstein, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). 6 x 12 cm Prolene mesh fixed to the anterior aspect of the posterior wall.	Nyhus, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). 6x12 cm prolene mesh to the posterior aspect of the inguinal defect
Hamza et al., 2010[704]	TAPP, no other details reported	TEP, no other details reported	Lichtenstein, no other details reported	Open properitoneal mesh, no other details reported

Study	Treatment A	Treatment B	Treatment C	Treatment D
Heikkinen et al., 1997[705,706]	TAPP, explored for contralateral hernia, mesh 7 x 10 cm on average (Surgipro mesh, USSC) and stapled medially to the Cooper's ligament and pubic peristeum. A few staples placed superolaterally above the iliopubic tract. Peritoneum stapled over the mesh.	Lichtenstein, 8 x 12 cm polypropylene mesh, sutured with polypropylene (Prolene, Ethicon) medially to the pubic fascia and inferiorly to the inguinal ligament. A few loose biodegradable sutures (Vicryl, Ethicon) placed superiorly and laterally to fix the mesh on the internus muscle.	NA	NA
Heikkinen et al., 1998[706,707]	TEP, general anesthesia, balloon expander (PDB1000, Origin, CA), periteoneum and hernia sac were dissected from the anterior abdominal wall, Cooper's ligament, and psoas muscle. 10x15cm polypropylene mesh (Prolene, Ethicon) placed over the dissected area and fixed selectively usig the Origin Tacker System (OMS_TSS, Origin).	Lichtenstein, as describe by Amid, local anesthesia in 52%, spinal anesthesia in 39%, general anesthesia in 9%, (according to patient preference), 8 x 12 cm polypropylene mesh (Prolene, Ethicon) was trimmed and sutured with 2-0 polypropylene sutures (Prolene, Ethicon) fixed medially to the pubic fascia with a 2 to 3 cm overlap and inferiorly to the inguinal ligament. A few loose biodegradable sutures (Vicryl, Ethicon) were placed superiorly and laterally to fix the mesh on the internus muscle.	NA	NA
Heikkinen et al., 1998[706,708]	TAPP, general anesthesia, the mesh size averaged 10 x 14 cm, polypropylene mesh (Prolene, Ethicon), stapled with EdoUniversal, US Surgical). The surgeon had "moderate" experience in both open and laparoscopic hernia surgery; authors did not define "moderate."	Lichtenstein, local anesthesia 7 x 12 cm polypropylene mesh. The surgeon had "moderate" experience in both open and laparoscopic hernia surgery; authors did not define "moderate."	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Johansson et al., 1999[712,713]	TAPP, all surgeons had at least 10 prior laparoscopic hernia repairs (did not report whether these had to be TAPPs) and also at least 5 open mesh repairs. general anesthesia. 10x15cm polypropylene mesh (Prolene) placed peritoneally and attached to Cooper's ligament and the transverse fascia with titanium staples (EMS Hernia Stapler, Ethicon). No staples were to be placed below the ilioinguinal tract lateral to Cooper's ligament. Aimed at complete peritoneal coverage of the mesh.	No simple label was used, but it was open mesh preperitoneal. All surgeons had at least 10 prior laparoscopic hernia repairs (did not report whether these had to be TAPPs) and also at least 5 open mesh repairs. Regional or general anesthesia in accordance with the patient's preference or depending on anesthesiologic considerations. Preperitoneal approach through a split incision. The hernia sac was either excised or reduced and left in situ. 10 x 15 c m polypropylene mesh attached to Cooper's ligament and to the transverse fascia with interrupted nonresorbable monofilament sutures. No sutures below the ilioinguinal tract lateral to Cooper's ligament.	NA	NA
Khoury et al., 1998[718]	TEP, general anesthesia, balloon dissection, 10 x 14 cm polypropylene mesh covering both direct and indirect spaces, and fixed with staples.	mesh plug, local anesthesia in 92%, spinal anesthesia in 3%, general anesthesia in 5%, complete and high dissection of the sac to the internal spermatic ring. Plug prosthesis inserted at the internal ring and its fixation secured with absorbable sutures. mesh encircline the cord structures and covering the direct space is then placed without fixation.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Koninger et al., 2004[726]	TAPP, general anesthesia, three surgeons, "experienced in both conventional and laparoscopic techniques (>100 TAPP, Lichtenstein and Shouldice interventions each)" (did not report the specific prior experience numbers for each of these procedures). Mesh fixation with 4-6 titanium clips (EMS Herniostate, Ethicon) with strict avoidance of clips in the area distal of the ileopubic tract.	Lichtenstein, general anesthesia, three surgeons, "experienced in both conventional and laparoscopic techniques (>100 TAPP, Lichtenstein and Shouldice interventions each)" (did not report the specific prior experience numbers for each of these procedures). Mesh fixed with a running suture (4/0 Prolene) to the inguinal ligament.	NA	NA
Lal et al., 2003[729]	TEP, surgeon was "well experienced in laparoscopic surgeries other than that for hernia," and before the study, the surgeon gained experience on 10 cases using the open Stoppa procedure, five of which had been converted from TEP, 24/25 cases involved general anesthesia, the other involved epidural. Extraperitoneal space crated using blunt dissection with the little finger behind the rectus muscel and in front of the peritoneum, and also with an indigenous balloon. Polypropylene mesh 12 x 14 cm is rolled tightly so that 3-4 cm is left unrolled at one end. Mesh fixated with two 5-mm tacks medially on the pubic symphysis and unrolled over the peritoneum up to the semicircular line of Douglas.	Lichtenstein, surgeons were "well experienced," anesthesia was general in 3/25, spinal in 17/25, and local in 5/25, choice of anesthesia was based on availability and choice of anesthesiologist. Sac is either ligated and divided or reduced, repair to the posterior wall of the inguinal canal using the polypropylene mesh as described by Lichtenstein (specific mesh not reported)	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Langeveld et al., 2010[736]	TEP, and all surgeons were either experience with both TEP and Lichtenstein, or they were supervised by an experienced surgeons (did not report the percentage of surgeons who needed supervision). For TEP, either the surgeon or the supervisor had to have a minimum of 100 laparoscopic interventions and a minimum of 30 endoscopic corrections of inguinal hernia (did not report whether these had to be TEPs). general anesthesia. INsufflation with carbon dioxide through a blunt tip trocar (pressure, 12-15 mm Hg). 12 x 15 cm polypropylene mesh (Prolene or Marlex) placed over the myopectineal oprifice of Fruchaud. No routine mesh fixation, but if it was done, it was fixed to Coopers ligament with tackers.	Lichtenstein, and all surgeons were either experience with both TEP and Lichtenstein, or they were supervised by an experienced surgeons (did not report the percentage of surgeons who needed supervision). 44% used general anesthesia, 51% used local anesthesia, and 5% used spinal anesthesia. Hernia sac was not opened except when the contents of the hernia was fixed to the hernia site. Polypropylene mesh 7.5 x 15 cm (Prolene or Marlex) placed with an overlap in the pubic bone. mesh fixed with monofilament nonabsorbable suture (Prolene 2-0)	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Lau et al., 2006[739]	TEP, specialist surgeons who had experience exceeding 200 corresponding procedures. general anesthesia. Balloon dissection was not used. Insufflation with carbon dioxide to a pressure of 10 mmHg. For direct hernia, transversalis fascia was routinely inverted and ligated with an endoloop if feasible. The indirect peritoneal sax was isolated and ligated with absorbable sutures followed by distal transection using endoscissors. Spermatic cord and pelvis floor were parietalized fo ra length of at least 4 cm. Prolene mesh 10 x 14 cm (Prolene, Ethicon), to cover the posterior wall of the inguinal canal, obturator foramen and femoral and internal inguinal rings. mesh anchored with an endostapler only if the maximal diameter of the hernial defect exceeded 4 cm.	Lichtenstein, specialist surgeons who had experience exceeding 200 corresponding procedures, general anesthesia. For indirect hernia, the peritoneal sac was routinely ligated and extirpated. For direct, the hernial sac was inverted and closed with suture over the transversalis fascia. Posterior wall of the inguinal canal was reinforced with laterally split Prolene mesh 8 x6 cm. mesh fixed to the inguinal ligament and conjoint tendon with 2/0 Prolene sutures.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
MRC et al., 1999[747,753-760]	77% TEP (321/419 initiated procedures), 23% TAPP (98/419 initiated procedures), depending on surgeon's preference. 27 surgeons. "All surgeons had previous experience of at least ten laparoscopic hernia repairs. Surgeons who felt that they were still learning the technique were visited by an experienced surgeon who gave them additional training and observed each surgeon doing the hernia repair." 65% of surgeons were consultants (i.e., most experienced), 34% were senior trainees (i.e., moderate experience), 2% were junior trainees (i.e., least experienced). general anesthesia, unless the patient requested otherwise (did not report the number who requested otherwise). Recommended mesh 15 cm x 10 cm polypropylene, but other meshes may have been used. Whether to fix the mesh was based on surgeon preference.	Specific open approach was by surgeon preference. Most involve the Lichtenstein procedure (unreported %) but some involve the Stoppa procedure (unreported %) and a few involved non-mesh repair (6.6%). At one of the centers, which had operated on 33% of the open patients in the trial (151/453), the percentages were 70% Lichtenstein, 27% Stoppa, and 3% non-mesh. 27 surgeons total. "All surgeons had previous experience of at least ten laparoscopic hernia repairs. Surgeons who felt that they were still learning the technique were visited by an experienced surgeon who gave them additional training and observed each surgeon doing the hernia repair." 25% of surgeons were consultants (i.e., most experienced), 48% were senior trainees (i.e., moderate experience), 27% were junior trainees (i.e., least experienced). general anesthesia, unless the patient requested otherwise (did not report the number who requested otherwise). Recommended mesh 15 cm x 10 cm polypropylene, but other meshes may have been used. Whether to fix the mesh was based on surgeon preference.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Neumayer et al., 2004[762-768]	90% TEP, 10% TAPP. TAPP was the method of Fitzgibbons; TEP was the method of Smith. 99.1% had general anesthesia; 0.7% had regional anesthesia; 0.2% had local anesthesia. Specific meshes not reported, but there was a minimum mesh size (not reported) and a minimum overlap beyond a direct defect. 78 surgeons; 26% (20) had at least 250 prior laparoscopic repairs (did not report whether these were always the same as those performed in the study), and the other 74% (58) had more than 25 but fewer than 250 prior laparoscopic hernia repairs (did not report the average number). Surgeons submitted a videotape of a previously performed laparoscopic hernia procedure that was reviewed by a surgeon on the study committee. Attending surgeon was present through the procedure if he/she was not the one performing the procedure. Techniques were agreed upon beforehand and clarified with videos from the American College of Surgery.	Lichtenstein as described by Amid. 61% had general anesthesia; 27.5% had regional anesthesia; 11.5% had local anesthesia. Specific meshes not reported, but there was a minimum mesh size (not reported) and a minimum overlap beyond a direct defect. 117 surgeons, and most had substantial prior experience (84% or 635/756 primary hernias repaired with the open procedure were performed by surgeons with at least 250 prior open hernia operations). All had performed at least 25 prior open hernia procedures. Techniques were agreed upon beforehand and clarified with videos from the American College of Surgery.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Paganini et al., 1998[783]	TAPP, general anesthesia, surgeons were required to have open tension-free hernia repair as their routine procedure for hernioplasty, and also they had performed at least 100 prior basis laparoscopic operations (such as laparoscopic cholecystectomy) and also at least 20 laparoscopic hernioplasties with the TAPP method. At least 12 x 7 cm polypropylene mesh, large enough to cover the three areas of weakness of the inguinofemoral region corresponding to the mypectineal orifice: the internal inguinal ring, Hesselbach's triangle, and the femoral ring. mesh was tacked with titanium clips to the pubic tubercle, Cooper's ligament, and transversalis fascia overlying the transversus abdominis muscle on each side of the inferior epigastric vessels and above the iliopubic tract. Individual surgeons decided whether to make a slit on the mesh to accomodate the spermatic cord. Average actual mesh size 12.7 x 12.3 cm. Average 15.9 clips to tack the mesh into place.	Lichtenstein, local anesthesia, surgeons were required to have open tension-free hernia repair as their routine procedure for hernioplasty, and also they had performed at least 100 prior basis laparoscopic operations (such as laparoscopic cholecystectomy) and also at least 20 laparoscopic hernioplasties with the TAPP method. Surgeons could choose to use a titanium clip applier designed for open surgery (Multifire Versatack, US Surgical) to secure the upper edge of the mesh to the internal oblique aponeurosis or muscle.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Pavlidis et al., 2002[786]	The laparoscopic TAPP tension-free mesh technique used a transabdominal preperitoneal approach to place a 6 x 11 cm polypropylene mesh (Prolene) under the transversalis fascia and secured by titanium clips.	The open tension-free patch technique used a polypropylene mesh (Prolene) as a patch placed on the transversalis fascia and secured by sutures or skin staples.	The open tension-free patch and plug technique used a cone shaped polypropylene mesh (Marlex) as a plug inserted through the internal ring and another as patch placed and secured by sutures or skin staples.	NA
Payne et al., 1994[787]	TAPP, general anesthesia, all surgeons had 3-14 years experience, but and at least 10 prior TAPPs for inguinal hernia. 9 x 15 cm mesh (Surgipro) stapled in place with the EndoHernia instrument (US Surgical) to cover potential sites of femoral, direct, and indirect hernia. Secure mesh to Cooper's ligament (4.0 mm staples). Peritoneum closed over the mesh with additional staples.	Lichtenstein, 9 x 15 cm mesh (Surgipro, US Surgical Corp.). Most procedures (unreported %) involve local anesthesia with sedation. The mesh was overlapped onto the pubic bone and secured with interrupted 2-0 braided nylon sutures (Surgilon, Davis and Geck, Danbury CT).	NA	NA
Picchio et al., 1999[789]	TAPP, all surgeons had at least 30 prior operations (study did not report whether these 30 were actually TAPPs), general anesthesia, 7 x 12 cm polypropylene mesh (Surgipro, Auto Suture) covering all three possible hernia sites and fixed with a hernia stapler (Ethicon EMS) to the pubic tubercle, Cooper's ligament, and the abdominal wall. Once secured, the mesh was covered by stapling the peritoneal flap back in place.	Lichtenstein, all surgeons had "considerable experience in this field," local anesthesia, 7 x 12 cm polypropylene mesh (Surgipro, Auto Suture)	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Pokorny et al., 2008[791,792]	TAPP, all surgeons had either performed at least 30 prior laparoscopic repairs (for unreported clinical conditions) or had performed at least 30 prior open repairs (again for unreported clinical conditions), general anesthesia, no local anesthetic, polypropylene mesh (SurgiPro, Autosuture) no other mesh details reported.	TEP, all surgeons had either performed at least 30 prior laparoscopic repairs (for unreported clinical conditions) or had performed at least 30 prior open repairs (again for unreported clinical conditions), general anesthesia, no local anesthetic, polypropylene mesh, no other mesh details reported.	Lichtenstein, all surgeons had either performed at least 30 prior laparoscopic repairs (for unreported clinical conditions) or had performed at least 30 prior open repairs (again for unreported clinical conditions). Lichtenstein as described by Amid; general anesthesia, no local anesthetic, polypropylene mesh, no other mesh details reported.	NA
Sevonius et al., 2009[535,805-813]	"Laparoscopic"; some TAPP, some TEP, did not report the ratio, or any other procedural details.	Lichtenstein. The publication by Novik et al., 2011[811] detailed fixation methods from 82,015 procedures: nonabsorbable sutures in 95.7% (78,867); long-term absorbable sutures in 2.4% (1,938); short-term absorbable sutures in 1.5% (1,210); Staples or tacks in 0.1% (75); glue in 0.017% (14); no fixation in 0.2% (151).	"Plug," no other details reported	Open preperitoneal mesh, no other details reported
Simmermacher et al., 2000[814]	TEP as described by Liem using two ports. All surgeons were "familiar" with both TEP and the Ugahary approach (authors did not state the number of prior repairs of either type surgeons had performed). 15 x 10 cm polypropylene mesh (Prolene) without fixing it to the anterior abdominal wall.	Ugahary grid iron approach. All surgeons were "familiar" with both TEP and the Ugahary approach (authors did not state the number of prior repairs of either type surgeons had performed). 15 x 10 cm polypropylene mesh (Prolene) inserted to cover the myopectineal orificium without fixing the mesh to the abdominal wall, and the mesh ends exactly where it would be in a TEP	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Singh et al., 2011[815]	53% TEP, 47% TAPP. General anesthesia. TAPP: Peritoneum was "teased" down to where down to the point where vas deferens turns medially. Herna sac reduction attempt, but if adhesions, then sac was ligated then divided. Rolled polypropylene mesh introduced via umbilical port, to cover entire myopectineal area. For bilateral cases, two pieces of mesh used, overlapping at the midline. Mesh not fixed. TEP: Rolled polypropylene mesh via Hassan port, spread to adequately cover the entire my pectineal orifice. Mesh unfixed. Heavy weight mesh in 80%, lightweight in 20%. Median mesh size 10.4x16 cm, significantly larger than the meshes used for open procedures.	Lichtenstein using "heavy-weight" mesh. Local anesthesia for all but one patient. Sac freed from the spermatic cord and reduced into the peritoneal space. Medial end f the mesh was fixed at the pubic tubercle. Lateral end of the mesh was slit into a wide upper leaf and a narrow one below. Medical and upper margins were secured with interrupted sutures, avoiding the nerves. Median mesh size 7.5x12 cm.	NA	NA
Vatansev et al., 2002[826]	TEP, general anesthesia, polypropylene mesh (specifics not reported) for the reinforcement of the preperitoneal areal	Lichtenstein, general anesthesia, polypropylene mesh (specifics not reported) for the reinforcement of the posterior wall	Nyhus, general anesthesia, polypropylene mesh (specifics not reported) for the reinforcement of the preperitoneal areal	NA
Wara, 2008[829-834]	TAPP in 91.7%; TEP in 8.3%. "Six of 33 hospital departments reported more than 50 laparoscopic repairs per year whereas 21 departments performed fewer than 20 repairs annually."	Lichtenstein, no other details reported	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Zieren et al., 1998[838,839]	TAPP, general anesthesia, 12x10 cm Prolene mesh (Ethicon). All operations were performed by surgical residents, overseen by a more experienced surgeon.	Mesh plug as described by Rutkow and Robbins, 5 x 5 cm prolene mesh plug inserted behind the internal ring and secured to its margin with only one suture. 10 x 5 cm onlay patch (Prolene) placed ont he fascia transversalis with an aperture for the spermatic cord and fixed by one suture near to the pubic tubercle Both arms of the slit were sutured together. Patients could choose local or general anesthesia; if they chose local (chosen by 71/80 or 89% of them), it was a solution of 1% Xylocithin and 0.5% Carbostesin (Astra, Wedel, Germany). All operations were performed by surgical residents, overseen by a more experienced surgeon.	NA	NA

Table Note:
For Pavlidis et al., 2002[786] all laparoscopic repairs were performed under general anesthesia, while open repairs under general, epidural, regional or even local anesthesia. Antibiotic prophylaxis was attempted by 3 doses of a second generation cephalosporin. For Hamza et al., 2010[704] all operations were performed by one consultant surgeon.

Table 16. Key Question 2a: Baseline characteristics

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Anadol et al., 2004[624]	% bilateral	0% (0/25)	0% (0/25)			
	% emergency hernia	0% (0/25)	0% (0/25)			
	% recurrent	0% (0/25)	0% (0/25)			
	% right-side	56% (14/25)	56% (14/25)			
	% male	100% (25/25)	100% (25/25)			
	Age	41.84 (SD: 10.81) (N=25)	41.24 (SD: 10.90) (N=25)			
Andersson et al., 2003[625,626]	% bilateral	9% (7/81)	3% (3/87)			
	% incarcerated	2% (2/81)	0% (0/87)			
	% irreducible	0% (0/81)	0% (0/87)			
	% primary	9% (7/81)	3% (3/87)			
	% primary unilateral hernia	75% (61/81)	79% (69/87)			
	% recurrent	16% (13/81)	17% (15/87)			
	% recurrent unilateral	16% (13/81)	17% (15/87)			
	% symptoms bulge	98% (79/81)	95% (83/87)			
	% male	100% (81/81)	100% (87/87)			
	% work “on the sick list”	0% (0/81)	1% (1/87)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Andersson et al., 2003[625,626] (continued)	% work manual	26% (21/81)	25% (22/87)			
	% work mixed manual office	36% (29/81)	31% (27/87)			
	% work office	31% (25/81)	37% (32/87)			
	% work retired	7% (6/81)	6% (5/87)			
	Age	50 (SD: 9) (N=81)	49 (SD: 9) (N=87)			
	% pain before surgery	56% (45/81)	60% (52/87)			
	% required analgesiz during follow-up	2% (2/81)	2% (2/87)			
Bender et al., 2009[630]	% bilateral	0% (0/20)	0% (0/20)			
	% direct	10% (2/20)	10% (2/20)			
	% indirect	90% (18/20)	90% (18/20)			
	% irreducible	0% (0/20)	0% (0/20)			
	% recurrent	0% (0/20)	0% (0/20)			
	% scrotal	5% (1/20)	5% (1/20)			
	% male	100% (20/20)	100% (20/20)			
	Age	45.1 (SD: 13.27) (N=20)	41 (SD: 11.11) (N=20)			
	BMI (kg/m^2)	26.24 (SD: 2.18) (N=20)	25.57 (SD: 2.18) (N=20)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Bostanci et al., 1998[640]	% bilateral	9% (3/32)	9% (3/32)			
	% direct primary	9% (3/32)	6% (2/32)			
	% femoral, primary	3% (1/32)	3% (1/32)			
	% Nyhus type 1	0% (0/32)	0% (0/32)			
	% Nyhus type 2	50% (16/32)	34% (11/32)			
	% Nyhus type 3a	9% (3/32)	6% (2/32)			
	% Nyhus type 3b	44% (14/32)	50% (16/32)			
	% Nyhus type 3c	3% (1/32)	3% (1/32)			
	% Nyhus type 4	3% (1/32)	16% (5/32)			
	% recurrent	3% (1/32)	16% (5/32)			
	% male	97% (31/32)	100% (32/32)			
	Age	NR (Range: 20 to 59) (N=32)	NR (Range: 20 to 71) (N=32)			
Bringman et al., 2003[641]	% bilateral	0% (0/92)	0% (0/103)	0% (0/104)		
	% combined direct/indirect	9% (8/92)	3% (3/103)	4% (4/104)		
	% direct	37% (34/92)	43% (44/103)	43% (45/104)		
	% femoral	1% (1/92)	0% (0/103)	1% (1/104)		
	% indirect	53% (49/92)	54% (56/103)	52% (54/104)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Bringman et al., 2003[641] (continued)	% recurrent	14% (13/92)	11% (11/103)	16% (17/104)		
	% recurrent, one prior operations	12% (11/92)	11% (11/103)	13% (13/104)		
	% recurrent, three prior operations	1% (1/92)	0% (0/103)	1% (1/104)		
	% recurrent, two prior operations	1% (1/92)	0% (0/103)	3% (3/104)		
	% male	100% (92/92)	100% (103/103)	100% (104/104)		
	% work any	70% (64/92)	66% (68/103)	68% (71/104)		
	% work long-term sick leave	0% (0/92)	0% (0/103)	1% (1/104)		
	% work retired	26% (24/92)	29% (30/103)	31% (32/104)		
	% work unemployed but not retired and not long-term sick leave	4% (4/92)	4% (4/103)	0% (0/104)		
	Age	55 (SD: 12) (N=92)	54 (SD: 11) (N=103)	55 (SD: 12) (N=104)		
	BMI (kg/m^2)	25 (SD: 3) (N=92)	25 (SD: 3) (N=103)	25 (SD: 4) (N=104)		
Bueno et al., 2004[646]	% bilateral	0% (0/200)	0% (0/200)			
	% direct	30% (59/200)	29% (57/200)			
	% external inguinal ring protrusion	85% (169/200)	87% (173/200)			
	% femoral	0% (0/200)	0% (0/200)			
	% indirect	68% (136/200)	66% (131/200)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Bueno et al., 2004[646] (continued)	% pantaloon	3% (5/200)	6% (12/200)			
	% recurrent	7% (13/200)	6% (12/200)			
	% right-side	57% (113/200)	53% (105/200)			
	% scrotal	9% (17/200)	8% (15/200)			
	% male	100% (200/200)	100% (200/200)			
	Age	Median: 50.6 (SD: 11.5) (N=200)	Median: 51.3 (SD: 12.8) (N=200)			
	% bilateral	0% (0/22)	0% (0/22)	0% (0/22)		
	% recurrent	0% (0/22)	0% (0/22)	0% (0/22)		
	% male	100% (22/22)	100% (22/22)	100% (22/22)		
Butters et al., 2007[648,649]	% bilateral	0% (0/93)	0% (0/94)			
	% recurrent	0% (0/93)	0% (0/94)			
	% male	100% (93/93)	100% (94/94)			
	Age	56 (Range: 25 to 75) (N=93)	53 (Range: 30 to 74) (N=94)			
	BMI (kg/m^2)	25.2 (Range: 17.7 to 36.7) (N=93)	25.4 (Range: 20.6 to 30.3) (N=94)			
Champault et al., 1997[651-654]	% bilateral	41% (21/51)	49% (24/49)			
	% direct	71% (36/51)	80% (39/49)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Champault et al., 1997[651-654] (continued)	% femoral	0% (0/51)	0% (0/49)			
	% indirect	29% (15/51)	20% (10/49)			
	% irreducible	0% (0/51)	0% (0/49)			
	% large inguinoscrotal hernia	0% (0/51)	0% (0/49)			
	% primary	61% (31/51)	53% (26/49)			
	% recurrent	39% (20/51)	47% (23/49)			
	% strangulated	0% (0/51)	0% (0/49)			
	% male	100% (51/51)	100% (49/49)			
	% smoking	41% (21/51)	57% (28/49)			
	% with body mass index greater than 30	33% (17/51)	29% (14/49)			
	Age	57.2 (SD: 40.74) (N=51)	61.3 (SD: 43.77) (N=49)			
	% ASA score 1	27% (14/51)	24% (12/49)			
	% ASA score 2	67% (34/51)	67% (33/49)			
	% ASA score 3	6% (3/51)	8% (4/49)			
	% ASA score 4	0% (0/51)	0% (0/49)			
	% prostatism	27% (14/51)	18% (9/49)			
Colak et al., 2003[662]	% incarcerated	0% (0/67)	0% (0/67)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Colak et al., 2003[662] (continued)	% irreducible	0% (0/67)	0% (0/67)			
	% primary	31% (21/67)	9% (6/67)			
	% primary unilateral hernia	58% (39/67)	84% (56/67)			
	% recurrent	10% (7/67)	7% (5/67)			
	% male	85% (57/67)	93% (62/67)			
	Age	49.4 (Range: 21 to 78) (N=67)	51.6 (Range: 16 to 77) (N=67)			
	VAS standing	Median: 5 (2-22) (N=295)	Median: 4 (2-22) (N=296)			
	VAS walking	Median: 6 (2-33) (N=295)	Median: 9 (3-31) (N=296)			
Douek et al., 2003[674,675]	% bilateral	12% (23/200)	12% (24/200)			
	% femoral	0% (0/200)	0% (0/200)			
	% recurrent	11% (21/200)	10% (19/200)			
	% symptoms urinary	7% (14/200)	9% (17/200)			
	Surface area in square meters	1.88 (Range: 1.48 to 2.24) (N=200)	1.86 (Range: 1.39 to 2.42) (N=200)			
	% work either unemployed, retired, or housework	36% (72/200)	36% (72/200)			
	% work employed by a company	48% (96/200)	50% (99/200)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Douek et al., 2003[674,675] (continued)	% work self employed	16% (31/200)	15% (29/200)			
	Age	Median: 52.5 (Range: 19 to 83) (N=200)	Median: 51.5 (Range: 19 to 80) (N=200)			
	% ASA score 1 or 2	97% (193/200)	95% (190/200)			
	% hypertension	16% (32/200)	8% (16/200)			
	% previous lower abdominal surgery	29% (57/200)	28% (56/200)			
	% taking regular analgesia or NSAID	14% (28/200)	14% (27/200)			
	SF-36 bodily pain	61.5 (NR) (N=197)	64.5 (NR) (N=195)			
	SF-36 general health	74.1 (NR) (N=196)	71.8 (NR) (N=195)			
	SF-36 mental health	73.9 (NR) (N=197)	74.9 (NR) (N=195)			
	SF-36 physical functioning	74.9 (NR) (N=194)	79.3 (NR) (N=195)			
	SF-36 role limitation, emotional	78.3 (NR) (N=192)	80.5 (NR) (N=194)			
	SF-36 role limitation, physical	65.8 (NR) (N=192)	68.3 (NR) (N=194)			
	SF-36 social functioning	83.8 (NR) (N=197)	84 (NR) (N=195)			
	SF-36 vitality	62.2 (NR) (N=197)	64.6 (NR) (N=195)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Eklund et al., 2006[679-682]	% bilateral	0% (0/665)	0% (0/706)			
	% hernia size: large enough to be palpable, but not visible	23% (156/665)	26% (187/706)			
	% hernia size: large enough to be visible	76% (507/665)	73% (513/706)			
	% hernia size: unknown	0% (2/665)	1% (6/706)			
	% Nyhus type 1	0% (0/665)	0% (0/706)			
	% Nyhus type 2	32% (213/665)	28% (195/706)			
	% Nyhus type 3a	33% (222/665)	34% (237/706)			
	% Nyhus type 3b	34% (223/665)	37% (262/706)			
	% Nyhus type 3c	0% (2/665)	0% (3/706)			
	% Nyhus type 4	0% (0/665)	0% (0/706)			
	% Nyhus type missing	1% (5/665)	1% (9/706)			
	% recurrent	0% (0/665)	0% (0/706)			
	% scrotal	0% (0/665)	0% (0/706)			
	% male	100% (665/665)	100% (706/706)			
	% smoking	21% (139/665)	18% (129/706)			
	% work heavy	25% (169/665)	25% (176/706)			
	% work light	31% (206/665)	33% (233/706)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Eklund et al., 2006[679-682] (continued)	% work moderate	25% (163/665)	23% (160/706)			
	% work retired	15% (102/665)	13% (93/706)			
	% work unmployed	3% (21/665)	6% (39/706)			
	% work unspecified	1% (4/665)	1% (5/706)			
	Age	53 (SD: 10) (N=665)	52 (SD: 10) (N=706)			
	Height (cm)	179 (SD: 6) (N=665)	179 (SD: 7) (N=706)			
	Weight (kg)	80 (SD: 10) (N=665)	81 (SD: 10) (N=706)			
	% ASA score 1	88% (584/665)	90% (633/706)			
	% ASA score 2	10% (66/665)	8% (57/706)			
	% ASA score 3	1% (5/665)	1% (5/706)			
	% ASA score unknown	2% (10/665)	2% (11/706)			
	% comorbidity chronic obstructive pulmonary disease	2% (16/665)	2% (13/706)			
	% steroid medication	2% (14/665)	2% (12/706)			
	Combined functional index score (ranges from 3-9)	Median: 3 (Range: 3-9) (N=665)	Median: 3 (Range: 3-7) (N=706)			
Gokalp et al., 2003[700]	% bilateral	0% (0/61)	0% (0/62)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Gokalp et al., 2003[700] (continued)	% femoral	0% (0/61)	0% (0/62)			
	% irreducible	0% (0/61)	0% (0/62)			
	% Nyhus type 1	0% (0/61)	0% (0/62)			
	% Nyhus type 2	57% (35/61)	60% (37/62)			
	% Nyhus type 3a	36% (22/61)	34% (21/62)			
	% Nyhus type 3b	7% (4/61)	6% (4/62)			
	% Nyhus type 3c	0% (0/61)	0% (0/62)			
	% Nyhus type 4	0% (0/61)	0% (0/62)			
	% recurrent	0% (0/61)	0% (0/62)			
	% male	100% (61/61)	100% (62/62)			
	% work manual	62% (38/61)	61% (38/62)			
	% work office	38% (23/61)	39% (24/62)			
	Age	Median: 47 (Range: 18 to 59) (N=61)	Median: 45 (Range: 18 to 60) (N=62)			
	% ASA score 2	28% (17/61)	35% (22/62)			
	% ASA score 9	72% (44/61)	65% (40/62)			
Gong et al., 2011[701]	% bilateral	0% (0/50)	0% (0/52)	0% (0/62)		
	% combined direct/indirect	12% (6/50)	8% (4/52)	13% (8/62)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Gong et al., 2011[701] (continued)	% direct	18% (9/50)	21% (11/52)	18% (11/62)		
	% direct, large	12% (6/50)	10% (5/52)	11% (7/62)		
	% direct, small	6% (3/50)	12% (6/52)	6% (4/62)		
	% emergency hernia	0% (0/50)	0% (0/52)	0% (0/62)		
	% femoral	0% (0/50)	0% (0/52)	0% (0/62)		
	% giant hernia	0% (0/50)	0% (0/52)	0% (0/62)		
	% indirect	70% (35/50)	71% (37/52)	69% (43/62)		
	% indirect or scrotal hernia, insufficient internal ring	34% (17/50)	37% (19/52)	34% (21/62)		
	% indirect, internal ring enlarged	26% (13/50)	27% (14/52)	24% (15/62)		
	% indirect, internal ring not enlarged	10% (5/50)	8% (4/52)	11% (7/62)		
	% irreducible	0% (0/50)	0% (0/52)	0% (0/62)		
	% recurrent	0% (0/50)	0% (0/52)	0% (0/62)		
	% male	100% (50/50)	100% (52/52)	100% (62/62)		
	Age	56 (SD: 10) (N=50)	57 (SD: 9) (N=52)	56 (SD: 10) (N=62)		
Gunal et al., 2007[702]	% bilateral	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% Nyhus type 3c	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% Nyhus type 4	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Gunal et al., 2007[702] (continued)	% recurrent	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	Age	25.72 (SD: 6.8) (N=39)	22.38 (SD: 4.1) (N=40)	22.76 (SD: 1.9) (N=42)	23.85 (SD: 3.1) (N=40)	SDs calculated by ECRI Institute based on reported SEMs and Ns
Hamza et al., 2010[704]	% direct	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% indirect	100% (25/25)	100% (25/25)	100% (25/25)	100% (25/25)	
	% irreducible	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% obstructed	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% recurrent	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% male	100% (25/25)	100% (25/25)	100% (25/25)	100% (25/25)	
	% smoking	44% (11/25)	36% (9/25)	40% (10/25)	44% (11/25)	
	% work heavy weight lifting	36% (9/25)	40% (10/25)	32% (8/25)	32% (8/25)	
	Age	36.73 (SD: 12.06) (N=25)	34.91 (SD: 13) (N=25)	35.12 (SD: 10.11) (N=25)	35.67 (SD: 12.965) (N=25)	
	BMI (kg/m^2)	22.4 (SD: 1.242) (N=25)	23.2 (SD: 5.3) (N=25)	24.34 (SD: 14.22) (N=25)	22.2 (SD: 1.568) (N=25)	
Heikkinen et al., 1997[705,706]	% bilateral	5% (1/20)	6% (1/18)			
	% irreducible	0% (0/20)	0% (0/18)			
	% lateral hernia	65% (13/20)	72% (13/18)			
	% Medial	40% (8/20)	28% (5/18)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Heikkinen et al., 1997[705,706] (continued)	% male	95% (19/20)	94% (17/18)			
	% work any	85% (17/20)	72% (13/18)			
	% work retired	15% (3/20)	28% (5/18)			
	Age	Median: 47.5 (Range: 20 to 66) (N=20)	Median: 50 (Range: 25 to 70) (N=18)			
Heikkinen et al., 1998[706,707]	% bilateral	0% (0/22)	0% (0/23)			
	% femoral	5% (1/22)	4% (1/23)			
	% irreducible	0% (0/22)	0% (0/23)			
	% Nyhus type 1	0% (0/22)	0% (0/23)			
	% Nyhus type 2	59% (13/22)	48% (11/23)			
	% Nyhus type 3a	32% (7/22)	35% (8/23)			
	% Nyhus type 3b	9% (2/22)	9% (2/23)			
	% Nyhus type 3c	5% (1/22)	4% (1/23)			
	% Nyhus type 4	0% (0/22)	0% (0/23)			
	% recurrent	0% (0/22)	0% (0/23)			
	% insurance compensated	77% (17/22)	78% (18/23)			
	% insurance self employed	23% (5/22)	22% (5/23)			
	% male	100% (22/22)	100% (23/23)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Heikkinen et al., 1998[706,707] (continued)	% work manual heavy lifting >30 kg	45% (10/22)	39% (9/23)			
	% work manual medium lifting <30 kg	45% (10/22)	43% (10/23)			
	% work office	9% (2/22)	17% (4/23)			
	% work retired	0% (0/22)	0% (0/23)			
	Age	Median: 44 (Range: 21 to 65) (N=22)	Median: 46 (Range: 22 to 58) (N=23)			
	BMI (kg/m^2)	25.8 (Range: 20.4 to 30.4) (N=22)	24.5 (Range: 18.1 to 30.8) (N=23)			
	% ASA score 1	68% (15/22)	70% (16/23)			
	% ASA score 2	32% (7/22)	30% (7/23)			
Heikkinen et al., 1998[706,708]	% bilateral	0% (0/18)	0% (0/20)			
	% irreducible	0% (0/18)	0% (0/20)			
	% recurrent	0% (0/18)	0% (0/20)			
	% scrotal	11% (2/18)	10% (2/20)			
	% male	94% (17/18)	100% (20/20)			
	% work retired	17% (3/18)	25% (5/20)			
	Age	Median: 51 (Range: 34 to 68) (N=18)	Median: 55.5 (Range: 29 to 69) (N=20)			
Johansson et al., 1999[712,713]	% bilateral	0% (0/207)	0% (0/199)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Johansson et al., 1999[712,713] (continued)	% direct	39% (81/207)	38% (76/199)			
	% emergency hernia	0% (0/207)	0% (0/199)			
	% giant hernia	0% (0/207)	0% (0/199)			
	% irreducible	0% (0/207)	0% (0/199)			
	% recurrent, two or more prior operations	0% (0/207)	0% (0/199)			
	% male	100% (207/207)	100% (199/199)			
	Age	55.9 (SD: 9.7) (N=207)	56.8 (SD: 9.4) (N=199)			
	Height (cm)	177.7 (SD: 5.8) (N=207)	176.9 (SD: 6.8) (N=199)			
	Weight (kg)	78 (SD: 10.3) (N=207)	78.3 (SD: 10.2) (N=199)			
Khoury et al., 1998[718]	% bilateral	13% (19/150)	3% (4/142)			
	% combined direct/indirect	3% (4/150)	4% (5/142)			
	% direct	27% (41/150)	24% (34/142)			
	% femoral	4% (6/150)	3% (4/142)			
	% indirect	79% (118/150)	73% (103/142)			
	% recurrent	9% (13/150)	12% (17/142)			
	% right-side	44% (66/150)	52% (74/142)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Khoury et al., 1998[718] (continued)	% unilateral	17% (25/150)	94% (134/142)			
	% male	93% (140/150)	93% (132/142)			
	Age	48 (Range: 19 to 76) (N=150)	54 (Range: 18 to 80) (N=142)			
Koninger et al., 2004[726]	% recurrent	0% (0/94)	0% (0/93)			
	% male	100% (94/94)	100% (93/93)			
	Age	53 (Range: 30-74) (N=94)	53 (Range: 26-74) (N=93)			
	BMI (kg/m^2)	25.4 (Range: 20.6 to 30.3) (N=94)	25.7 (Range: 18.4 to 32.1) (N=93)			
Lal et al., 2003[729]	% bilateral	0% (0/25)	0% (0/25)			
	% obstructed	0% (0/25)	0% (0/25)			
	% recurrent	0% (0/25)	0% (0/25)			
	% right-side	76% (19/25)	60% (15/25)			
	% scrotal	0% (0/25)	0% (0/25)			
	% strangulated	0% (0/25)	0% (0/25)			
	% male	100% (25/25)	100% (25/25)			
	Age	36.72 (SD: 12.08) (N=25)	37.8 (12.43) (N=25)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Langeveld et al., 2010[736]	% bilateral	12% (39/336)	8% (25/324)			
	% primary	87% (293/336)	91% (295/324)			
	% recurrent	9% (29/336)	6% (21/324)			
	% recurrent first	7% (23/336)	6% (18/324)			
	% recurrent, two or more prior operations	2% (6/336)	1% (3/324)			
	% scrotal	0% (0/336)	0% (0/324)			
	% unilateral	85% (284/336)	90% (292/324)			
	% male	99% (333/336)	98% (318/324)			
	Age	Median: 55 (NR) (N=336)	Median: 56 (NR) (N=324)			
	BMI (kg/m^2)	25 (NR) (N=336)	25 (NR) (N=324)			
	% comorbidity chronic obstructive pulmonary disease	8% (27/336)	4% (14/324)			
	% comorbidity diabetes	2% (6/336)	3% (9/324)			
	% corticosteroid use	7% (24/336)	4% (13/324)			
	% preoperative analgesic use	5% (16/336)	3% (11/324)			
	% preoperative sensibility abnormality	1% (2/336)	1% (2/324)			
	% preoperative testis abnormality	2% (7/336)	3% (9/324)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Langeveld et al., 2010[736] (continued)	% previous abdominal surgery	21% (71/336)	25% (81/324)			
	% Problem to bow and pick up	35% (118/336)	32% (104/324)			Counts calculated based on reported percentages
	% Problem to carry 5 kg for 10 meters	26% (87/336)	32% (104/324)			Counts calculated based on reported percentages
	% Problem to get dressed/undressed	9% (30/336)	9% (29/324)			Counts calculated based on reported percentages
	% Problem to get in/out of bed	3% (10/336)	7% (23/324)			Counts calculated based on reported percentages
	% Problem to walk	19% (64/336)	30% (97/324)			Counts calculated based on reported percentages
	% Problem to walk fast	66% (222/336)	67% (217/324)			Counts calculated based on reported percentages
	ASA score	1 (NR) (N=336)	1 (NR) (N=324)			
	Pain VAS	1.2 (NR) (N=336)	1.3 (NR) (N=324)			
	Quality of life: EuroQOL, VAS	Median: 80 (NR) (N=336)	Median: 85 (NR) (N=324)			
Lau et al., 2006[739]	% bilateral	0% (0/100)	0% (0/100)			
	% Nyhus type 1	0% (0/100)	0% (0/100)			
	% Nyhus type 2	49% (49/100)	57% (57/100)			
	% Nyhus type 3a	27% (27/100)	25% (25/100)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Lau et al., 2006[739] (continued)	% Nyhus type 3b	24% (24/100)	18% (18/100)			
	% Nyhus type 3c	0% (0/100)	0% (0/100)			
	% Nyhus type 4	0% (0/100)	0% (0/100)			
	% recurrent	0% (0/100)	0% (0/100)			
	% male	100% (100/100)	100% (100/100)			
	Age	55 (SD: 15.5) (N=100)	56 (SD: 13.1) (N=100)			
MRC et al., 1999[747,753-760]	% bilateral	7% (33/461)	8% (37/460)			
	% femoral	2% (9/453)	1% (4/444)			
	% incarcerated	0% (0/468)	0% (0/460)			
	% inguinoscrotal	0% (0/468)	0% (0/460)			
	% recurrent	12% (56/460)	9% (42/451)			
	% right-side	52% (241/461)	51% (233/460)			
	% male	94% (441/468)	97% (445/460)			
	Age	55.3 (SD: 16.2) (N=468)	55.7 (SD: 16.8) (N=460)			
Neumayer et al., 2004[762-768]	% bilateral	18% (175/989)	18% (178/994)			
	% duration <6 weeks	9% (89/989)	10% (97/994)			
	% duration >one year	35% (348/989)	36% (358/994)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Neumayer et al., 2004[762-768] (continued)	% duration 6 weeks to one year	49% (488/989)	47% (463/994)			
	% duration unknown	6% (64/989)	8% (76/994)			
	% obstructed	0% (0/989)	0% (0/994)			
	% primary	90% (893/989)	91% (906/994)			
	% recurrent	10% (96/989)	9% (88/994)			
	% strangulated	0% (0/989)	0% (0/994)			
	% unilateral	82% (814/989)	82% (816/994)			
	% alcohol >2 drinks/day	14% (136/989)	16% (159/994)			
	% male	100% (989/989)	100% (994/994)			
	% race asian	0% (1/989)	0% (2/994)			
	% race black	22% (219/989)	20% (202/994)			
	% race multiracial	3% (26/989)	3% (30/994)			
	% race unknown	1% (13/989)	1% (12/994)			
	% race white	74% (731/989)	75% (748/994)			
	% smoking	40% (400/989)	43% (426/994)			
	Age	58.6 (SD: 12.8) (N=989)	58.4 (SD: 12.7) (N=994)			
	Height (inches)	69.8 (SD: 2.8) (N=813)	69.9 (SD: 2.7) (N=808)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Neumayer et al., 2004[762-768] (continued)	Highest educational grade completed	12.7 (SD: 2.4) (N=813)	12.7 (SD: 2.4) (N=808)			
	Weight (pounds)	178.5 (SD: 30.6) (N=813)	177.8 (SD: 28.7) (N=808)			
	% ASA score 1	35% (343/989)	34% (334/994)			
	% ASA score 2	47% (463/989)	48% (474/994)			
	% ASA score 3	19% (183/989)	19% (186/994)			
	% comorbidity chronic cough	9% (90/989)	8% (79/994)			
	% comorbidity congestive heart failure	1% (5/989)	0% (1/994)			
	% comorbidity diabetes	6% (61/989)	5% (46/994)			
	% comorbidity hypertension	34% (339/989)	36% (354/994)			
	% comorbidity prior myocardial infarction	0% (2/989)	0% (3/994)			
	% comorbidity prostatism	18% (177/989)	17% (169/994)			
	% comorbidity severe chronic obstructive pulmonary disease	5% (48/989)	5% (50/994)			
	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL)	0.79; Median: 0.81 (IQR: 0.71 to 0.90) (N=687)	0.77; Median: 0.78 (IQR: 0.68 to 0.88) (N=708)			
	SF-36 bodily pain	45.2 (SD: 10.6) (N=687)	44 (SD: 10.3) (N=708)			
	SF-36 general health	51.3 (SD: 9.4) (N=687)	50.4 (SD: 10) (N=708)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Neumayer et al., 2004[762-768] (continued)	SF-36 mental health	49.6 (SD: 11.3) (N=687)	48.7 (SD: 11.3) (N=708)			
	SF-36 physical functioning	44.8 (SD: 10.3) (N=687)	43.2 (SD: 10.7) (N=708)			
	SF-36 role limitation, emotional	46 (SD: 12.7) (N=687)	44 (SD: 13.3) (N=708)			
	SF-36 role limitation, physical	42.7 (SD: 11.5) (N=687)	41.2 (SD: 11.5) (N=708)			
	SF-36 social functioning	47.5 (SD: 10.7) (N=687)	46 (SD: 11.3) (N=708)			
	SF-36 vitality	52.4 (SD: 10.4) (N=687)	50.9 (SD: 10.9) (N=708)			
Paganini et al., 1998[783]	% bilateral	29% (15/52)	29% (16/56)			
	% bilateral direct	23% (18/77)	15% (11/72)			N is number of hernias
	% bilateral femoral	0% (0/77)	1% (1/72)			N is number of hernias
	% bilateral indirect	16% (12/77)	28% (20/72)			N is number of hernias
	% bilateral recurrent hernia	0% (0/52)	0% (0/56)			
	% direct	43% (33/77)	46% (33/72)			N is number of hernias
	% femoral	5% (4/77)	3% (2/72)			N is number of hernias
	% incarcerated	0% (0/77)	0% (0/72)			
	% indirect	39% (30/77)	51% (37/72)			N is number of hernias

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Paganini et al., 1998[783] (continued)	% Nyhus type 1	0% (0/52)	0% (0/56)			
	% pantaloon	13% (10/77)	0% (0/72)			N is number of hernias
	% recurrent	17% (9/52)	7% (4/56)			
	% scrotal massive	0% (0/77)	0% (0/72)			
	% sliding	0% (0/77)	0% (0/72)			
	% unilateral	54% (28/52)	64% (36/56)			
	% unilateral primary	54% (28/52)	64% (36/56)			
	% unilateral primary direct	10% (8/77)	29% (21/72)			N is number of hernias
	% unilateral primary femoral	5% (4/77)	1% (1/72)			N is number of hernias
	% unilateral primary indirect	21% (16/77)	19% (14/72)			N is number of hernias
	% unilateral primary pantaloon	13% (10/77)	0% (0/72)			N is number of hernias
	% unilateral recurrent	17% (9/52)	7% (4/56)			
	% unilateral recurrent combined	0% (0/77)	0% (0/72)			N is number of hernias
	% unilateral recurrent direct	9% (7/77)	1% (1/72)			N is number of hernias
	% unilateral recurrent femoral	0% (0/77)	0% (0/72)			N is number of hernias
	% unilateral recurrent indirect	3% (2/77)	4% (3/72)			N is number of hernias
	% wearing an inguinal truss	23% (12/52)	32% (18/56)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Paganini et al., 1998[783] (continued)	% male	92% (48/52)	91% (51/56)			
	Age	54 (SD: 15.3) (N=52)	55.6 (SD: 15.2) (N=56)			
	Height (cm)	169.9 (SD: 7.9) (N=52)	171.2 (SD: 6.7) (N=56)			
	Weight (kg)	73 (SD: 9.2) (N=52)	74.4 (SD: 10.8) (N=56)			
	% ASA score 2	56% (29/52)	54% (30/56)			
	% ASA score 6	44% (23/52)	46% (26/56)			
	% congential hernia	0% (0/77)	0% (0/72)			
	Pain VAS	Median: 1 (25th percentile 1, 75th percentile 2) (N=52)	Median: 1 (25th percentile 1, 75th percentile 1) (N=56)			
Pavlidis et al., 2002[786]	% bilateral	28% (10/36)	28% (14/50)	20% (11/54)		
	% primary hernia based on the number of repairs (i.e., 64 vs. 65 vs. 46)	89% (32/36)	106% (53/50)	104% (56/54)		
	% recurrent	39% (14/36)	22% (11/50)	17% (9/54)		N is hernias
	% unilateral	72% (26/36)	72% (36/50)	80% (43/54)		
	% male	8% (3/36)	92% (46/50)	91% (49/54)		
	Age	Median: 59 (Range: 33-82) (N=36)	Median: 60 (Range: 35-75) (N=50)	Median: 62 (Range: 30-78) (N=54)		
Payne et al., 1994[787]	% bilateral	8% (4/48)	12% (6/52)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Payne et al., 1994[787] (continued)	% femoral	0% (0/48)	0% (0/52)			
	% incarcerated	0% (0/48)	0% (0/52)			
	% recurrent	13% (6/48)	4% (2/52)			
	% male	98% (47/48)	96% (50/52)			
	% work manual	38% (18/48)	29% (15/52)			
	Age	46 (NR) (N=48)	45 (NR) (N=52)			
	% asymptomatic	0% (0/48)	0% (0/52)			
Picchio et al., 1999[789]	% direct	23% (12/52)	29% (15/52)			
	% indirect	77% (40/52)	71% (37/52)			
	% recurrent	0% (0/52)	0% (0/52)			
	% male	71% (37/52)	77% (40/52)			
	Age	57.7 (SD: 11) (N=52)	55.2 (12.4) (N=52)			
	% asymptomatic	0% (0/52)	0% (0/52)			
Pokorny et al., 2008[791,792]	% bilateral	0% (0/93)	0% (0/36)	0% (0/69)		
	% femoral	0% (0/93)	0% (0/36)	0% (0/69)		
	% incarcerated	0% (0/93)	0% (0/36)	0% (0/69)		
	% recurrent	0% (0/93)	0% (0/36)	0% (0/69)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Pokorny et al., 2008[791,792] (continued)	% right-side	62% (58/93)	56% (20/36)	61% (42/69)		
	% male	92% (86/93)	97% (35/36)	93% (64/69)		
	Age	49 (Range: 21-78) (N=93)	48 (Range: 19-73) (N=36)	52 (Range: 19-84) (N=69)		
	BMI (kg/m^2)	25 (Range: 17-35) (N=93)	25 (Range: 21-30) (N=36)	25 (Range: 19-33) (N=69)		
Sevonius et al., 2009[535,805-813]	% recurrent	Entire study 12% (16648/142578)				Reported by Magnusson.[806]
	% male	Entire study 92% (131607/142578)				Reported by Magnusson.[806]
	Age	Entire study 59 (NR) (N=142578)				Reported by Magnusson.[806]
Simmermacher et al., 2000[814]	% bilateral	0% (0/80)	0% (0/82)			
	% Nyhus type 1	19% (15/80)	9% (7/82)			
	% Nyhus type 2	19% (15/80)	12% (10/82)			
	% Nyhus type 3	63% (50/80)	79% (65/82)			
	% Nyhus type 4	0% (0/80)	0% (0/82)			
	% recurrent	0% (0/80)	0% (0/82)			
	% male	100% (80/80)	100% (82/82)			
Singh et al., 2011[815]	% recurrent	0% (0/60)	0% (0/57)			
	% male	100% (60/60)	100% (57/57)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Singh et al., 2011[815] (continued)	Age	45.7 (SD: 14.6) (N=60)	45.4 (SD: 17.8) (N=57)			
	BMI (kg/m^2)	24.2 (SD: 3.4) (N=60)	23.3 (SD: 2.4) (N=57)			
	% ASA score 1	78% (47/60)	84% (48/57)			
	% ASA score 2	20% (13/60)	17% (9/57)			
	% work light exertion	12% (7/60)	18% (10/57)			
	% work moderate exertion	53% (32/60)	47% (27/57)			
	% work heavy exertion	25% (15/60)	26% (15/57)			
	% work unemployed	10% (6/60)	9% (5/57)			
	Duration of hernia (years)	1.4 (SD: 1.0)	1.2 (SD: 0.9)			Converted from reported months
	% symptoms swelling	98% (59/60)	97% (55/57)			
	% symptoms pain as presenting complaint	48% (29/60)	46% (26/57)			
	% symptoms pain on further evaluation	90% (54/60)	95% (54/57)			
	% bilateral	25% (15/60)	23% (13/57)			
	% right-side (of unilateral cases)	58% (26/45)	64% (28/44)			
Vatansev et al., 2002[826]	% bilateral	0% (0/20)	0% (0/24)	0% (0/21)		
	% direct	25% (5/20)	21% (5/24)	19% (4/21)		
	% femoral	5% (1/20)	8% (2/24)	5% (1/21)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Vatansev et al., 2002[826] (continued)	% indirect	65% (13/20)	71% (17/24)	76% (16/21)		
	% recurrent	0% (0/20)	0% (0/24)	0% (0/21)		
	% male	90% (18/20)	92% (22/24)	86% (18/21)		
	Age	54.6 (SD: 12.8) (N=20)	53.2 (12.6) (N=24)	50.7 (15.3) (N=21)		
Wara, 2008[829-834]	% bilateral	49% (1757/3606)	4% (1451/39537)			
	% bilateral primary	35% (1253/3606)	3% (1260/39537)			
	% bilateral primary hernia and both were direct	18% (644/3606)	2% (710/39537)			
	% bilateral primary hernia and both were indirect	7% (250/3606)	0% (192/39537)			
	% bilateral primary hernia, mixed procedure	0% (9/3606)	0% (80/39537)			
	% bilateral primary hernia, one indirect and one direct	5% (166/3606)	0% (107/39537)			
	% bilateral primary hernia, other	5% (184/3606)	0% (171/39537)			
	% recurrent	52% (1865/3606)	12% (4824/39537)			
	% recurrent bilateral hernia, mixed procedures	0% (6/3606)	0% (19/39537)			
	% recurrent bilateral hernia, uniform procedure	14% (498/3606)	0% (172/39537)			
	% recurrent unilateral	38% (1361/3606)	12% (4633/39537)			
	% unilateral primary	14% (488/3606)	85% (33453/39537)			
	% unilateral primary direct	5% (179/3606)	34% (13303/39537)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Wara, 2008[829-834] (continued)	% unilateral primary indirect	7% (254/3606)	42% (16463/39537)			
	% unilateral primary other	1% (46/3606)	5% (2100/39537)			
	% unilateral primary pantaloon	0% (9/3606)	4% (1587/39537)			
	% male	95% (3423/3606)	94% (37140/39537)			
	Age	Median: 58 (Range: 18-93) (N=3606)	Median: 60 (Range: 18-99) (N=39537)			
Zieren et al., 1998[838,839]	% incarcerated	0% (0/80)	0% (0/80)			
	% Nyhus type 1	13% (10/80)	10% (8/80)			
	% Nyhus type 2	20% (16/80)	28% (22/80)			
	% Nyhus type 3a	35% (28/80)	30% (24/80)			
	% Nyhus type 3b	33% (26/80)	33% (26/80)			
	% Nyhus type 3c	0% (0/80)	0% (0/80)			
	% Nyhus type 4	0% (0/80)	0% (0/80)			
	% recurrent	0% (0/80)	0% (0/80)			
	% male	90% (72/80)	93% (74/80)			
	% work manual	53% (42/80)	51% (41/80)			
	% work office	38% (30/80)	40% (32/80)			
	Age	43 (SD: 12) (N=80)	47 (SD: 14) (N=80)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Zieren et al., 1998[838,839] (continued)	BMI (kg/m^2)	24 (SD: 9) (N=80)	26 (SD: 5) (N=80)			

Table 17. Key Question 2a: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Anadol et al., 2004[624]	Hernia recurrence	Median: 13.5 months (Range: 8-28)	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	?	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain VAS	12 hours	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one day	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	three days	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain/swelling/purulent discharge requiring readmission	postoperative	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesis, number of tablets of 500 mg oral metamizole	postoperative	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Andersson et al., 2003[625,626]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hernia recurrence	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	% complete recovery	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Complete recovery (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Complete recovery (days): Those working in manual labor	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Andersson et al., 2003[625,626] (continued)	Complete recovery (days): Those working in mixed manual labor/office work	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Complete recovery (days): Those working in office work	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Impact on day-to-day living, VAS, 0-100 where 0=none	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Long lasting impact on ability to move	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days): Those working in manual labor	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days): Those working in mixed manual labor/office work	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days): Those working in office work	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: VAS	one year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Groin pain	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain	postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain: analgesia use, grams of acetominophen	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: analgesia use, mg of dextropropoxyphene	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Severe pain	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Testicular pain	postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Andersson et al., 2003[625,626] (continued)	Testicular pain	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hydrocele	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Impaired inguinal sensibility	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Neuralgia	postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Neuralgia	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Testicular atrophy	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Umbilical hernia	Median: 7.3 years (Range: 6.1 to 8.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Bender et al., 2009[630]	Hospital stay was one day	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normal activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain any	one month	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	two hours	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one week	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Bostanci et al., 1998[640]	Hernia recurrence	Median: 15 months (Range: 4-24)	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	?	?	Y	Y	Mod.
	Pain: need for analgesia (grams/day) metamizole	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain: need for analgesia (grams/day) metamizole	between day 1 and day 2	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bostanci et al., 1998[640] (continued)	Pain: need for analgesia (grams/day) metamizole	between day 2 and day 3	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain: need for analgesia (grams/day) metamizole	total in first three days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain: VAS score	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain: VAS score	between day 1 and day 2	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain: VAS score	average in first three days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain: VAS score	between day 2 and day 3	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	?	Y	Y	Mod.
Bringman et al., 2003[641]	Hernia recurrence	Mean: 19.8 months (SD: 8.6)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Full recovery (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain	Mean: 19.8 months (SD: 8.6)	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	?	Y	Y	Mod.
	Pain, prolonged	one month	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: required extra analgesia	four hours	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	four hours	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two hours	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	first postoperative morning	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Bueno et al., 2004[646]	Hernia recurrence	Mean: 21.5 months (SD: 9.5 months)	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	?	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bueno et al., 2004[646] (continued)	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Neuralgia	Mean: 21.5 months (SD: 9.5 months)	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
Butler et al., 2007[647]	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	three days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	four days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	five days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	six days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	one week	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
Butters et al., 2007[648,649]	Hernia recurrence	one year	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	N	Y	Mod.
	Hernia recurrence	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	N	Y	Mod.
	Satisfaction: completely satisfied	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction: satisfied	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction: unsatisfied	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction: would have this procedure again: Do not know	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction: would have this procedure again: No	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction: would have this procedure again: Yes	Median: 4.3 years; Range: 3.8 to 5	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Butters et al., 2007[648,649] (continued)	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	N	Y	Mod.
Champault et al., 1997[651-654]	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Colak et al., 2003[662]	Hernia recurrence	Mean: 12.04 months (SD: 2.84) in the TEP group, and 11.10 months (SD: 2.67) in the open group	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	Y	Y	Y	Y	Mod.
	Hospital stay <1 day	NA	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	Y	Y	Y	Y	Mod.
	Hospital stay >2 days	NA	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	Y	Y	Y	Y	Mod.
	Hospital stay between 1 day and 2 days	NA	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	Y	Y	Y	Y	Mod.
	time to return to normal activities (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	N	Y	Y	Y	Mod.
	Pain VAS	one day	Y	?	Y	Y	Y	Y	?	Y	?	N	?	N	Y	Y	Y	Mod.
	Pain: Groin discomfort/pain	postoperative	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	N	Y	Y	Y	Mod.
	Pain: Number of days needing postoperative intramuscular analgesia injections	NA	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	Y	Y	Y	Y	Mod.
	Numbness/neuralgia	postoperative	Y	?	Y	Y	Y	Y	?	Y	Y	N	?	N	Y	Y	Y	Mod.
Douek et al., 2003[674,675]	Hernia recurrence	Mean: 5.8 years	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	?	N	Y	Mod.
	At least 2 nights in hospital	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.
	At least 3 nights in hospital	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.
	At least 4 nights in hospital	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Douek et al., 2003[674,675] (continued)	At least 5 nights in hospital	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.
	Hospital readmission	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.
	Among those with unilateral hernia, return to social activities (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Among those with unilateral hernia, return to usual activities around the house (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Return to driving car (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Return to moving freely about the house (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Return to walking short distances (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Full return to active or heavy work (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Full return to sedentary work (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Return to active or heavy work but taking it easy (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Return to sedentary work but taking it easy (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	SF-36 bodily pain, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Douek et al., 2003[674,675] (continued)	SF-36 bodily pain, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 general health, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 general health, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 mental health, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 mental health, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 physical functioning, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Douek et al., 2003[674,675] (continued)	SF-36 physical functioning, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	SF-36 role limitation, emotional, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 role limitation, emotional, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	SF-36 role limitation, physical, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 role limitation, physical, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	SF-36 social functioning, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Douek et al., 2003[674,675] (continued)	SF-36 social functioning, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 vitality, change from baseline, positive #s indicate improvement	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	SF-36 vitality, change from baseline, positive #s indicate improvement, change from baseline, positive #s indicate improvement	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: dissatisfied	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: dissatisfied	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: moderately satisfied	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: moderately satisfied	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: very dissatisfied	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: very dissatisfied	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: very satisfied	one month	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Satisfaction: very satisfied	three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Groin or thigh pain	one week or one month or three months	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: Groin	Mean: 5.8 years	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Douek et al., 2003[674,675] (continued)	Pain: no analgesia required	during hospital stay	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: no pain	half an hour	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: no pain	four hours	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	N	Mod.
	Pain: no pain	two hours	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: no pain	one hour	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 0	one day	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 0	four days	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 0	one week	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 0	two weeks	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 0	four weeks	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 1 2 3 4 or 5	one day	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 1 2 3 4 or 5	four days	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 1 2 3 4 or 5	one week	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 1 2 3 4 or 5	two weeks	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 1 2 3 4 or 5	four weeks	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10	one day	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10	four days	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10	one week	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10	two weeks	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10	four weeks	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10	Mean: 5.8 years	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Douek et al., 2003[674,675] (continued)	Pain: VAS score 6 7 8 9 or 10 at rest	Mean: 5.8 years	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Pain: VAS score 6 7 8 9 or 10 on movement	Mean: 5.8 years	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	N	Y	Mod.
	Injury to vas deferens	Intraoperative	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	Y	Y	Y	Y	Mod.
Eklund et al., 2006[679-682]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	N	Y	Mod.
	Hernia recurrence	Median: 5.1 years (Range: 4.4 to 9.1)	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	?	Y	Y	Mod.
	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	N	Y	Mod.
	Hernia recurrence	three years	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	N	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hospital stay >24 hours	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function)	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 3	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 4	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 5	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
Eklund et al., 2006[679-682] (continued)	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 6	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 7	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 8	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 9	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to full activity (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to heavy work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to light work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to moderate work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain chronic	one year	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic	Median: 5.1 years (Range: 4.4 to 9.1)	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	?	N	Y	Mod.
	Pain chronic	Median: 5.1 years (Range: 4.4 to 9.1)	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
Eklund et al., 2006[679-682] (continued)	Pain chronic	two years	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic	three years	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic mild	one year	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic mild	Median: 5.1 years (Range: 4.4 to 9.1)	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain chronic mild	two years	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic mild	three years	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic moderate or severe	one year	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic moderate or severe	Median: 5.1 years (Range: 4.4 to 9.1)	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
	Pain chronic moderate or severe	two years	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain chronic moderate or severe	three years	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	N	Y	Mod.
	Pain from staple requiring reoperation	three months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain or discomfort	three months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	one day	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	two days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Eklund et al., 2006[679-682] (continued)	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	three days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	five days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one day	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	three days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	five days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two weeks	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	?	?	Mod.
	Pain: VAS	four weeks	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	?	?	Mod.
	Pain: VAS	six weeks	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	?	?	Mod.
	Pain: VAS	two months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	?	?	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: VAS	three months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	Neuralgia	three months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Neuralgia requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	?	Y	Y	Mod.
Eklund et al., 2006[679-682] (continued)	Return to full activity (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
Gokalp et al., 2003[700]	Hernia recurrence	Median: 18 months	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	time until the end of limited daily activities (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	time to return to work	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest (0-10 scale)	six hours	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest (0-10 scale)	12 hours	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest (0-10 scale)	one day	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest (0-10 scale)	two days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest (0-10 scale)	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest (0-10 scale)	one month	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS in exercise (0-10 scale)	12 hours	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS in exercise (0-10 scale)	one day	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS in exercise (0-10 scale)	two days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS in exercise (0-10 scale)	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain VAS in exercise (0-10 scale)	one month	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain/tenderness persistent	Median: 18 months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: Number of days taking oral analgesics	NA	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Gokalp et al., 2003[700] (continued)	Pain: Number of postoperative intramuscular analgesic injections	NR	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Gong et al., 2011[701]	Hernia recurrence	Mean: 15.6 months (SD: 8.5, Range: 4-35)	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normal activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one day	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one week	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Gunal et al., 2007[702]	Hernia recurrence	TAPP 87.59 months (±2.77, but authors didn't define "±"); TEP 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	Y	?	Y	Y	Y	Y	Y	?	Y	Y	?	N	N	Y	Y	Mod.
	Pain VAS	six hours	Y	?	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	Y	?	Y	Y	?	Y	N	Y	Y	Mod.
Hamza et al., 2010[704]	Recurrence	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	At least two nights in hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	LOS 1 day, 2 days, >2 days	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Return to domestic activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
Hamza et al., 2010[704] (continued)	Return to normal domestic activities & normal work activities	Up to 24 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	six hours	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: Groin	postoperative	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (0-10)	Days 1 & 2	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	Complications	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Heikkinen et al., 1997[705,706]	Hernia recurrence	Median: 10 months	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: mean score, Range: 1-4; 4 represented highest satisfaction	NR	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain continued >1 month	postoperative	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	day of surgery	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Heikkinen et al., 1997[705,706] (continued)	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	three days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	four days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	five days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	six days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	one week	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	eight days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	nine days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	10 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	11 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Heikkinen et al., 1997[705,706] (continued)	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	12 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	13 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	14 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	Overall average across the first two weeks	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: needed analgesia for >2 weeks	NR	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	day of surgery	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	three days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	four days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	five days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	six days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one week	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	eight days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	nine days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	10 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	11 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	12 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: VAS	13 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	14 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Heikkinen et al., 1997[705,706] (continued)	Pain: VAS	Overall average across the first two weeks	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Heikkinen et al., 1998[706,707]	Hernia recurrence	Median: 10 months	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	?	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to household chores (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Return to normal life (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: Satisfied	NR	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: Unsatisfied	NR	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: Very satisfied	NR	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: duration of analgesia (days)	NA	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: during physical activity	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: during physical activity	1-2 months	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	14 days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: needed analgesia for >2 weeks	NR	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	day of surgery	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one day	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: VAS	three days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	four days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Heikkinen et al., 1998[706,707] (continued)	Pain: VAS	five days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	six days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	eight days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	nine days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	10 days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	11 days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	12 days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	13 days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	14 days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	Overall average across the first two weeks	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Scrotal tenderness or pain	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Heikkinen et al., 1998[706,708]	Hernia recurrence	Median: 17 months (Range: 2-36)	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	?	Y	Y	Mod.
	Among those who did not need a hospital overnight, the number of hours in the hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normal life (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: Satisfied	NR	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: Unsatisfied	NR	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Satisfaction: Very satisfied	NR	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain for >1 month	postoperative	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
Heikkinen et al., 1998[706,708] (continued)	Pain in right shoulder	postoperative	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: duration of analgesia (days)	NA	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	First two weeks	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: needed analgesia for >2 weeks	NR	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	Overall average across the first two weeks	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Johansson et al., 1999[712,713]	Hernia recurrence	six months	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Severe discomfort restricting physical activity	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	time until full recovery (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	time until full recovery (days)	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Return to work within 7 days	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Return to work within 8 weeks	two months	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Pain mild	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Pain moderate	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Pain none	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain severe	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Pain/tenderness	<8 weeks postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
Johansson et al., 1999[712,713] (continued)	Pain/tenderness	one year	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Pain/tenderness resulting in reoperation	<8 weeks postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Mild discomfort restricting physical activity at 7 days	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Moderate discomfort restricting physical activity	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	No discomfort restricting physical activity	one week	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	No discomfort restricting physical activity	two months	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
Khoury et al., 1998[718]	Hernia recurrence	Median: 17 months (Range: 2-36)	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	?	?	Y	Y	Mod.
	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	?	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	Y	Y	Y	Y	Mod.
	time to return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	N	Y	Y	Y	Mod.
	Inguinal pain	postoperative	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of tablets (acetaminophen + codeine)	postoperative	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Pain: VAS score	postoperative	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Koninger et al., 2004[726]	Pain “I do not feel as well as I used to due to pain in the groin”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
Koninger et al., 2004[726] (continued)	Pain “I find myself limited in daily life and social activities (walking, carrying bags of groceries, dancing)”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “I find myself limited in sports”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “I have abandoned sporting activities”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “I have moderate pain”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “I have severe pain in the operated-on groin”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “I only have slight discomfort”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “Pain usually occurs with medium physical stress (going upstairs or downstairs, entering a car, dancing, etc)”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “Pain usually occurs with mild physical exercise (walking without heavy load)”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain “Since the operation I have been unable to go to work”	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain at rest	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Pain but it is not related to physical exercise	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain none	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
Koninger et al., 2004[726] (continued)	Pain "I feel pain only under severe physical stress (carrying heavy loads, intensive sporting activities)"	Median: 4.33 years (Range: 3.8 to 5)	Y	Y	Y	Y	Y	Y	Y	?	?	?	?	N	?	N	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	Y	?	Y	?	?	Y	?	N	Y	Mod.
Lal et al., 2003[729]	Hernia recurrence	Mean: 13 months (Range: 9-18)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	?	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	y	Y	Y	Mod.
	Hospital stay 1 day	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay 2 days	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to manual work (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to office work (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Satisfaction: not satisfied with the cosmesis	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	?	Y	Y	Mod.
	Satisfaction: not satisfied with the surgery	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	?	Y	Y	Mod.
	Satisfaction: satisfied with the cosmesis	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	?	Y	Y	Mod.
	Satisfaction: satisfied with the surgery	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	?	Y	Y	Mod.
	Satisfaction: very satisfied with the cosmesis	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	?	Y	Y	Mod.
	Satisfaction: very satisfied with the surgery	NR	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: Number of 50 mg Voveran tablets	one week	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	12 hours	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
Lal et al., 2003[729] (continued)	Pain: VAS	one day	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two days	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	three days	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one week	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Neuralgia	postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
Langeveld et al., 2010[736]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	N	Y	Mod.
	Hernia recurrence	Median: 49 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	N	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Problem to bow and pick up	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to bow and pick up	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to carry 5 kg for 10 meters	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to carry 5 kg for 10 meters	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to get dressed/undressed	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to get dressed/undressed	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to get in/out of bed	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to get in/out of bed	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to walk	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to walk	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Problem to walk fast	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Problem to walk fast	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
Langeveld et al., 2010[736] (continued)	QOL: EuroQOL, median, VAS	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: any	six weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: any	one year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain: at the scar	one year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain: Chronic pain requiring reoperation	Median: 49 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	?	N	Y	Mod.
	Pain: need for analgesics (scale not reported)	one day	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesics (scale not reported)	two days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesics (scale not reported)	three days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one day	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	three days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	four weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Lau et al., 2006[739]	Hernia recurrence	one year	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	time to urinate (hours)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	time to walk (hours)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain VAS at rest	same day of operation	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	one day	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	two days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
Lau et al., 2006[739] (continued)	Pain VAS at rest	three days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	four days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	five days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	six days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	same day of operation	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	one day	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	two days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	three days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	four days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	five days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS on coughing	six days	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: any chronic pain	one year	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: Chronic pain requiring oral analgesia	one year	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
MRC et al., 1999[747,753-760]	hernia recurrence	one year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	N	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	time to be able to enjoy usual interests or hobbies (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	time to be able to enjoy usual sex life (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	time to be able to enjoy usual social life (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	time to be able to look after the house (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Satisfaction: recovery faster than expected	three years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
MRC et al., 1999[747,753-760] (continued)	Satisfaction: very satisfied with the appearance of operation scars	three years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction: would recommend the operation they received to another person	three years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	Satisfaction:described life as “much better”	three years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain: any in the past week	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: any	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: any	two years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: any	three years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: any	five years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: mild	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: mild	two years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: mild	three years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: mild	five years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: severe	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: severe	two years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: severe	three years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: severe	five years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: very mild	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: very mild	two years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: very mild	three years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: very mild	five years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: very severe	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: in groin: very severe	two years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
MRC et al., 1999[747,753-760] (continued)	Pain: in groin: very severe	three years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in groin: very severe	five years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in testicles: any	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in testicles: any	two years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in testicles: any	three years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: in testicles: any	five years	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: severe groin pain in the last week	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: still using oral analgesia	one day	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: still using oral analgesia	three days	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: still using oral analgesia	one week	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: testicles	one year	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	N	Y	Mod.
	Pain: VAS at rest	six hours	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS at rest	six hours	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS when moving	one day	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS when moving	one day	Y	Y	Y	Y	Y	Y	N	Y	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Neumayer et al., 2004[762-768]	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Inpatient visit # days	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Outpatient visit # days	three months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Outpatient visit # days	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Outpatient visits	three months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Neumayer et al., 2004[762-768] (continued)	Outpatient visits	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normal activities (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to sexual activities (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	QOL: Accumulated QALYs over two years (one the scale of years)	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL)	six months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL)	one year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL)	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	day of surgery	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	two weeks	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	three months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	six months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	one year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during normal activities	day of surgery	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain VAS during normal activities	two weeks	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
Neumayer et al., 2004[762-768] (continued)	Pain VAS during normal activities	three months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during normal activities	six months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during normal activities	one year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during normal activities	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during work or exercise	day of surgery	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during work or exercise	two weeks	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during work or exercise	three months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during work or exercise	six months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during work or exercise	one year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS during work or exercise	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS worst pain	day of surgery	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS worst pain	two weeks	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS worst pain	three months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS worst pain	six months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS worst pain	one year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS worst pain	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: Chronic groin pain	short-term postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: Chronic groin pain	long-term	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: chronic leg pain	short-term postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: chronic leg pain	long-term	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Neumayer et al., 2004[762-768] (continued)	Neuralgia or other pain	immediate postop	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Neuralgia or other pain	long-term	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
Paganini et al., 1998[783]	Hernia recurrence	Median: 28 months (25th percentile 24.9, 75th percentile 30.9)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay: discharge <24 hours	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay: discharge >48 hours	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay: discharge between 24 and 36 hours	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay: discharge between 36 and 48 hours	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to sports (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to unrestricted activity (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	time to eating	in-hospital	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	time to passing stool	in-hospital	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	time to walk	in-hospital	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain discomforting during the night	three months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain distressing	between one week and three months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain inguinal region	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of placebo tablets taken	between one and two days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS score at rest	six hours	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
	Pain: VAS score at rest	nine hours	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
Paganini et al., 1998[783] (continued)	Pain: VAS score at rest	one day	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS score at rest	two days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS score at rest	one week	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Pavlidis et al., 2002[786]	Recurrence, %	Mean: 12.7 months (Range: 1-24)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	LOS, days	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to work, days	Mean: 12.7 months (Range: 1-24)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	No analgesic use, %	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Non-opioid analgesic, %	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Opioids	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Complications, %	Mean: 12.7 months (Range: 1-24)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Payne et al., 1994[787]	Hernia recurrence	Median: 10 months (Range: 7-18)	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to manual work (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: Groin: >1 month	postoperative	Y	Y	Y	Y	Y	Y	N	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Picchio et al.,1999[789]	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	time to sexual intercourse (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	time to walk (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Picchio et al., 1999[789] (continued)	time to both pain free-normal activities and work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Groin discomfort or pain	either intraoperative or postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesis intramuscular diclofena: number who did not need any	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesis intramuscular diclofena: number who needed one dose	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesis intramuscular diclofena: number who needed three or more doses	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesis intramuscular diclofena: number who needed two doses	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: VAS score	one day	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: VAS score	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Numbness/neuralgia	either intraoperative or postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
Pokorny et al., 2008[791,792]	Hernia recurrence	three years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain persistent	long-term	Y	Y	Y	Y	Y	Y	?	Y	?	Y	N	N	?	Y	Y	Mod.
	Pain: need for analgesia	perioperative	Y	Y	Y	Y	Y	Y	?	Y	?	Y	N	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Neuralgia	long-term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Sevonius et al., 2009[535,805-813]	Hernia recurrence	five years	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
	Pain: felt pain within the past week	between 2 and 3 years	N	N	Y	N	N	?	?	?	?	?	N	N	?	Y	Y	High
	Pain: in pain now	between 2 and 3 years	N	N	Y	N	N	?	?	?	?	?	N	N	?	Y	Y	High
Simmermacher et al., 2000[814]	Adverse events other than pain	early postoperative	Y	?	Y	Y	Y	Y	?	?	Y	N	?	Y	Y	Y	Y	Mod.
Singh et al., 2011[815]	Hernia recurrence	Median 22 months (range 10-30)	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Quality of life	Three months	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain	6 months or less	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain	One year	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	?	?	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Vatansev et al., 2002[826]	Pain: need for analgesia meperidin mg in 24 hours	one day	Y	Y	Y	Y	Y	Y	?	Y	?	N	?	N	Y	Y	Y	Mod.
Wara et al., 2005[829-834]	Hernia recurrence	between 0 and 3 years	N	N	Y	N	N	?	?	?	Y	N	N	?	?	Y	Y	High
	Hernia recurrence	between 0 and 3 years	N	N	Y	N	N	?	?	?	Y	N	N	?	?	Y	Y	High
Zieren et al., 1998[838,839]	Hernia recurrence	Median: 25 months (SD: 7)	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to daily activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of days	NA	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of grams Metamizol	postoperative	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	day of surgery	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Zieren et al., 1998[838,839] (continued)	Pain: VAS	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	three days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	four days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	five days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	six days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	one week	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	eight days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	nine days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	10 days	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Persistent pain	postoperative	Y	?	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.

Table 18. Key Question 2a: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Anadol et al., 2004[624]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 13.5 months (Range: 8-28)	0% (0/25)	0% (0/25)	n.s. based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	1.52 (SD: 0.51) (N=25)	2.24 (SD: 0.97) (N=25)	p=0.03 Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain VAS	12 hours	39.96 (SD: 8.21) (N=25)	54.12 (SD: 13.06) (N=25)	p<0.005 Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain VAS	one day	20.92 (SD: 8.73) (N=25)	37.24 (SD: 11.38) (N=25)	p<0.0003 Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain VAS	two days	14.72 (SD: 7.03) (N=25)	17.36 (SD: 4.52) (N=25)	p NS Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain VAS	three days	9.44 (SD: 4.23) (N=25)	13.12 (SD: 5.95) (N=25)	p NS Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain/swelling/ purulent discharge requiring readmission	postoperative	8% (2/25)	0% (0/25)	n.s. based on OR=5.43 (95% CI: 0.25 to 118.96)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesis, number of tablets of 500 mg oral metamizole	postoperative	6.72 (SD: 2.72) (N=25)	7.52 (SD: 2) (N=25)	p NS Mann Whitney	
	TAPP vs. Lichtenstein	ADV	Any complications	intraoperative	0% (0/25)	0% (0/25)	n.s. based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal hematoma	postoperative	0% (0/25)	4% (1/25)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Anadol et al., 2004[624] (continued)	TAPP vs. Lichtenstein	ADV	Superficial wound infection	postoperative	0% (0/25)	4% (1/25)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
Andersson et al., 2003[625,626]	TEP vs. Lichtenstein	RC	Hernia recurrence	one year	3% (2/76)	0% (0/85)	n.s. based on OR=5.74 (95% CI: 0.27 to 121.44)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	Median: 7.3 years (Range: 6.1 to 8.9)	4% (3/69)	5% (4/78)	NS based on OR=0.84 (95% CI: 0.18 to 3.9)[@]	
	TEP vs. Lichtenstein	HOSP	At least one night in hospital	NA	23% (19/81)	21% (18/87)	NS based on OR=1.17 (95% CI: 0.57 to 2.44)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	0.57 (SD: 0.29) (N=81)	0.52 (SD: 0.26) (N=87)	p=0.24, t-test	
	TEP vs. Lichtenstein	RTDA	Impact on day-to-day living, VAS, 0-100 where 0=none	Median: 7.3 years (Range: 6.1 to 8.9)	Median: 4 (Range: 0-86) (N=73)	Median: 5 (Range: 0-69) (N=81)	p=0.15 Mann Whitney	
	TEP vs. Lichtenstein	RTDA	Long lasting impact on ability to move	Median: 7.3 years (Range: 6.1 to 8.9)	5% (4/73)	6% (5/81)	NS based on OR=0.88 (95% CI: 0.23 to 3.41)[@]	
	TEP vs. Lichtenstein	RTDA	Complete recovery (days)	NA	13 (SD: 10) (N=81)	19 (SD: 13) (N=87)	p=0.007, t-test	
	TEP vs. Lichtenstein	RTW	Complete recovery (days): Those working in manual labor	NA	17 (SD: 10) (N=21)	30 (SD: 12) (N=22)	p=0.001, t-test	
	TEP vs. Lichtenstein	RTW	Complete recovery (days): Those working in mixed manual labor/ office work	NA	13 (SD: 11) (N=29)	13 (SD: 10) (N=27)	p=0.98, t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Andersson et al., 2003[625,626] (continued)	TEP vs. Lichtenstein	RTW	Complete recovery (days): Those working in office work	NA	10 (SD: 8) (N=25)	15 (SD: 10) (N=32)	p=0.04, t-test	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	8 (SD: 5) (N=81)	11 (SD: 8) (N=87)	p=0.003, t-test	
	TEP vs. Lichtenstein	RTW	Return to work (days): Those working in manual labor	NA	11 (SD: 4) (N=21)	16 (SD: 10) (N=22)	p=0.003, t-test	
	TEP vs. Lichtenstein	RTW	Return to work (days): Those working in mixed manual labor/ office work	NA	8 (SD: 5) (N=29)	10 (SD: 5) (N=27)	p=0.08, t-test	
	TEP vs. Lichtenstein	RTW	Return to work (days): Those working in office work	NA	5 (SD: 4) (N=25)	7 (SD: 6) (N=32)	p=0.12, t-test	
	TEP vs. Lichtenstein	SFN	Satisfaction: VAS (higher number is better)	one year	Median: 100 (Range: 18 to 100) (N=78)	Median: 98 (Range: 30 to 100) (N=85)	p=0.53, Mann Whitney	
	TEP vs. Lichtenstein	SFN	% complete recovery (higher % is better)	Median: 7.3 years (Range: 6.1 to 8.9)	89% (65/73)	95% (77/81)	NS based on OR=0.42 (95% CI: 0.12 to 1.47)[@]	
	TEP vs. Lichtenstein	Pain	Neuralgia	postoperative	7% (5/76)	5% (4/81)	NS based on OR=1.36 (95% CI: 0.35 to 5.25)[@]	
	TEP vs. Lichtenstein	Pain	Pain	postoperative	22% (14/64)	35% (22/63)	NS based on OR=0.52 (95% CI: 0.24 to 1.15)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Andersson et al., 2003[625,626] (continued)	TEP vs. Lichtenstein	Pain	Pain: analgesia use, grams of acetominophen	one week	Median: 5 g (Range: 0 to 28) (N=81)	Median: 11 g (Range: 0 to 28) (N=86)	p<0.001 Mann Whitney	
	TEP vs. Lichtenstein	Pain	Pain: analgesia use, mg of dextropropoxyphene	one week	Median: 400 mg (Range: 0 to 2,400) (N=81)	Median: 900 mg (Range: 0 to 2,800) (N=86)	p<0.001 Mann Whitney	
	TEP vs. Lichtenstein	Pain	Testicular pain	postoperative	31% (19/62)	8% (6/79)	p<0.05 based on OR=5.38 (95% CI: 1.99 to 14.5)[@]	
	TEP vs. Lichtenstein	Pain	Groin pain	Median: 7.3 years (Range: 6.1 to 8.9)	8% (6/73)	14% (11/81)	NS based on OR=0.57 (95% CI: 0.2 to 1.63)[@]	
	TEP vs. Lichtenstein	Pain	Neuralgia	Median: 7.3 years (Range: 6.1 to 8.9)	1% (1/69)	0% (0/78)	NS based on OR=3.44 (95% CI: 0.14 to 85.79)[@]	
	TEP vs. Lichtenstein	Pain	Severe pain	Median: 7.3 years (Range: 6.1 to 8.9)	5% (4/73)	2% (2/81)	NS based on OR=2.29 (95% CI: 0.41 to 12.89)[@]	
	TEP vs. Lichtenstein	Pain	Testicular pain	Median: 7.3 years (Range: 6.1 to 8.9)	14% (10/73)	1% (1/81)	p<0.05 based on OR=12.7 (95% CI: 1.58 to 101.85)[@]	
	TEP vs. Lichtenstein	ADV	Acute airway obstruction	perioperative	1% (1/80)	0% (0/87)	NS based on OR=3.3 (95% CI: 0.13 to 82.23)[@]	
	TEP vs. Lichtenstein	ADV	Bowel obstruction	postoperative	1% (1/80)	0% (0/86)	NS based on OR=3.26 (95% CI: 0.13 to 81.3)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Andersson et al., 2003[625,626] (continued)	TEP vs. Lichtenstein	ADV	Change in echocardiogram or heart rhythm results	perioperative	3% (2/79)	1% (1/86)	NS based on OR=2.21 (95% CI: 0.2 to 24.83)[@]	
	TEP vs. Lichtenstein	ADV	Constipation	postoperative	11% (8/73)	8% (6/80)	NS based on OR=1.52 (95% CI: 0.5 to 4.6)[@]	
	TEP vs. Lichtenstein	ADV	Epigastric vessel bleeding	perioperative	3% (2/79)	2% (2/85)	NS based on OR=1.08 (95% CI: 0.15 to 7.84)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	postoperative	9% (7/74)	26% (18/68)	p<0.05 based on OR=0.29 (95% CI: 0.11 to 0.75)[@]	
	TEP vs. Lichtenstein	ADV	Hydrocele	postoperative	1% (1/80)	0% (0/85)	NS based on OR=3.23 (95% CI: 0.13 to 80.36)[@]	
	TEP vs. Lichtenstein	ADV	Impaired inguinal sensibility	postoperative	11% (8/71)	81% (38/47)	p<0.05 based on OR=0.03 (95% CI: 0.01 to 0.08)[@]	
	TEP vs. Lichtenstein	ADV	Injury to peritoineum	perioperative	3% (2/79)	0% (0/85)	NS based on OR=5.52 (95% CI: 0.26 to 116.7)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	postoperative	0% (0/81)	2% (2/84)	NS based on OR=0.2 (95% CI: 0.01 to 4.28)[@]	
	TEP vs. Lichtenstein	ADV	Serosal tear in the colon	perioperative	0% (0/81)	1% (1/86)	NS based on OR=0.35 (95% CI: 0.01 to 8.71)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Andersson et al., 2003[625,626] (continued)	TEP vs. Lichtenstein	ADV	Urinary retention	postoperative	5% (4/77)	2% (2/84)	NS based on OR=2.25 (95% CI: 0.4 to 12.63)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	postoperative	0% (0/81)	2% (2/84)	NS based on OR=0.2 (95% CI: 0.01 to 4.28)[@]	
	TEP vs. Lichtenstein	ADV	Hydrocele	Median: 7.3 years (Range: 6.1 to 8.9)	1% (1/69)	0% (0/78)	NS based on OR=3.44 (95% CI: 0.14 to 85.79)[@]	
	TEP vs. Lichtenstein	ADV	Impaired inguinal sensibility	Median: 7.3 years (Range: 6.1 to 8.9)	12% (9/73)	32% (26/81)	p<0.05 based on OR=0.3 (95% CI: 0.13 to 0.69)[@]	
	TEP vs. Lichtenstein	ADV	Testicular atrophy	Median: 7.3 years (Range: 6.1 to 8.9)	3% (2/69)	4% (3/75)	NS based on OR=0.72 (95% CI: 0.12 to 4.42)[@]	
	TEP vs. Lichtenstein	ADV	Umbilical hernia	Median: 7.3 years (Range: 6.1 to 8.9)	1% (1/69)	0% (0/78)	n.s. based on OR=3.44 (95% CI: 0.14 to 85.79)[@]	
Bender et al., 2009[630]	TEP vs. Kugel patch	HOSP	Hospital stay was one day (higher % is better)	NA	100% (20/20)	100% (20/20)	n.s. based on OR=1 (95% CI: 0.02 to 52.85)[@]	
	TEP vs. Kugel patch	RTDA	Return to normal activities (days)	NA	8.85 (SD: 2.18) (N=20)	8.95 (SD: 2.68) (N=20)	p=0.296, t-test	
	TEP vs. Kugel patch	Pain	Pain VAS	two hours	3.4 (SD: 1.60) (N=20)	3.5 (SD: 1.53) (N=20)	p=0.869 t-test	
	TEP vs. Kugel patch	Pain	Pain VAS	one day	1.55 (SD: 1.39) (N=20)	1.9 (SD: 1.29) (N=20)	p=0.374 t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bender et al., 2009[630] (continued)	TEP vs. Kugel patch	Pain	Pain VAS	one week	0.4 (SD: 0.68) (N=20)	0.35 (SD: 0.67) (N=20)	p=0.756 t-test	
	TEP vs. Kugel patch	Pain	Pain any	one month	0% (0/20)	0% (0/20)	n.s. based on OR=1 (95% CI: 0.02 to 52.85)[@]	
	TEP vs. Kugel patch	ADV	Any complications	Mean: 2.3 months (SD: 1.9)	0% (0/20)	0% (0/20)	n.s. based on OR=1 (95% CI: 0.02 to 52.85)[@]	
Bostanci et al., 1998[640]	TEP vs. OPM	RC	Hernia recurrence	Median: 15 months (Range: 4-24)	0% (0/32)	0% (0/32)	n.s. based on OR=1 (95% CI: 0.02 to 51.94)[@]	
	TEP vs. OPM	Pain	Pain: need for analgesia (grams/ day) metamizole	one day	0.46 (SD: 0.55) (N=32)	0.93 (SD: 0.61) (N=32)	p<0.05 by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	Pain	Pain: VAS score	one day	3.61 (SD: 1.8) (N=32)	5.04 (SD: 2.05) (N=32)	p<0.05 by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	Pain	Pain: need for analgesia (grams/ day) metamizole	between day 1 and day 2	0.28 (SD: 0.33) (N=32)	0.4 (SD: 0.42) (N=32)	p>0.05, NS, by either Mann-Whitney or t-test (not reported which)	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bostanci et al., 1998[640] (continued)	TEP vs. OPM	Pain	Pain: VAS score	between day 1 and day 2	3.17 (SD: 1.85) (N=32)	4.03 (SD: 2.06) (N=32)	p>0.05, NS, by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	Pain	Pain: need for analgesia (grams/day) metamizole	between day 2 and day 3	0.21 (SD: 0.38) (N=32)	0.21 (SD: 0.3) (N=32)	p>0.05, NS, by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	Pain	Pain: VAS score	between day 2 and day 3	2.61 (SD: 1.88) (N=32)	2.83 (SD: 1.80) (N=32)	p>0.05, NS, by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	Pain	Pain: need for analgesia (grams/day) metamizole	total in first three days	0.96 (SD: 0.95) (N=32)	1.56 (SD: 0.94) (N=32)	p<0.05 by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	Pain	Pain: VAS score	average in first three days	3.13 (SD: 1.53) (N=32)	3.9 (SD: 1.44) (N=32)	p<0.05 by either Mann-Whitney or t-test (not reported which)	
	TEP vs. OPM	ADV	Echymosis	postoperative	0% (0/32)	3% (1/32)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.23)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bostanci et al., 1998[640] (continued)	TEP vs. OPM	ADV	Hematoma	postoperative	0% (0/32)	3% (1/32)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.23)[@]	
	TEP vs. OPM	ADV	Hydrocele	postoperative	6% (2/32)	3% (1/32)	NS based on OR=2.07 (95% CI: 0.18 to 24.01)[@]	
	TEP vs. OPM	ADV	Infection	postoperative	0% (0/32)	3% (1/32)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.23)[@]	
	TEP vs. OPM	ADV	Urinary retention	postoperative	3% (1/32)	0% (0/32)	n.s. based on OR=3.1 (95% CI: 0.12 to 78.87)[@]	
	TEP vs. OPM	ADV	Mortality	Median: 15 months (Range: 4-24)	0% (0/32)	0% (0/32)	n.s. based on OR=1 (95% CI: 0.02 to 51.94)[@]	
Bringman et al., 2003[641]	TEP vs. Lichtenstein	RC	Hernia recurrence	Mean: 19.8 months (SD: 8.6)	2% (2/90)	0% (0/102)	n.s. based on OR=5.79 (95% CI: 0.27 to 122.24)[@]	
	TEP vs. Lichtenstein	RTDA	Full recovery (days)	NA	Median: 14 (Range: 0-80) (N=84)	Median: 28.5 (Range: 1-365) (N=86)	Recovery time shorter after TEP than the open groups: p<0.0001, Kruskal Wallis then Siegel-Castellan	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	Median: 5 (SD: NR, Range: 0-30) (Ns NR)	Median: 7 (SD: NR, Range: 0-70) (Ns NR)	Recovery time shorter after TEP than Lichtenstein: p=0.02, Kruskal Wallis then Siegel-Castellan	
	TEP vs. Lichtenstein	Pain	Pain: VAS	two hours	Median: 2 (25th: 1, 75th: 3) (N=92)	Median: 3 (25th: 1, 75th: 4) (N=103)	Pain scores lower in the TEP group than Lichtenstein group: p=0.009, chi square test	
	TEP vs. Lichtenstein	Pain	Pain: required extra analgesia	four hours	18% (17/92)	19% (20/103)	NS based on OR=0.94 (95% CI: 0.46 to 1.93)[@]	
	TEP vs. Lichtenstein	Pain	Pain: VAS	four hours	Median: 2 (25th: 1, 75th: 3) (N=92)	Median: 2 (25th: 2, 75th: 4) (N=103)	Pain scores lower in the TEP group than Lichtenstein group: p=0.015, chi square test	
	TEP vs. Lichtenstein	Pain	Pain: VAS	first postoperative morning	Median: 1 (25th: 1, 75th: 2) (N=92)	Median: 2 (25th: 1, 75th: 3) (N=103)	Pain scores lower in the TEP group than both of the open groups: p<0.0001, chi square test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	TEP vs. Lichtenstein	Pain	Pain, prolonged	one month	0% (0/90)	2% (2/102)	n.s. based on OR=0.22 (95% CI: 0.01 to 4.69)[@]	
	TEP vs. Lichtenstein	Pain	Pain	Mean: 19.8 months (SD: 8.6)	3% (3/90)	10% (10/102)	NS based on OR=0.32 (95% CI: 0.08 to 1.19)[@]	
	TEP vs. Lichtenstein	ADV	Any complications	perioperative	0% (0/92)	0% (0/103)	n.s. based on OR=1.12 (95% CI: 0.02 to 56.96)[@]	
	TEP vs. Lichtenstein	ADV	Dyspnea	one month	1% (1/90)	0% (0/102)	n.s. based on OR=3.44 (95% CI: 0.14 to 85.41)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	one month	3% (3/90)	8% (8/102)	NS based on OR=0.41 (95% CI: 0.1 to 1.58)[@]	
	TEP vs. Lichtenstein	ADV	Sensory loss	one month	0% (0/90)	2% (2/102)	n.s. based on OR=0.22 (95% CI: 0.01 to 4.69)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	one month	1% (1/90)	0% (0/102)	n.s. based on OR=3.44 (95% CI: 0.14 to 85.41)[@]	
	TEP vs. Lichtenstein	ADV	Superficial infection	one month	1% (1/90)	4% (4/102)	NS based on OR=0.28 (95% CI: 0.03 to 2.51)[@]	
	TEP vs. Lichtenstein	ADV	Testicular swelling	one month	0% (0/90)	2% (2/102)	n.s. based on OR=0.22 (95% CI: 0.01 to 4.69)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	TEP vs. Lichtenstein	ADV	Urinary retention	one month	2% (2/90)	0% (0/102)	n.s. based on OR=5.79 (95% CI: 0.27 to 122.24)[@]	
	TEP vs. Lichtenstein	ADV	Wound healing delayed	one month	0% (0/90)	0% (0/102)	n.s. based on OR=1.13 (95% CI: 0.02 to 57.67)[@]	
	TEP vs. Lichtenstein	ADV	Wound secretion	one month	1% (1/90)	3% (3/102)	NS based on OR=0.37 (95% CI: 0.04 to 3.63)[@]	
	TEP vs. Lichtenstein	ADV	Hyperesthesia	Mean: 19.8 months (SD: 8.6)	0% (0/90)	0% (0/102)	n.s. based on OR=1.13 (95% CI: 0.02 to 57.67)[@]	
	TEP vs. Lichtenstein	ADV	Mesh-related problems	Mean: 19.8 months (SD: 8.6)	0% (0/90)	2% (2/102)	n.s. based on OR=0.22 (95% CI: 0.01 to 4.69)[@]	
	TEP vs. Lichtenstein	ADV	Sensory loss	Mean: 19.8 months (SD: 8.6)	0% (0/90)	3% (3/102)	n.s. based on OR=0.16 (95% CI: 0.01 to 3.08)[@]	
	TEP vs. Mesh plug	RC	Hernia recurrence	Mean: 19.8 months (SD: 8.6)	2% (2/90)	2% (2/102)	NS based on OR=1.14 (95% CI: 0.16 to 8.24)[@]	
	TEP vs. Mesh plug	RTDA	Full recovery (days)	NA	Median: 14 (Range: 0-80) (N=84)	Median: 24.5 (Range: 0-122) (N=94)	Recovery time shorter after TEP than the open groups: p<0.0001, Kruskal Wallis then Siegel-Castellan	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	TEP vs. Mesh plug	RTW	Return to work (days)	NA	Median: 5 (SD: NR, Range: 0-30) (Ns NR)	Median: 7 (SD: NR, Range: 0-150) (Ns NR)	Recovery time shorter after TEP than Lichtenstein: p=0.02, Kruskal Wallis then Siegel-Castellan	
	TEP vs. Mesh plug	Pain	Pain: VAS	two hours	Median: 2 (25th: 1, 75th: 3) (N=92)	Median: 4 (25th: 1, 75th: 4) (N=104)	Pain scores lower in the TEP group than Lichtenstein group: p=0.009, chi square test	
	TEP vs. Mesh plug	Pain	Pain: required extra analgesia	four hours	18% (17/92)	25% (26/104)	NS based on OR=0.68 (95% CI: 0.34 to 1.35)[@]	
	TEP vs. Mesh plug	Pain	Pain: VAS	four hours	Median: 2 (25th: 1, 75th: 3) (N=92)	Median: 2 (25th: 1, 75th: 3) (N=104)	Pain scores lower in the TEP group than Lichtenstein group: p=0.015, chi square test	
	TEP vs. Mesh plug	Pain	Pain: VAS	first postoperative morning	Median: 1 (25th: 1, 75th: 2) (N=92)	Median: 2 (25th: 1, 75th: 4) (N=104)	Pain scores lower in the TEP group than both of the open groups: p<0.0001, chi square test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	TEP vs. Mesh plug	Pain	Pain, prolonged	one month	0% (0/90)	1% (1/102)	NS based on OR=0.37 (95% CI: 0.02 to 9.29)[@]	
	TEP vs. Mesh plug	Pain	Pain	Mean: 19.8 months (SD: 8.6)	3% (3/90)	4% (4/102)	NS based on OR=0.84 (95% CI: 0.18 to 3.88)[@]	
	TEP vs. Mesh plug	ADV	Any complications	perioperative	0% (0/92)	0% (0/104)	NS based on OR=1.13 (95% CI: 0.02 to 57.51)[@]	
	TEP vs. Mesh plug	ADV	Dyspnea	one month	1% (1/90)	0% (0/102)	NS based on OR=3.44 (95% CI: 0.14 to 85.41)[@]	
	TEP vs. Mesh plug	ADV	Hematoma	one month	3% (3/90)	7% (7/102)	NS based on OR=0.47 (95% CI: 0.12 to 1.87)[@]	
	TEP vs. Mesh plug	ADV	Sensory loss	one month	0% (0/90)	1% (1/102)	NS based on OR=0.37 (95% CI: 0.02 to 9.29)[@]	
	TEP vs. Mesh plug	ADV	Seroma	one month	1% (1/90)	1% (1/102)	NS based on OR=1.13 (95% CI: 0.07 to 18.41)[@]	
	TEP vs. Mesh plug	ADV	Superficial infection	one month	1% (1/90)	3% (3/102)	NS based on OR=0.37 (95% CI: 0.04 to 3.63)[@]	
	TEP vs. Mesh plug	ADV	Testicular swelling	one month	0% (0/90)	0% (0/102)	NS based on OR=1.13 (95% CI: 0.02 to 57.67)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	TEP vs. Mesh plug	ADV	Urinary retention	one month	2% (2/90)	0% (0/102)	NS based on OR=5.79 (95% CI: 0.27 to 122.24)[@]	
	TEP vs. Mesh plug	ADV	Wound healing delayed	one month	0% (0/90)	1% (1/102)	NS based on OR=0.37 (95% CI: 0.02 to 9.29)[@]	
	TEP vs. Mesh plug	ADV	Wound secretion	one month	1% (1/90)	2% (2/102)	NS based on OR=0.56 (95% CI: 0.05 to 6.3)[@]	
	TEP vs. Mesh plug	ADV	Hyperesthesia	Mean: 19.8 months (SD: 8.6)	0% (0/90)	1% (1/102)	NS based on OR=0.37 (95% CI: 0.02 to 9.29)[@]	
	TEP vs. Mesh plug	ADV	Mesh-related problems	Mean: 19.8 months (SD: 8.6)	0% (0/90)	2% (2/102)	NS based on OR=0.22 (95% CI: 0.01 to 4.69)[@]	
	TEP vs. Mesh plug	ADV	Sensory loss	Mean: 19.8 months (SD: 8.6)	0% (0/90)	1% (1/102)	NS based on OR=0.37 (95% CI: 0.02 to 9.29)[@]	
Bueno et al., 2004[646]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Mean: 21.5 months (SD: 9.5 months)	5% (10/200)	4% (7/200)	NS based on OR=1.45 (95% CI: 0.54 to 3.89)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	1.4 (SD: 1.1) (N=200)	1.9 (SD: 1.3) (N=200)	NR	
	TAPP vs. Lichtenstein	Pain	Neuralgia	Mean: 21.5 months (SD: 9.5 months)	6% (11/200)	10% (19/200)	NS based on OR=0.55 (95% CI: 0.26 to 1.2)[@]	
	TAPP vs. Lichtenstein	ADV	Epigastric vessels injury	Intraoperative	2% (3/200)	1% (2/200)	NS based on OR=1.51 (95% CI: 0.25 to 9.12)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bueno et al., 2004[646] (continued)	TAPP vs. Lichtenstein	ADV	Subcutaneous emphysema, important	Intraoperative	2% (3/200)	0% (0/200)	NS based on OR=7.11 (95% CI: 0.36 to 138.48)[@]	
	TAPP vs. Lichtenstein	ADV	Trocar site hemorrhage	Intraoperative	4% (7/200)	0% (0/200)	NS based on OR=15.54 (95% CI: 0.88 to 274.01)[@]	
	TAPP vs. Lichtenstein	ADV	Hydrocele	Mean: 21.5 months (SD: 9.5 months)	1% (2/200)	1% (1/200)	NS based on OR=2.01 (95% CI: 0.18 to 22.35)[@]	
	TAPP vs. Lichtenstein	ADV	Inguinal/trocar hematoma	Mean: 21.5 months (SD: 9.5 months)	4% (7/200)	5% (9/200)	NS based on OR=0.77 (95% CI: 0.28 to 2.11)[@]	
	TAPP vs. Lichtenstein	ADV	Orchitis/cordon cyst	Mean: 21.5 months (SD: 9.5 months)	1% (2/200)	2% (3/200)	NS based on OR=0.66 (95% CI: 0.11 to 4.01)[@]	
	TAPP vs. Lichtenstein	ADV	Small bowel obstruction	Mean: 21.5 months (SD: 9.5 months)	1% (1/200)	0% (0/200)	NS based on OR=3.02 (95% CI: 0.12 to 74.46)[@]	
	TAPP vs. Lichtenstein	ADV	Trocar site hernia	Mean: 21.5 months (SD: 9.5 months)	3% (5/200)	0% (0/200)	NS based on OR=11.28 (95% CI: 0.62 to 205.4)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	Mean: 21.5 months (SD: 9.5 months)	2% (4/200)	6% (12/200)	NS based on OR=0.32 (95% CI: 0.1 to 1.01)[@]	
	TAPP vs. Lichtenstein	ADV	Wound infection	Mean: 21.5 months (SD: 9.5 months)	1% (2/200)	6% (12/200)	p<0.05 based on OR=0.16 (95% CI: 0.03 to 0.72)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bueno et al., 2004[646] (continued)	TAPP vs. Lichtenstein	ADV	Wound seroma	Mean: 21.5 months (SD: 9.5 months)	3% (6/200)	7% (13/200)	NS based on OR=0.44 (95% CI: 0.17 to 1.19)[@]	
Butler et al., 2007[647]	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	12.9 (SEM: 0.9) (N=22)	11.4 (SEM: 1.0) (N=22)	p=0.075 ANOVA comparing the three groups	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	six days	35.6 (SD: NR) (N=22)	36.7 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	one day	64.7 (SD: NR) (N=22)	63.1 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647] (continued)	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	two days	61.2 (SD: NR) (N=22)	59.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	three days	50.6 (SD: NR) (N=22)	55.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	four days	47.7 (SD: NR) (N=22)	44.9 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647] (continued)	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	five days	41.8 (SD: NR) (N=22)	41.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0-100	one week	31.7 (SD: NR) (N=22)	38.5 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. Lichtenstein	ADV	Wound complications	postoperative	0% (0/22)	0% (0/22)	n.s. based on OR=1 (95% CI: 0.02 to 52.63)[@]	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	9.9 (SEM: 1.0) (N=22)	11.4 (SEM: 1.0) (N=22)	p=0.075 ANOVA comparing the three groups	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	six days	34.2 (SD: NR) (N=22)	36.7 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	one day	54.2 (SD: NR) (N=22)	63.1 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	two days	46.9 (SD: NR) (N=22)	59.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	three days	49.8 (SD: NR) (N=22)	55.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	four days	42.1 (SD: NR) (N=22)	44.9 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	five days	45.4 (SD: NR) (N=22)	41.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS score 0-100	one week	30.7 (SD: NR) (N=22)	38.5 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TEP vs. Lichtenstein	ADV	Wound complications	postoperative	0% (0/22)	0% (0/22)	n.s. based on OR=1 (95% CI: 0.02 to 52.63)[@]	
Butters et al., 2007[648,649]	TAPP vs. Lichtenstein	RC	Hernia recurrence	one year	1% (1/81)	1% (1/76)	NS based on OR=0.94 (95% CI: 0.06 to 15.26)[@]	
	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 4.3 years; Range: 3.8 to 5	1% (1/81)	1% (1/76)	NS based on OR=0.94 (95% CI: 0.06 to 15.26)[@]	
	TAPP vs. Lichtenstein	SFN	Satisfaction: completely satisfied (higher % is better)	Median: 4.3 years; Range: 3.8 to 5	91% (74/81)	75% (57/76)	Chi square test for linear trend $X^2(2)=5.5$, p=0.02.[@]	
	TAPP vs. Lichtenstein	SFN	Satisfaction: satisfied (higher % is better)	Median: 4.3 years; Range: 3.8 to 5	7% (6/81)	20% (15/76)	See above	
	TAPP vs. Lichtenstein	SFN	Satisfaction: unsatisfied	Median: 4.3 years; Range: 3.8 to 5	1% (1/81)	5% (4/76)	See above	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butters et al., 2007[648,649] (continued)	TAPP vs. Lichtenstein	SFN	Satisfaction: would have this procedure again: Yes (higher % is better)	Median: 4.3 years; Range: 3.8 to 5	98% (79/81)	86% (65/76)	Chi square test $X^2(1)=6.5$, p=0.01.[@]	
	TAPP vs. Lichtenstein	SFN	Satisfaction: would have this procedure again: No	Median: 4.3 years; Range: 3.8 to 5	1% (1/81)	11% (8/76)	See above.	
	TAPP vs. Lichtenstein	SFN	Satisfaction: would have this procedure again: Do not know	Median: 4.3 years; Range: 3.8 to 5	1% (1/81)	4% (3/76)	See above.	
	TAPP vs. Lichtenstein	ADV	Lateral cutaneous nerve damage	Median: 4.3 years; Range: 3.8 to 5	1% (1/81)	0% (0/76)	n.s. based on OR=2.85 (95% CI: 0.11 to 71.06)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal numbness	Median: 4.3 years; Range: 3.8 to 5	0% (0/81)	13% (10/76)	p<0.05 based on OR=0.04 (95% CI: 0 to 0.68)[@]	
	TAPP vs. Lichtenstein	ADV	Suprapubic numbness	Median: 4.3 years; Range: 3.8 to 5	0% (0/81)	1% (1/76)	n.s. based on OR=0.31 (95% CI: 0.01 to 7.7)[@]	
	TAPP vs. Lichtenstein	ADV	Testicular atrophy	Median: 4.3 years; Range: 3.8 to 5	0% (0/81)	0% (0/76)	n.s. based on OR=0.94 (95% CI: 0.02 to 47.9)[@]	
Champault et al., 1997[651-654]	Primary hernia: TEP vs. Stoppa	HOSP	Hospital stay (days)	NA	2.9 (SD: NR) (N=31)	7.2 (SD: NR) (N=26)	NR	Primary hernia only. Calculated based on means and Ns for recurrent vs. overall hernias, reported in Table 3 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Colak et al., 2003[662]	TEP vs. Lichtenstein	RC	Hernia recurrence	TEP Mean: 12.04 months (SD: 2.84), and open Mean: 11.10 months (SD: 2.67)	3% (2/67)	6% (4/67)	NS based on OR=0.48 (95% CI: 0.09 to 2.74)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	1.8 (SD: 0.65) (N=67)	2.73 (SD: 1.62) (N=67)	p=0.001 t test	
	TEP vs. Lichtenstein	HOSP	Hospital stay <1 day (higher % is better)	NA	33% (22/67)	19% (13/67)	NS based on OR=2.03 (95% CI: 0.92 to 4.48)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay >2 days	NA	13% (9/67)	51% (34/67)	p<0.05 based on OR=0.15 (95% CI: 0.06 to 0.35)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay between 1 day and 2 days	NA	54% (36/67)	30% (20/67)	p<0.05 based on OR=2.73 (95% CI: 1.34 to 5.55)[@]	
	TEP vs. Lichtenstein	RTDA	Time to return to normal activities (days)	NA	10.8 (SD: 7.4) (N=67)	15.2 (SD: 8.5) (N=67)	p<0.001	
	TEP vs. Lichtenstein	Pain	Pain VAS	one day	2.73 (SD: 1.69) (N=67)	4.61 (SD: 1.77) (N=67)	p<0.001	
	TEP vs. Lichtenstein	Pain	Numbness/ neuralgia	postoperative	1% (1/67)	4% (3/67)	NS based on OR=0.32 (95% CI: 0.03 to 3.19)[@]	
	TEP vs. Lichtenstein	Pain	Pain: Groin discomfort/ pain	postoperative	6% (4/67)	4% (3/67)	NS based on OR=1.35 (95% CI: 0.29 to 6.3)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Colak et al., 2003[662] (continued)	TEP vs. Lichtenstein	Pain	Pain: Number of days needing postoperative intramuscular analgesia injections	NA	0.34 (SD: 0.8) (N=67)	1.22 (SD: 1.83) (N=67)	p<0.001	
	TEP vs. Lichtenstein	ADV	Hematoma or seroma	postoperative	7% (5/67)	4% (3/67)	NS based on OR=1.72 (95% CI: 0.39 to 7.51)[@]	
	TEP vs. Lichtenstein	ADV	Intestinal obstruction	postoperative	0% (0/67)	0% (0/67)	n.s. based on OR=1 (95% CI: 0.02 to 51.14)[@]	
	TEP vs. Lichtenstein	ADV	Major vessel injury	postoperative	0% (0/67)	0% (0/67)	n.s. based on OR=1 (95% CI: 0.02 to 51.14)[@]	
	TEP vs. Lichtenstein	ADV	Visceral injury	postoperative	0% (0/67)	0% (0/67)	n.s. based on OR=1 (95% CI: 0.02 to 51.14)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	postoperative	0% (0/67)	3% (2/67)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.12)[@]	
Douek et al., 2003[674,675]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Mean: 5.8 years	2% (2/122)	3% (3/120)	NS based on OR=0.65 (95% CI: 0.11 to 3.96)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital readmission	three months	2% (3/182)	3% (6/176)	NS based on OR=0.47 (95% CI: 0.12 to 1.93)[@]	
	TAPP vs. Lichtenstein	HOSP	At least 2 nights in hospital	NA	2% (4/200)	0% (0/200)	n.s. based on OR=9.18 (95% CI: 0.49 to 171.71)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	HOSP	At least 3 nights in hospital	NA	1% (2/200)	0% (0/200)	n.s. based on OR=5.05 (95% CI: 0.24 to 105.87)[@]	
	TAPP vs. Lichtenstein	HOSP	At least 4 nights in hospital	NA	1% (1/200)	0% (0/200)	n.s. based on OR=3.02 (95% CI: 0.12 to 74.46)[@]	
	TAPP vs. Lichtenstein	HOSP	At least 5 nights in hospital	NA	1% (1/200)	0% (0/200)	n.s. based on OR=3.02 (95% CI: 0.12 to 74.46)[@]	
	TAPP vs. Lichtenstein	HOSP	At least one night in hospital	NA	12% (23/200)	5% (9/200)	p<0.05 based on OR=2.76 (95% CI: 1.24 to 6.12)[@]	
	TAPP vs. Lichtenstein	RTDA	Among those with unilateral hernia, return to social activities (days)	NA	Median: 5 (SD: NR) (N=159)	Median: 8 (SD: NR) (N=163)	Adjusted Hazard ratio: 0.66 (95% CI: 0.52 to 0.84)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	RTDA	Among those with unilateral hernia, return to usual activities around the house (days)	NA	Median: 2 (SD: NR) (N=160)	Median: 4 (SD: NR) (N=164)	Adjusted Hazard ratio: 0.78 (95% CI: 0.69 to 0.99)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
	TAPP vs. Lichtenstein	RTDA	Return to driving car (days)	NA	Median: 7 (SD: NR) (N=131)	Median: 8.5 (SD: NR) (N=132)	Adjusted Hazard ratio: 0.73 (95% CI: 0.56 to 0.95)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	RTDA	Return to moving freely about the house (days)	NA	Median: 1 (SD: NR) (N=197)	Median: 3 (SD: NR) (N=199)	Adjusted Hazard ratio: 0.52 (95% CI: 0.40 to 0.67)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
	TAPP vs. Lichtenstein	RTDA	Return to walking short distances (days)	NA	Median: 3 (SD: NR) (N=197)	Median: 4 (SD: NR) (N=199)	Adjusted Hazard ratio: 0.51 (95% CI: 0.40 to 0.65)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	RTW	Full return to active or heavy work (days)	NA	Median: 21 (SD: NR) (N=95)	Median: 26 (SD: NR) (N=86)	Adjusted Hazard ratio: 0.89 (95% CI: 0.65 to 1.23)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
	TAPP vs. Lichtenstein	RTW	Full return to sedentary work (days)	NA	Median: 11 (SD: NR) (N=27)	Median: 18 (SD: NR) (N=32)	Adjusted Hazard ratio: 0.43 (95% CI: 0.24 to 0.79)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	RTW	Return to active or heavy work but taking it easy (days)	NA	Median: 17 (SD: NR) (N=95)	Median: 21 (SD: NR) (N=86)	Adjusted Hazard ratio: 0.87 (95% CI: 0.63 to 1.20)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
	TAPP vs. Lichtenstein	RTW	Return to sedentary work but taking it easy (days)	NA	Median: 10 (SD: NR) (N=27)	Median: 14 (SD: NR) (N=32)	Adjusted Hazard ratio: 0.41 (95% CI: 0.23 to 0.75)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
	TAPP vs. Lichtenstein	Pain	Pain: no pain (higher % is better)	one hour	34% (67/198)	78% (154/197)	p<0.05 based on OR=0.14 (95% CI: 0.09 to 0.22)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: no pain (higher % is better)	half an hour	37% (73/198)	79% (157/199)	p<0.05 based on OR=0.16 (95% CI: 0.1 to 0.24)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	Pain	Pain: no pain (higher % is better)	two hours	37% (74/199)	66% (129/194)	p<0.05 based on OR=0.3 (95% CI: 0.2 to 0.45)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: no pain (higher % is better)	four hours	44% (62/142)	56% (60/108)	NS based on OR=0.62 (95% CI: 0.37 to 1.03)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0 (higher % is better)	one day	4% (8/197)	3% (5/198)	NS based on OR=1.63 (95% CI: 0.53 to 5.08)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 1 2 3 4 or 5	one day	69% (135/197)	33% (66/198)	p<0.05 based on OR=4.35 (95% CI: 2.86 to 6.64)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10	one day	27% (54/197)	64% (127/198)	p<0.05 based on OR=0.21 (95% CI: 0.14 to 0.32)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: no analgesia required (higher % is better)	during hospital stay	66% (132/200)	84% (167/200)	p<0.05 based on OR=0.38 (95% CI: 0.24 to 0.62)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0 (higher % is better)	four days	11% (21/197)	4% (8/198)	p<0.05 based on OR=2.83 (95% CI: 1.22 to 6.56)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 1 2 3 4 or 5	four days	78% (153/197)	70% (138/198)	NS based on OR=1.51 (95% CI: 0.96 to 2.38)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10	four days	12% (23/197)	26% (52/198)	p<0.05 based on OR=0.37 (95% CI: 0.22 to 0.64)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0 (higher % is better)	one week	18% (36/196)	12% (24/196)	NS based on OR=1.61 (95% CI: 0.92 to 2.82)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 1 2 3 4 or 5	one week	78% (153/196)	80% (157/196)	NS based on OR=0.88 (95% CI: 0.54 to 1.44)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10	one week	4% (7/196)	8% (15/196)	NS based on OR=0.45 (95% CI: 0.18 to 1.12)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0 (higher % is better)	two weeks	23% (44/188)	21% (40/192)	NS based on OR=1.16 (95% CI: 0.71 to 1.89)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 1 2 3 4 or 5	two weeks	72% (136/188)	70% (135/192)	NS based on OR=1.1 (95% CI: 0.71 to 1.72)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10	two weeks	4% (8/188)	9% (17/192)	NS based on OR=0.46 (95% CI: 0.19 to 1.09)[@]	
	TAPP vs. Lichtenstein	Pain	Groin or thigh pain	one week or one month or three months	57% (104/182)	76% (133/176)	p<0.05 based on OR=0.43 (95% CI: 0.27 to 0.68)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 0 (higher % is better)	four weeks	37% (60/164)	40% (69/174)	NS based on OR=0.88 (95% CI: 0.57 to 1.36)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 1 2 3 4 or 5	four weeks	59% (96/164)	57% (99/174)	NS based on OR=1.07 (95% CI: 0.69 to 1.65)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10	four weeks	5% (8/164)	3% (6/174)	NS based on OR=1.44 (95% CI: 0.49 to 4.23)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: Groin	Mean: 5.8 years	2% (2/122)	10% (12/120)	p<0.05 based on OR=0.15 (95% CI: 0.03 to 0.69)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10	Mean: 5.8 years	0% (0/122)	5% (6/120)	NS based on OR=0.07 (95% CI: 0 to 1.29)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10 at rest	Mean: 5.8 years	0% (0/122)	2% (2/120)	NS based on OR=0.19 (95% CI: 0.01 to 4.07)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score 6 7 8 9 or 10 on movement	Mean: 5.8 years	0% (0/122)	3% (4/120)	NS based on OR=0.11 (95% CI: 0.01 to 1.98)[@]	
	TAPP vs. Lichtenstein	Pain	Testicular pain	Mean: 5.8 years	3% (4/122)	5% (6/120)	NS based on OR=0.64 (95% CI: 0.18 to 2.34)[@]	
	TAPP vs. Lichtenstein	ADV	Injury to vas deferens	Intraoperative	0% (0/200)	1% (1/200)	NS based on OR=0.33 (95% CI: 0.01 to 8.19)[@]	
	TAPP vs. Lichtenstein	ADV	Visceral injury	Intraoperative	0% (0/200)	0% (0/200)	NS based on OR=1 (95% CI: 0.02 to 50.65)[@]	
	TAPP vs. Lichtenstein	ADV	Felt sick/dizzy/ headache	one hour	25% (50/198)	6% (12/197)	p<0.05 based on OR=4.41 (95% CI: 2.46 to 7.91)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	ADV	Felt sick/dizzy/ headache	half an hour	29% (58/198)	9% (17/198)	p<0.05 based on OR=5.21 (95% CI: 2.68 to 10.14)[@]	
	TAPP vs. Lichtenstein	ADV	Felt sick/dizzy/ headache	two hours	23% (45/198)	5% (10/194)	p<0.05 based on OR=5.41 (95% CI: 2.64 to 11.1)[@]	
	TAPP vs. Lichtenstein	ADV	Sore throat	one week	6% (11/200)	1% (1/200)	p<0.05 based on OR=11.58 (95% CI: 1.48 to 90.58)[@]	
	TAPP vs. Lichtenstein	ADV	Mortality	one month	0% (0/200)	1% (1/200)	NS based on OR=0.33 (95% CI: 0.01 to 8.19)[@]	
	TAPP vs. Lichtenstein	ADV	Bruising or severe groin swelling	three months	59% (107/182)	66% (117/176)	NS based on OR=0.72 (95% CI: 0.47 to 1.11)[@]	
	TAPP vs. Lichtenstein	ADV	Constipation	three months	18% (32/182)	32% (56/176)	p<0.05 based on OR=0.46 (95% CI: 0.28 to 0.75)[@]	
	TAPP vs. Lichtenstein	ADV	Intestinal obstruction	three months	0% (0/182)	0% (0/176)	NS based on OR=0.97 (95% CI: 0.02 to 49.01)[@]	
	TAPP vs. Lichtenstein	ADV	Local numbness	three months	2% (3/182)	21% (37/176)	p<0.05 based on OR=0.06 (95% CI: 0.02 to 0.21)[@]	
	TAPP vs. Lichtenstein	ADV	Port site hernia	three months	0% (0/182)	0% (0/176)	NS based on OR=0.97 (95% CI: 0.02 to 49.01)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Douek et al., 2003[674,675] (continued)	TAPP vs. Lichtenstein	ADV	Swelling genital	three months	27% (49/182)	43% (76/176)	p<0.05 based on OR=0.48 (95% CI: 0.31 to 0.75)[@]	
	TAPP vs. Lichtenstein	ADV	Testicular atrophy	three months	0% (0/182)	1% (2/176)	NS based on OR=0.19 (95% CI: 0.01 to 4.01)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	three months	7% (12/182)	3% (5/176)	NS based on OR=2.41 (95% CI: 0.83 to 7)[@]	
	TAPP vs. Lichtenstein	ADV	Wound infection	three months	3% (6/182)	11% (19/176)	p<0.05 based on OR=0.28 (95% CI: 0.11 to 0.72)[@]	
	TAPP vs. Lichtenstein	ADV	Numbness	Mean: 5.8 years	2% (3/122)	23% (27/120)	p<0.05 based on OR=0.09 (95% CI: 0.03 to 0.3)[@]	
	TAPP vs. Lichtenstein	ADV	Paresthesia, clinically important	Mean: 5.8 years	0% (0/122)	10% (12/120)	p<0.05 based on OR=0.04 (95% CI: 0 to 0.61)[@]	
	TAPP vs. Lichtenstein	ADV	Removal of infected mesh	Mean: 5.8 years	0% (0/122)	1% (1/120)	NS based on OR=0.33 (95% CI: 0.01 to 8.06)[@]	
	TAPP vs. Lichtenstein	ADV	Testicular atrophy	Mean: 5.8 years	1% (1/122)	3% (3/120)	NS based on OR=0.32 (95% CI: 0.03 to 3.14)[@]	
	TAPP vs. Lichtenstein	ADV	Umbilical hernia	Mean: 5.8 years	1% (1/122)	0% (0/120)	NS based on OR=2.98 (95% CI: 0.12 to 73.77)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682]	TEP vs. Lichtenstein	RC	Hernia recurrence	one year	2% (11/546)	1% (3/577)	p<0.05 based on OR=3.93 (95% CI: 1.09 to 14.18)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	two years	2% (11/545)	1% (3/581)	p<0.05 based on OR=3.97 (95% CI: 1.1 to 14.3)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	three years	2% (11/554)	1% (5/589)	NS based on OR=2.37 (95% CI: 0.82 to 6.85)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	Median: 5.1 years (Range: 4.4 to 9.1)	4% (21/600)	1% (7/583)	p<0.05 based on OR=2.98 (95% CI: 1.26 to 7.08)[@]	Ns calculated based on reported counts and percentages
	TEP vs. Lichtenstein	HOSP	At least one night in hospital	NA	91% (605/665)	91% (642/706)	NS based on OR=1.01 (95% CI: 0.69 to 1.45)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay >24 hours	NA	100% (665/665)	99% (700/706)	n.s. based on OR=12.35 (95% CI: 0.69 to 219.67)[@]	
	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function)	one week	Median: 3 (Range: 3-9) (N=571)	Median: 3 (Range: 3-9) (N=612)	NR	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 3	one week	71% (405/571)	55% (336/612)	p<0.05 based on OR=2 (95% CI: 1.58 to 2.55)[@]	Ns calculated based on reported %s and counts

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 4	one week	15% (84/571)	20% (122/612)	p<0.05 based on OR=0.69 (95% CI: 0.51 to 0.94)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 5	one week	7% (39/571)	10% (61/612)	NS based on OR=0.66 (95% CI: 0.44 to 1.01)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 6	one week	6% (32/571)	10% (63/612)	p<0.05 based on OR=0.52 (95% CI: 0.33 to 0.8)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 7	one week	2% (11/571)	3% (18/612)	NS based on OR=0.65 (95% CI: 0.3 to 1.38)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 8	one week	0% (0/571)	1% (8/612)	n.s. based on OR=0.06 (95% CI: 0 to 1.08)[@]	Ns calculated based on reported %s and counts

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function): Score of 9	one week	0% (0/571)	1% (4/612)	n.s. based on OR=0.12 (95% CI: 0.01 to 2.2)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	RTDA	Return to full activity (days)	NA	26 (SD: 22.6) (Ns NR)	37.2 (SD: 28) (Ns NR)	p<0.001 t-test	
	TEP vs. Lichtenstein	RTDA	Return to full activity (days)	NA	Median: 20 (SD: NR, Range: 0-179) (Ns NR)	Median: 31 (SD: NR, Range: 0-163) (Ns NR)	p<0.001 Mann Whitney	
	TEP vs. Lichtenstein	RTW	Return to heavy work (days)	NA	Median: 12 (Range: 0-62) (N=166)	Median: 17 (Range: 0-54) (N=171)	p<0.001 Mann Whitney	
	TEP vs. Lichtenstein	RTW	Return to light work (days)	NA	Median: 4.5 (Range: 0-77) (N=192)	Median: 7 (Range: 0-37) (N=228)	p<0.001 Mann Whitney	
	TEP vs. Lichtenstein	RTW	Return to moderate work (days)	NA	Median: 8 (Range: 0-39) (N=159)	Median: 13 (Range: 0-55) (N=151)	p<0.001 Mann Whitney	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	9.3 (SD: 8.4) (N=517)	12.6 (SD: 8.4) (N=550)	p<0.001 t-test	
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	one day	2.8 (SD: NR) (Ns NR)	4.7 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 3 of the article.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS	one day	40.3 (SD: NR) (Ns NR)	60.1 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 2 of the article.
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	two days	2 (SD: NR) (Ns NR)	3.9 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 3 of the article.
	TEP vs. Lichtenstein	Pain	Pain: VAS	two days	31.2 (SD: NR) (Ns NR)	45.7 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 2 of the article.
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	three days	1.4 (SD: NR) (Ns NR)	3.1 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 3 of the article.
	TEP vs. Lichtenstein	Pain	Pain: VAS	three days	21.4 (SD: NR) (Ns NR)	39.4 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 2 of the article.
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	five days	0.9 (SD: NR) (Ns NR)	1.7 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 3 of the article.
	TEP vs. Lichtenstein	Pain	Pain: VAS	five days	12 (SD: NR) (Ns NR)	21.7 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 2 of the article.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	Pain	Pain	one week	2% (9/571)	1% (8/612)	NS based on OR=1.21 (95% CI: 0.46 to 3.16)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	one week	0.5 (SD: NR) (N=571)	1.2 (SD: NR) (N=612)	p<0.001, Mann Whitney	Estimated based on Figure 3 of the article. Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	Pain	Pain: VAS	one week	7.3 (SD: NR) (N=571)	12.1 (SD: NR) (N=612)	p<0.001, Mann Whitney	Estimated based on Figure 2 of the article. Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	Pain	Pain: VAS	two weeks	0 (SD: NR) (Ns NR)	7.3 (SD: NR) (Ns NR)	p<0.001, Mann Whitney	Estimated based on Figure 2 of the article.
	TEP vs. Lichtenstein	Pain	Pain: VAS	four weeks	NR (SD: NR) (Ns NR)	NR (SD: NR) (Ns NR)	Data not reported, but p=0.002, unclear if this result combined timepoints	
	TEP vs. Lichtenstein	Pain	Pain: VAS	six weeks	NR (SD: NR) (Ns NR)	NR (SD: NR) (Ns NR)	Data not reported, but p=0.002, unclear if this result combined timepoints	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS	two months	NR (SD: NR) (Ns NR)	NR (SD: NR) (Ns NR)	Data not reported, but p=0.002, unclear if this result combined timepoints	
	TEP vs. Lichtenstein	Pain	Neuralgia	three months	1% (3/589)	1% (8/618)	NS based on OR=0.39 (95% CI: 0.1 to 1.48)[@]	
	TEP vs. Lichtenstein	Pain	Pain from staple requiring reoperation	three months	0% (1/589)	0% (0/618)	NS based on OR=3.15 (95% CI: 0.13 to 77.56)[@]	
	TEP vs. Lichtenstein	Pain	Pain or discomfort	three months	8% (45/589)	8% (51/618)	NS based on OR=0.92 (95% CI: 0.61 to 1.4)[@]	
	TEP vs. Lichtenstein	Pain	Pain: VAS	three months	NR (SD: NR) (N=589)	NR (SD: NR) (N=618)	Data not reported, but p=0.011	
	TEP vs. Lichtenstein	Pain	Pain chronic	one year	11% (60/546)	22% (125/577)	p<0.05 based on OR=0.45 (95% CI: 0.32 to 0.62)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic mild	one year	8% (45/546)	15% (84/577)	p<0.05 based on OR=0.53 (95% CI: 0.36 to 0.77)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic moderate or severe	one year	3% (15/546)	7% (41/577)	p<0.05 based on OR=0.37 (95% CI: 0.2 to 0.68)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	two years	11% (60/545)	25% (144/581)	p<0.05 based on OR=0.38 (95% CI: 0.27 to 0.52)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	Pain	Pain chronic mild	two years	7% (38/545)	18% (107/581)	p<0.05 based on OR=0.33 (95% CI: 0.22 to 0.49)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic moderate or severe	two years	4% (22/545)	6% (37/581)	NS based on OR=0.62 (95% CI: 0.36 to 1.06)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	three years	10% (55/554)	20% (119/589)	p<0.05 based on OR=0.44 (95% CI: 0.31 to 0.61)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic mild	three years	8% (45/554)	16% (96/589)	p<0.05 based on OR=0.45 (95% CI: 0.31 to 0.66)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic moderate or severe	three years	2% (10/554)	4% (23/589)	p<0.05 based on OR=0.45 (95% CI: 0.21 to 0.96)[@]	
	TEP vs. Lichtenstein	Pain	Neuralgia requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	0% (0/616)	0% (1/659)	NS based on OR=0.36 (95% CI: 0.01 to 8.76)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	Median: 5.1 years (Range: 4.4 to 9.1)	9% (58/616)	19% (124/659)	p<0.05 based on OR=0.45 (95% CI: 0.3 to 0.67)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	Median: 5.1 years (Range: 4.4 to 9.1)	9% (43/457)	19% (78/415)	p<0.05 based on OR=0.45 (95% CI: 0.32 to 0.63)[@]	Ns calculated based on reported counts and percentages
	TEP vs. Lichtenstein	Pain	Pain chronic mild	Median: 5.1 years (Range: 4.4 to 9.1)	7% (46/616)	15% (101/659)	p<0.05 based on OR=0.45 (95% CI: 0.31 to 0.64)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	Pain	Pain chronic moderate or severe	Median: 5.1 years (Range: 4.4 to 9.1)	2% (12/616)	3% (23/659)	NS based on OR=0.55 (95% CI: 0.27 to 1.11)[@]	
	TEP vs. Lichtenstein	ADV	Anesthesia related complications, major	intraoperative	0% (1/665)	0% (1/706)	NS based on OR=1.06 (95% CI: 0.07 to 17.01)[@]	
	TEP vs. Lichtenstein	ADV	Major hemorrhage	intraoperative	0% (0/665)	0% (1/706)	NS based on OR=0.35 (95% CI: 0.01 to 8.69)[@]	
	TEP vs. Lichtenstein	ADV	Minor bleeding from epigastric vessels	intraoperative	1% (6/665)	1% (4/706)	NS based on OR=1.6 (95% CI: 0.45 to 5.69)[@]	
	TEP vs. Lichtenstein	ADV	Minor nerve injury	intraoperative	0% (0/665)	1% (9/706)	p<0.05 based on OR=0.06 (95% CI: 0 to 0.95)[@]	
	TEP vs. Lichtenstein	ADV	Minor technical problem	intraoperative	2% (12/665)	0% (0/706)	p<0.05 based on OR=27.03 (95% CI: 1.6 to 457.42)[@]	
	TEP vs. Lichtenstein	ADV	Reoperation with 24 hours	intraoperative	0% (1/665)	0% (0/706)	NS based on OR=3.19 (95% CI: 0.13 to 78.44)[@]	
	TEP vs. Lichtenstein	ADV	Anesthesia related complications	at discharge	2% (10/665)	1% (9/706)	NS based on OR=1.18 (95% CI: 0.48 to 2.93)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	at discharge	2% (10/665)	1% (10/706)	NS based on OR=1.06 (95% CI: 0.44 to 2.57)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	ADV	Mortality	at discharge	0% (0/665)	0% (0/706)	NS based on OR=1.06 (95% CI: 0.02 to 53.58)[@]	
	TEP vs. Lichtenstein	ADV	Other complications (specifics not reported)	at discharge	0% (1/665)	0% (0/706)	NS based on OR=3.19 (95% CI: 0.13 to 78.44)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	at discharge	4% (28/665)	8% (53/706)	p<0.05 based on OR=0.54 (95% CI: 0.34 to 0.87)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma ≥50 cm2	one week	11% (60/571)	13% (79/612)	NS based on OR=0.79 (95% CI: 0.55 to 1.13)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Mortality	one week	0% (0/571)	0% (0/612)	NS based on OR=1.07 (95% CI: 0.02 to 54.11)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Other complications (specifics not reported)	one week	1% (4/571)	0% (0/612)	NS based on OR=9.71 (95% CI: 0.52 to 180.83)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Reoperation	one week	0% (1/571)	0% (1/612)	NS based on OR=1.07 (95% CI: 0.07 to 17.18)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Seroma	one week	1% (5/571)	1% (5/612)	NS based on OR=1.07 (95% CI: 0.31 to 3.72)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Superficial infection/ cystitis	one week	1% (8/571)	1% (4/612)	NS based on OR=2.16 (95% CI: 0.65 to 7.21)[@]	Ns calculated based on reported %s and counts

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	ADV	Testicular discomfort	one week	1% (7/571)	1% (4/612)	NS based on OR=1.89 (95% CI: 0.55 to 6.48)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Urinary tract discomfort	one week	1% (5/571)	1% (6/612)	NS based on OR=0.89 (95% CI: 0.27 to 2.94)[@]	Ns calculated based on reported %s and counts
	TEP vs. Lichtenstein	ADV	Any major complications	three months	1% (8/665)	0% (3/706)	NS based on OR=2.85 (95% CI: 0.75 to 10.8)[@]	
	TEP vs. Lichtenstein	ADV	Infection	three months	0% (1/589)	1% (4/618)	NS based on OR=0.26 (95% CI: 0.03 to 2.34)[@]	
	TEP vs. Lichtenstein	ADV	Numbness	three months	1% (3/589)	4% (22/618)	p<0.05 based on OR=0.14 (95% CI: 0.04 to 0.47)[@]	
	TEP vs. Lichtenstein	ADV	Orchitis	three months	0% (0/589)	0% (2/618)	NS based on OR=0.21 (95% CI: 0.01 to 4.37)[@]	
	TEP vs. Lichtenstein	ADV	Other complications (specifics not reported)	three months	1% (8/589)	1% (5/618)	NS based on OR=1.69 (95% CI: 0.55 to 5.19)[@]	
	TEP vs. Lichtenstein	ADV	Scrotal discomfort	three months	3% (16/589)	1% (6/618)	p<0.05 based on OR=2.85 (95% CI: 1.11 to 7.33)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	three months	1% (4/589)	0% (1/618)	NS based on OR=4.22 (95% CI: 0.47 to 37.86)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2006[679-682] (continued)	TEP vs. Lichtenstein	ADV	Sex-related complaints	three months	0% (1/589)	0% (2/618)	NS based on OR=0.52 (95% CI: 0.05 to 5.79)[@]	
	TEP vs. Lichtenstein	ADV	Small bowel obstruction requiring reoperation	three months	0% (1/589)	0% (0/618)	NS based on OR=3.15 (95% CI: 0.13 to 77.56)[@]	
	TEP vs. Lichtenstein	ADV	Abdominal surgery requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	0% (3/616)	0% (0/659)	NS based on OR=7.52 (95% CI: 0.39 to 145.98)[@]	
	TEP vs. Lichtenstein	ADV	Bleeding: Hemorrhage not requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	0% (2/616)	0% (0/659)	NS based on OR=5.37 (95% CI: 0.26 to 112)[@]	
	TEP vs. Lichtenstein	ADV	Hydrocele requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	0% (1/616)	0% (1/659)	NS based on OR=1.07 (95% CI: 0.07 to 17.14)[@]	
	TEP vs. Lichtenstein	ADV	Ischaemic orchitis requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	0% (0/616)	0% (1/659)	NS based on OR=0.36 (95% CI: 0.01 to 8.76)[@]	
	TEP vs. Lichtenstein	ADV	Mortality	Median: 5.1 years (Range: 4.4 to 9.1)	2% (16/665)	1% (9/705)	NS based on OR=1.91 (95% CI: 0.84 to 4.34)[@]	
	TEP vs. Lichtenstein	ADV	Subcutaneous abscess not requiring reoperation	Median: 5.1 years (Range: 4.4 to 9.1)	0% (1/616)	0% (0/659)	n.s. based on OR=3.21 (95% CI: 0.13 to 79.06)[@]	
Gokalp et al., 2003[700]	TEP vs. Lichtenstein	RC	Hernia recurrence	Median: 18 months	0% (0/61)	0% (0/62)	n.s. based on OR=1.02 (95% CI: 0.02 to 52.03)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gokalp et al., 2003[700] (continued)	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	2 (SD: 1; Range: 1-7) (N=61)	2 (SD: 1; Range: 2-6) (N=62)	NR	
	TEP vs. Lichtenstein	RTDA	Time until the end of limited daily activities (days)	NA	2 (SD: 1) (N=61)	3 (SD: 2) (N=62)	p>0.05 by t-test	
	TEP vs. Lichtenstein	RTW	Time to return to work	NA	13 (SD: 6) (N=61)	18 (SD: 8) (N=62)	p<0.05 by t-test	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest (0-10 scale)	six hours	Median: 4 (Range: 2-5) (N=61)	Median: 4 (Range: 3-5) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest (0-10 scale)	12 hours	Median: 4 (Range: 2-5) (N=61)	Median: 4 (Range: 2-5) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS in exercise (0-10 scale)	12 hours	Median: 5 (Range: 3-6) (N=61)	Median: 5 (Range: 3-7) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest (0-10 scale)	one day	Median: 3 (Range: 2-4) (N=61)	Median: 4 (Range: 2-5) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS in exercise (0-10 scale)	one day	Median: 4 (Range: 2-5) (N=61)	Median: 4 (Range: 3-5) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest (0-10 scale)	two days	Median: 3 (Range: 2-4) (N=61)	Median: 3 (Range: 2-4) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS in exercise (0-10 scale)	two days	Median: 3 (Range: 2-4) (N=61)	Median: 4 (Range: 2-5) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest (0-10 scale)	one week	Median: 2 (Range: 1-3) (N=61)	Median: 2 (Range: 1-4) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS in exercise (0-10 scale)	one week	Median: 2 (Range: 1-3) (N=61)	Median: 2 (Range: 1-3) (N=62)	p=n.s. by Wilcoxon rank sum test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gokalp et al., 2003[700] (continued)	TEP vs. Lichtenstein	Pain	Pain VAS at rest (0-10 scale)	one month	Median: 1 (Range: 1-3) (N=61)	Median: 1 (Range: 1-2) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain VAS in exercise (0-10 scale)	one month	Median: 1 (Range: 1-3) (N=61)	Median: 1 (Range: 1-2) (N=62)	p=n.s. by Wilcoxon rank sum test	
	TEP vs. Lichtenstein	Pain	Pain/ tenderness persistent	Median: 18 months	2% (1/61)	0% (0/62)	n.s. based on OR=3.1 (95% CI: 0.12 to 77.58)[@]	
	TEP vs. Lichtenstein	Pain	Pain: Number of days taking oral analgesics	NA	2 (SD: NR) (N=61)	2 (SD: NR) (N=62)	p>0.05 by t-test	
	TEP vs. Lichtenstein	Pain	Pain: Number of postoperative intramuscular analgesic injections	NR	3.7 (SD: NR) (N=61)	4.3 (SD: NR) (N=62)	p>0.05 by t-test	
	TEP vs. Lichtenstein	ADV	Epigastric vessel bleeding	intraoperative	3% (2/61)	0% (0/62)	n.s. based on OR=5.25 (95% CI: 0.25 to 111.69)[@]	
	TEP vs. Lichtenstein	ADV	Ilioinguinal nerve divided	intraoperative	0% (0/61)	2% (1/62)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.34)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	Median: 18 months	7% (4/61)	5% (3/62)	NS based on OR=1.38 (95% CI: 0.3 to 6.44)[@]	
	TEP vs. Lichtenstein	ADV	Hydrocele	Median: 18 months	2% (1/61)	2% (1/62)	NS based on OR=1.02 (95% CI: 0.06 to 16.63)[@]	
	TEP vs. Lichtenstein	ADV	Paresthesia	Median: 18 months	2% (1/61)	3% (2/62)	NS based on OR=0.5 (95% CI: 0.04 to 5.66)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gokalp et al., 2003[700] (continued)	TEP vs. Lichtenstein	ADV	Seroma	Median: 18 months	8% (5/61)	5% (3/62)	NS based on OR=1.76 (95% CI: 0.4 to 7.69)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	Median: 18 months	5% (3/61)	6% (4/62)	NS based on OR=0.75 (95% CI: 0.16 to 3.5)[@]	
	TEP vs. Lichtenstein	ADV	Wound erythema	Median: 18 months	3% (2/61)	2% (1/62)	NS based on OR=2.07 (95% CI: 0.18 to 23.42)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	Median: 18 months	0% (0/61)	3% (2/62)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.18)[@]	
Gong et al., 2011[701]	TAPP vs. Mesh plug	RC	Hernia recurrence	Mean: 15.6 months (SD: 8.5, Range: 4-35)	0% (0/50)	0% (0/62)	n.s. based on OR=1.24 (95% CI: 0.02 to 63.48)[@]	
	TAPP vs. Mesh plug	HOSP	Hospital stay (days)	NA	3.4 (SD: 1.7) (N=50)	5 (SD: 2.5) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.614 TAPP vs. TEP (t-test)	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gong et al., 2011[701] (continued)	TAPP vs. Mesh plug	RTDA	Return to normal activities (days)	NA	6.6 (SD: 1.7) (N=50)	12 (SD: 4) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.978 TAPP vs. TEP (t-test)	
	TAPP vs. Mesh plug	Pain	Pain VAS	one day	1.6 (SD: 0.7) (N=50)	3.1 (SD: 0.9) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.826 TAPP vs. TEP (t-test)	
	TAPP vs. Mesh plug	Pain	Pain VAS	one week	0.3 (SD: 0.5) (N=50)	1.5 (SD: 0.9) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.844 TAPP vs. TEP (t-test)	
	TAPP vs. Mesh plug	ADV	Bowel injury	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/62)	n.s. based on OR=1.24 (95% CI: 0.02 to 63.48)[@]	
	TAPP vs. Mesh plug	ADV	Hematoma	Mean: 15.6 months (SD: 8.5)	0% (0/50)	5% (3/62)	n.s. based on OR=0.17 (95% CI: 0.01 to 3.34)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gong et al., 2011[701] (continued)	TAPP vs. Mesh plug	ADV	Infection	Mean: 15.6 months (SD: 8.5)	2% (1/50)	3% (2/62)	NS based on OR=0.61 (95% CI: 0.05 to 6.95)[@]	
	TAPP vs. Mesh plug	ADV	Ischemic orchitis	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/62)	n.s. based on OR=1.24 (95% CI: 0.02 to 63.48)[@]	
	TAPP vs. Mesh plug	ADV	Port site hernia	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/62)	n.s. based on OR=1.24 (95% CI: 0.02 to 63.48)[@]	
	TAPP vs. Mesh plug	ADV	Small bowel obstruction	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/62)	n.s. based on OR=1.24 (95% CI: 0.02 to 63.48)[@]	
	TAPP vs. Mesh plug	ADV	Testicular atrophy	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/62)	n.s. based on OR=1.24 (95% CI: 0.02 to 63.48)[@]	
	TAPP vs. Mesh plug	ADV	Urinary retention	Mean: 15.6 months (SD: 8.5)	6% (3/50)	3% (2/62)	NS based on OR=1.91 (95% CI: 0.31 to 11.93)[@]	
	TAPP vs. Mesh plug	ADV	Wound healing problems	Mean: 15.6 months (SD: 8.5)	4% (2/50)	5% (3/62)	NS based on OR=0.82 (95% CI: 0.13 to 5.1)[@]	
	TEP vs. Mesh plug	RC	Hernia recurrence	Mean: 15.6 months (SD: 8.5, Range: 4-35)	0% (0/52)	0% (0/62)	n.s. based on OR=1.19 (95% CI: 0.02 to 61.04)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gong et al., 2011[701] (continued)	TEP vs. Mesh plug	HOSP	Hospital stay (days)	NA	3.6 (SD: 1.6) (N=52)	5 (SD: 2.5) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.614 TAPP vs. TEP (t-test)	
	TEP vs. Mesh plug	RTDA	Return to normal activities (days)	NA	6.6 (SD: 1.5) (N=52)	12 (SD: 4) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.978 TAPP vs. TEP (t-test)	
	TEP vs. Mesh plug	Pain	Pain VAS	one day	1.7 (SD: 0.7) (N=52)	3.1 (SD: 0.9) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.826 TAPP vs. TEP (t-test)	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gong et al., 2011[701] (continued)	TEP vs. Mesh plug	Pain	Pain VAS	one week	0.3 (SD: 0.5) (N=52)	1.5 (SD: 0.9) (N=62)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.844 TAPP vs. TEP (t-test)	
	TEP vs. Mesh plug	ADV	Bowel injury	Mean: 15.6 months (SD: 8.5)	0% (0/52)	0% (0/62)	n.s. based on OR=1.19 (95% CI: 0.02 to 61.04)[@]	
	TEP vs. Mesh plug	ADV	Hematoma	Mean: 15.6 months (SD: 8.5)	4% (2/52)	5% (3/62)	NS based on OR=0.79 (95% CI: 0.13 to 4.9)[@]	
	TEP vs. Mesh plug	ADV	Infection	Mean: 15.6 months (SD: 8.5)	0% (0/52)	3% (2/62)	n.s. based on OR=0.23 (95% CI: 0.01 to 4.91)[@]	
	TEP vs. Mesh plug	ADV	Ischemic orchitis	Mean: 15.6 months (SD: 8.5)	0% (0/52)	0% (0/62)	n.s. based on OR=1.19 (95% CI: 0.02 to 61.04)[@]	
	TEP vs. Mesh plug	ADV	Port site hernia	Mean: 15.6 months (SD: 8.5)	0% (0/52)	0% (0/62)	n.s. based on OR=1.19 (95% CI: 0.02 to 61.04)[@]	
	TEP vs. Mesh plug	ADV	Small bowel obstruction	Mean: 15.6 months (SD: 8.5)	0% (0/52)	0% (0/62)	n.s. based on OR=1.19 (95% CI: 0.02 to 61.04)[@]	
	TEP vs. Mesh plug	ADV	Testicular atrophy	Mean: 15.6 months (SD: 8.5)	0% (0/52)	0% (0/62)	n.s. based on OR=1.19 (95% CI: 0.02 to 61.04)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gong et al., 2011[701] (continued)	TEP vs. Mesh plug	ADV	Urinary retention	Mean: 15.6 months (SD: 8.5)	8% (4/52)	3% (2/62)	NS based on OR=2.5 (95% CI: 0.44 to 14.23)[@]	
	TEP vs. Mesh plug	ADV	Wound healing problems	Mean: 15.6 months (SD: 8.5)	2% (1/52)	5% (3/62)	NS based on OR=0.39 (95% CI: 0.04 to 3.82)[@]	
Gunal et al., 2007[702]	TAPP vs. Lichtenstein	RC	Hernia recurrence	TAPP: 87.59 months (±2.77, but authors didn't define "±"); TEP: 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	3% (1/39)	7% (3/42)	NS based on OR=0.34 (95% CI: 0.03 to 3.44)[@]	
	TAPP vs. Lichtenstein	Pain	Pain VAS	six hours	6 (SD: 1.4) (N=39)	7.3 (SD: 1.6) (N=42)	F=12.754, p<0.001, ANOVA	
	TAPP vs. Lichtenstein	Pain	Pain VAS	two days	3.25 (SD: 1) (N=39)	4.8 (SD: 1.4) (N=42)	F=14.460, p<0.001, ANOVA	
	TAPP vs. Lichtenstein	ADV	Any complications	postoperative	5% (2/39)	21% (9/42)	NS based on OR=0.27 (95% CI: 0.07 to 1.06)[@]	
	TAPP vs. Lichtenstein	ADV	Any complications	perioperative	8% (3/39)	24% (10/42)	p<0.05 based on OR=0.2 (95% CI: 0.04 to 0.98)[@]	
	TAPP vs. Lichtenstein	ADV	Hematoma in penis	postoperative	0% (0/39)	2% (1/42)	n.s. based on OR=0.35 (95% CI: 0.01 to 8.85)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TAPP vs. Lichtenstein	ADV	Hematoma incisional	postoperative	0% (0/39)	0% (0/42)	n.s. based on OR=1.08 (95% CI: 0.02 to 55.54)[@]	
	TAPP vs. Lichtenstein	ADV	Inferior epigastric vessel bleeding	perioperative	8% (3/39)	10% (4/42)	NS based on OR=0.79 (95% CI: 0.17 to 3.79)[@]	
	TAPP vs. Lichtenstein	ADV	Nerve injury ilioinguinal	perioperative	0% (0/39)	7% (3/42)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.86)[@]	
	TAPP vs. Lichtenstein	ADV	Other complications (specifics not reported)	postoperative	0% (0/39)	0% (0/42)	n.s. based on OR=1.08 (95% CI: 0.02 to 55.54)[@]	
	TAPP vs. Lichtenstein	ADV	pampinioform plexus bleeding	perioperative	0% (0/39)	5% (2/42)	n.s. based on OR=0.21 (95% CI: 0.01 to 4.41)[@]	
	TAPP vs. Lichtenstein	ADV	scrotal edema	postoperative	0% (0/39)	17% (7/42)	n.s. based on OR=0.06 (95% CI: 0 to 1.09)[@]	
	TAPP vs. Lichtenstein	ADV	Subcutenous emphysema	postoperative	3% (1/39)	0% (0/42)	n.s. based on OR=3.31 (95% CI: 0.13 to 83.74)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	postoperative	3% (1/39)	2% (1/42)	NS based on OR=1.08 (95% CI: 0.07 to 17.86)[@]	
	TAPP vs. Lichtenstein	ADV	Vas deferens injury	perioperative	0% (0/39)	2% (1/42)	n.s. based on OR=0.35 (95% CI: 0.01 to 8.85)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TAPP vs. Nyhus	RC	Hernia recurrence	TAPP: 87.59 months (±2.77, but authors didn't define "±"); TEP: 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	3% (1/39)	3% (1/39)	NS based on OR=1 (95% CI: 0.06 to 16.58)[@]	
	TAPP vs. Nyhus	Pain	Pain VAS	six hours	6 (SD: 1.4) (N=39)	6 (SD: 1.4) (N=39)	F=12.754, p<0.001, ANOVA	
	TAPP vs. Nyhus	Pain	Pain VAS	two days	3.25 (SD: 1) (N=39)	3.7 (SD: 1) (N=39)	F=14.460, p<0.001, ANOVA	
	TAPP vs. Nyhus	ADV	Any complications	perioperative	8% (3/39)	18% (7/39)	NS based on OR=0.38 (95% CI: 0.09 to 1.6)[@]	
	TAPP vs. Nyhus	ADV	Any complications	postoperative	5% (2/39)	5% (2/39)	NS based on OR=1 (95% CI: 0.13 to 7.48)[@]	
	TAPP vs. Nyhus	ADV	Hematoma in penis	postoperative	0% (0/39)	0% (0/39)	n.s. based on OR=1 (95% CI: 0.02 to 51.66)[@]	
	TAPP vs. Nyhus	ADV	Hematoma incisional	postoperative	0% (0/39)	3% (1/39)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.22)[@]	
	TAPP vs. Nyhus	ADV	Inferior epigastric vessel bleeding	perioperative	8% (3/39)	18% (7/39)	NS based on OR=0.38 (95% CI: 0.09 to 1.6)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TAPP vs. Nyhus	ADV	Nerve injury ilioinguinal	perioperative	0% (0/39)	0% (0/39)	NS based on OR=1 (95% CI: 0.02 to 51.66)[@]	
	TAPP vs. Nyhus	ADV	Other complications (specifics not reported)	postoperative	0% (0/39)	0% (0/39)	NS based on OR=1 (95% CI: 0.02 to 51.66)[@]	
	TAPP vs. Nyhus	ADV	pampinioform plexus bleeding	perioperative	0% (0/39)	0% (0/39)	NS based on OR=1 (95% CI: 0.02 to 51.66)[@]	
	TAPP vs. Nyhus	ADV	scrotal edema	postoperative	0% (0/39)	0% (0/39)	NS based on OR=1 (95% CI: 0.02 to 51.66)[@]	
	TAPP vs. Nyhus	ADV	Subcutenous emphysema	postoperative	3% (1/39)	0% (0/39)	NS based on OR=3.08 (95% CI: 0.12 to 77.91)[@]	
	TAPP vs. Nyhus	ADV	Urinary retention	postoperative	3% (1/39)	3% (1/39)	NS based on OR=1 (95% CI: 0.06 to 16.58)[@]	
	TAPP vs. Nyhus	ADV	Vas deferens injury	perioperative	0% (0/39)	0% (0/39)	NS based on OR=1 (95% CI: 0.02 to 51.66)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	TAPP: 87.59 months (±2.77, but authors didn't define "±"); TEP: 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	0% (0/40)	7% (3/42)	NS based on OR=0.14 (95% CI: 0.01 to 2.79)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TEP vs. Lichtenstein	Pain	Pain VAS	six hours	5.5 (SD: 1.2) (N=40)	7.3 (SD: 1.6) (N=42)	F=12.754, p<0.001, anova	
	TEP vs. Lichtenstein	Pain	Pain VAS	two days	3.3 (SD: 1.2) (N=40)	4.8 (SD: 1.4) (N=42)	F=14.460, p<0.001, anova	
	TEP vs. Lichtenstein	ADV	Any complications	postoperative	8% (3/40)	21% (9/42)	NS based on OR=0.3 (95% CI: 0.07 to 1.19)[@]	
	TEP vs. Lichtenstein	ADV	Any complications	perioperative	5% (2/40)	24% (10/42)	p<0.05 based on OR=0.17 (95% CI: 0.03 to 0.83)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma in penis	postoperative	0% (0/40)	2% (1/42)	NS based on OR=0.34 (95% CI: 0.01 to 8.63)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma incisional	postoperative	0% (0/40)	0% (0/42)	NS based on OR=1.05 (95% CI: 0.02 to 54.15)[@]	
	TEP vs. Lichtenstein	ADV	Inferior epigastric vessel bleeding	perioperative	5% (2/40)	10% (4/42)	NS based on OR=0.5 (95% CI: 0.09 to 2.89)[@]	
	TEP vs. Lichtenstein	ADV	Nerve injury ilioinguinal	perioperative	0% (0/40)	7% (3/42)	NS based on OR=0.14 (95% CI: 0.01 to 2.79)[@]	
	TEP vs. Lichtenstein	ADV	Other complications (specifics not reported)	postoperative	5% (2/40)	0% (0/42)	NS based on OR=5.52 (95% CI: 0.26 to 118.61)[@]	
	TEP vs. Lichtenstein	ADV	pampinioform plexus bleeding	perioperative	0% (0/40)	5% (2/42)	NS based on OR=0.2 (95% CI: 0.01 to 4.3)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TEP vs. Lichtenstein	ADV	scrotal edema	postoperative	0% (0/40)	17% (7/42)	NS based on OR=0.06 (95% CI: 0 to 1.06)[@]	
	TEP vs. Lichtenstein	ADV	Subcutenous emphysema	postoperative	0% (0/40)	0% (0/42)	NS based on OR=1.05 (95% CI: 0.02 to 54.15)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	postoperative	3% (1/40)	2% (1/42)	NS based on OR=1.05 (95% CI: 0.06 to 17.4)[@]	
	TEP vs. Lichtenstein	ADV	Vas deferens injury	perioperative	0% (0/40)	2% (1/42)	NS based on OR=0.34 (95% CI: 0.01 to 8.63)[@]	
	TEP vs. Nyhus	RC	Hernia recurrence	TAPP 87.59 months (+/ - 2.77, but authors didn't define "+/ -"); TEP 87.20 months (+/ - 1.1); Lichtenstein 97.71 (+/ - 0.79), Nyhus 99 (+/ - 0.70)	0% (0/40)	3% (1/39)	NS based on OR=0.32 (95% CI: 0.01 to 8.02)[@]	
	TEP vs. Nyhus	Pain	Pain VAS	six hours	5.5 (SD: 1.2) (N=40)	6 (SD: 1.4) (N=39)	F=12.754, p<0.001, anova	
	TEP vs. Nyhus	Pain	Pain VAS	two days	3.3 (SD: 1.2) (N=40)	3.7 (SD: 1) (N=39)	F=14.460, p<0.001, anova	
	TEP vs. Nyhus	ADV	Any complications	perioperative	5% (2/40)	18% (7/39)	NS based on OR=0.24 (95% CI: 0.05 to 1.24)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TEP vs. Nyhus	ADV	Any complications	postoperative	8% (3/40)	5% (2/39)	NS based on OR=1.5 (95% CI: 0.24 to 9.5)[@]	
	TEP vs. Nyhus	ADV	Hematoma in penis	postoperative	0% (0/40)	0% (0/39)	NS based on OR=0.98 (95% CI: 0.02 to 50.37)[@]	
	TEP vs. Nyhus	ADV	Hematoma incisional	postoperative	0% (0/40)	3% (1/39)	NS based on OR=0.32 (95% CI: 0.01 to 8.02)[@]	
	TEP vs. Nyhus	ADV	Inferior epigastric vessel bleeding	perioperative	5% (2/40)	18% (7/39)	NS based on OR=0.24 (95% CI: 0.05 to 1.24)[@]	
	TEP vs. Nyhus	ADV	Nerve injury ilioinguinal	perioperative	0% (0/40)	0% (0/39)	NS based on OR=0.98 (95% CI: 0.02 to 50.37)[@]	
	TEP vs. Nyhus	ADV	Other complications (specifics not reported)	postoperative	5% (2/40)	0% (0/39)	NS based on OR=5.13 (95% CI: 0.24 to 110.36)[@]	
	TEP vs. Nyhus	ADV	pampinioform plexus bleeding	perioperative	0% (0/40)	0% (0/39)	NS based on OR=0.98 (95% CI: 0.02 to 50.37)[@]	
	TEP vs. Nyhus	ADV	scrotal edema	postoperative	0% (0/40)	0% (0/39)	NS based on OR=0.98 (95% CI: 0.02 to 50.37)[@]	
	TEP vs. Nyhus	ADV	Subcutenous emphysema	postoperative	0% (0/40)	0% (0/39)	NS based on OR=0.98 (95% CI: 0.02 to 50.37)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TEP vs. Nyhus	ADV	Urinary retention	postoperative	3% (1/40)	3% (1/39)	NS based on OR=0.97 (95% CI: 0.06 to 16.15)[@]	
	TEP vs. Nyhus	ADV	Vas deferens injury	perioperative	0% (0/40)	0% (0/39)	NS based on OR=0.98 (95% CI: 0.02 to 50.37)[@]	
Hamza et al., 2010[704]	TAPP vs. Lichtenstein	HOSP	At least one night in hospital	NA	12% (3/25)	16% (4/25)	NS based on OR=0.72 (95% CI: 0.14 to 3.59)[@]	
	TAPP vs. Lichtenstein	HOSP	At least two nights in hospital	NA	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
	TAPP vs. Lichtenstein	RTDA	Return to domestic activities (days)	NA	9.8 (SD: 5.979) (N=25)	12.11 (SD: 4.23) (N=25)	t=5.746 p<0.001 comparing the two lap groups with the two open groups	
	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	14.87 (SD: 8.774) (N=25)	15.25 (SD: 2.53) (N=25)	t=5.774 p=<0.001 comparing the two lap groups with the two open groups	
	TAPP vs. Lichtenstein	Pain	Pain VAS	six hours	5.8 (SD: 1.568) (N=25)	6.5 (SD: 3.5) (N=25)	t=3.424 p=0.002 comparing the two lap groups with the two open groups	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704] (continued)	TAPP vs. Lichtenstein	Pain	Pain VAS	two days	4.133 (SD: 1.125) (N=25)	4.63 (SD: 2.22) (N=25)	t=2.438 p=0.020 comparing the two lap groups with the two open groups	
	TAPP vs. Lichtenstein	Pain	Pain: Groin	postoperative	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal hematoma	postoperative	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. Lichtenstein	ADV	Wound infection	postoperative	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
	TAPP vs. OPM	HOSP	At least one night in hospital	NA	12% (3/25)	12% (3/25)	NS based on OR=1 (95% CI: 0.18 to 5.51)[@]	
	TAPP vs. OPM	HOSP	At least two nights in hospital	NA	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. OPM	RTDA	Return to domestic activities (days)	NA	9.8 (SD: 5.979) (N=25)	12.27 (SD: 3.535) (N=25)	t=5.746 p<0.001 comparing the two lap groups with the two open groups	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704] (continued)	TAPP vs. OPM	RTW	Return to work (days)	NA	14.87 (SD: 8.774) (N=25)	16.13 (SD: 3.758) (N=25)	t=5.774 p=<0.001 comparing the two lap groups with the two open groups	
	TAPP vs. OPM	Pain	Pain VAS	six hours	5.8 (SD: 1.568) (N=25)	7.067 (SD: 1.831) (N=25)	t=3.424 p=0.002 comparing the two lap groups with the two open groups	
	TAPP vs. OPM	Pain	Pain VAS	two days	4.133 (SD: 1.125) (N=25)	4.933 (SD: 1.624) (N=25)	t=2.438 p=0.020 comparing the two lap groups with the two open groups	
	TAPP vs. OPM	Pain	Pain: Groin	postoperative	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. OPM	ADV	Scrotal hematoma	postoperative	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
	TAPP vs. OPM	ADV	Wound infection	postoperative	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
	TEP vs. Lichtenstein	HOSP	At least one night in hospital	NA	4% (1/25)	16% (4/25)	NS based on OR=0.22 (95% CI: 0.02 to 2.11)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704] (continued)	TEP vs. Lichtenstein	HOSP	At least two nights in hospital	NA	0% (0/25)	4% (1/25)	NS based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
	TEP vs. Lichtenstein	RTDA	Return to domestic activities (days)	NA	7.53 (SD: 3.65) (N=25)	12.11 (SD: 4.23) (N=25)	t=5.746 p<0.001 comparing the two lap groups with the two open groups	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	13.22 (SD: 7.98) (N=25)	15.25 (SD: 2.53) (N=25)	t=5.774 p=<0.001 comparing the two lap groups with the two open groups	
	TEP vs. Lichtenstein	Pain	Pain VAS	six hours	4.8 (SD: 2.33) (N=25)	6.5 (SD: 3.5) (N=25)	t=3.424 p=0.002 comparing the two lap groups with the two open groups	
	TEP vs. Lichtenstein	Pain	Pain VAS	two days	3.98 (SD: 4.35) (N=25)	4.63 (SD: 2.22) (N=25)	t=2.438 p=0.020 comparing the two lap groups with the two open groups	
	TEP vs. Lichtenstein	Pain	Pain: Groin	postoperative	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	TEP vs. Lichtenstein	ADV	Scrotal hematoma	postoperative	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704] (continued)	TEP vs. Lichtenstein	ADV	Wound infection	postoperative	0% (0/25)	4% (1/25)	NS based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
	TEP vs. OPM	HOSP	At least one night in hospital	NA	4% (1/25)	12% (3/25)	NS based on OR=0.31 (95% CI: 0.03 to 3.16)[@]	
	TEP vs. OPM	HOSP	At least two nights in hospital	NA	0% (0/25)	0% (0/25)	n.s. based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	TEP vs. OPM	RTDA	Return to domestic activities (days)	NA	7.53 (SD: 3.65) (N=25)	12.27 (SD: 3.535) (N=25)	t=5.746 p<0.001 comparing the two lap groups with the two open groups	
	TEP vs. OPM	RTW	Return to work (days)	NA	13.22 (SD: 7.98) (N=25)	16.13 (SD: 3.758) (N=25)	t=5.774 p=<0.001 comparing the two lap groups with the two open groups	
	TEP vs. OPM	Pain	Pain VAS	six hours	4.8 (SD: 2.33) (N=25)	7.067 (SD: 1.831) (N=25)	t=3.424 p=0.002 comparing the two lap groups with the two open groups	
	TEP vs. OPM	Pain	Pain VAS	two days	3.98 (SD: 4.35) (N=25)	4.933 (SD: 1.624) (N=25)	t=2.438 p=0.020 comparing the two lap groups with the two open groups	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704] (continued)	TEP vs. OPM	Pain	Pain: Groin	postoperative	0% (0/25)	0% (0/25)	n.s. based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	TEP vs. OPM	ADV	Scrotal hematoma	postoperative	0% (0/25)	4% (1/25)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
	TEP vs. OPM	ADV	Wound infection	postoperative	0% (0/25)	4% (1/25)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
Heikkinen et al., 1997[705,706]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 10 months	0% (0/20)	0% (0/18)	n.s. based on OR=0.9 (95% CI: 0.02 to 47.82)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	Median: 1.5 (Range: 1-3.5) (N=20)	Median: 1.7 (Range: 1.5-3.5) (N=18)	z=0.5, p=0.6, Mann Whitney	
	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	Median: 14 (Range: 8-26) (N=20)	Median: 19 (Range: 5-40) (N=18)	z=2.2, p=0.03, Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	day of surgery	1.95 (SD: NR) (N=20)	2.06 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	one day	1.9 (SD: NR) (N=20)	2.4 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	one day	3.9 (SD: NR) (N=20)	5.5 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: VAS	day of surgery	3.6 (SD: NR) (N=20)	5.9 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1997[705,706] (continued)	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	two days	1.32 (SD: NR) (N=20)	2.07 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	two days	3.4 (SD: NR) (N=20)	5.1 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	three days	0.95 (SD: NR) (N=20)	1.9 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	three days	2.8 (SD: NR) (N=20)	4.6 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	four days	0.65 (SD: NR) (N=20)	1.4 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	four days	2.7 (SD: NR) (N=20)	4.2 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	five days	0.86 (SD: NR) (N=20)	1.23 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	five days	2.6 (SD: NR) (N=20)	4.3 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	six days	0.52 (SD: NR) (N=20)	1 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	six days	2.6 (SD: NR) (N=20)	3.8 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1997[705,706] (continued)	TAPP vs. Lichtenstein	Pain	Pain continued >1 month	postoperative	0% (0/20)	6% (1/18)	n.s. based on OR=0.28 (95% CI: 0.01 to 7.44)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	one week	0.2 (SD: NR) (N=20)	0.95 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	one week	2.3 (SD: NR) (N=20)	3.6 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	eight days	0.11 (SD: NR) (N=20)	0.72 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	eight days	1.9 (SD: NR) (N=20)	3 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	nine days	0.1 (SD: NR) (N=20)	0.56 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	nine days	1.8 (SD: NR) (N=20)	2.8 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	10 days	0 (SD: NR) (N=20)	0.45 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	10 days	1.6 (SD: NR) (N=20)	2.5 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	11 days	0.1 (SD: NR) (N=20)	0.4 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1997[705,706] (continued)	TAPP vs. Lichtenstein	Pain	Pain: VAS	11 days	1.6 (SD: NR) (N=20)	2.4 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	12 days	0 (SD: NR) (N=20)	0.4 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	12 days	1.3 (SD: NR) (N=20)	2.4 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	13 days	0 (SD: NR) (N=20)	0.3 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: VAS	13 days	1.2 (SD: NR) (N=20)	2.1 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	14 days	0 (SD: NR) (N=20)	0.3 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 2
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	Overall average across the first two weeks	Median: 7.5 (Range: 0-22) (N=20)	Median: 13 (Range: 0-45) (N=18)	z=2.0, p<0.05, Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain: VAS	14 days	1.2 (SD: NR) (N=20)	1.9 (SD: NR) (N=18)	NR	Estimated by ECRI Institute from Figure 1
	TAPP vs. Lichtenstein	Pain	Pain: VAS	Overall average across the first two weeks	Median: 2.2 (Range: 1.3-5) (N=20)	Median: 3.5 (Range: 1.6-5.3) (N=18)	z=3.3, p=0.001, Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain: needed analgesia for >2 weeks	NR	5% (1/20)	17% (3/18)	NS based on OR=0.26 (95% CI: 0.02 to 2.79)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1997[705,706] (continued)	TAPP vs. Lichtenstein	ADV	Any complications	intraoperative	0% (0/20)	0% (0/18)	n.s. based on OR=0.9 (95% CI: 0.02 to 47.82)[@]	
	TAPP vs. Lichtenstein	ADV	Any major complications	postoperative	0% (0/20)	0% (0/18)	n.s. based on OR=0.9 (95% CI: 0.02 to 47.82)[@]	
	TAPP vs. Lichtenstein	ADV	Inguinal numbness	postoperative	0% (0/20)	28% (5/18)	n.s. based on OR=0.06 (95% CI: 0 to 1.17)[@]	
	TAPP vs. Lichtenstein	ADV	Local hematoma	postoperative	10% (2/20)	50% (9/18)	p<0.05 based on OR=0.11 (95% CI: 0.02 to 0.63)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal swelling	postoperative	5% (1/20)	0% (0/18)	n.s. based on OR=2.85 (95% CI: 0.11 to 74.38)[@]	
	TAPP vs. Lichtenstein	ADV	Seroma	postoperative	5% (1/20)	0% (0/18)	n.s. based on OR=2.85 (95% CI: 0.11 to 74.38)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	postoperative	0% (0/20)	0% (0/18)	n.s. based on OR=0.9 (95% CI: 0.02 to 47.82)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	Median: 10 months	0% (0/22)	0% (0/23)	n.s. based on OR=1.04 (95% CI: 0.02 to 54.92)[@]	
	TEP vs. Lichtenstein	HOSP	At least one night in hospital	NA	27% (6/22)	13% (3/23)	NS based on OR=2.5 (95% CI: 0.54 to 11.59)[@]	
Heikkinen et al., 1998[706,707]	TEP vs. Lichtenstein	RTDA	Return to household chores (days)	NA	2.5 (Range: 1-14) (N=22)	6 (Range: 1-31) (N=23)	p=0.004, Mann-Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1998[706,707] (continued)	TEP vs. Lichtenstein	RTDA	Return to normal life (days)	NA	14 (Range: 3-35) (N=22)	20 (Range: 6-46) (N=23)	p=0.02, Mann-Whitney	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	12 (Range: 3-21) (N=22)	17 (Range: 4-31) (N=23)	p=0.01, Mann-Whitney	
	TEP vs. Lichtenstein	Pain	Pain: VAS	day of surgery	5.3 (SD: NR) (N=22)	3.8 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	one day	4 (SD: NR) (N=22)	4.8 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	two days	3 (SD: NR) (N=22)	4 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	three days	2.6 (SD: NR) (N=22)	3.5 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	four days	2.1 (SD: NR) (N=22)	3.1 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	five days	2 (SD: NR) (N=22)	2.9 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	six days	2 (SD: NR) (N=22)	2.8 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: during physical activity	one week	23% (5/22)	83% (19/23)	p<0.05 based on OR=0.06 (95% CI: 0.01 to 0.27)[@]	
	TEP vs. Lichtenstein	Pain	Pain: VAS	one week	1.8 (SD: NR) (N=22)	2.6 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Scrotal tenderness or pain	one week	18% (4/22)	0% (0/23)	n.s. based on OR=11.43 (95% CI: 0.58 to 226.12)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1998[706,707] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS	eight days	1.5 (SD: NR) (N=22)	2.2 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	nine days	1.4 (SD: NR) (N=22)	2 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	10 days	1.3 (SD: NR) (N=22)	2 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	11 days	1.3 (SD: NR) (N=22)	1.9 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	12 days	1.2 (SD: NR) (N=22)	1.7 (SD: NR) (N=23)	p<0.05, t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	13 days	1.1 (SD: NR) (N=22)	1.5 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	14 days	8 (SD: NR) (N=22)	11 (SD: NR) (N=23)	N.S., t-test	
	TEP vs. Lichtenstein	Pain	Pain: VAS	14 days	1.1 (SD: NR) (N=22)	1.4 (SD: NR) (N=23)	N.S., t-test	Estimated by ECRI Institute from Figure 1
	TEP vs. Lichtenstein	Pain	Pain: VAS	Overall average across the first two weeks	1.9 (Range: 1 to 4.5) (N=22)	2.3 (Range: 1.1 to 5.6) (N=23)	p=0.73, t-test	
	TEP vs. Lichtenstein	Pain	Pain: during physical activity	1-2 months	5% (1/22)	30% (7/23)	p<0.05 based on OR=0.11 (95% CI: 0.01 to 0.98)[@]	
	TEP vs. Lichtenstein	Pain	Pain: duration of analgesia (days)	NA	4 (SD: NR) (N=22)	5 (SD: NR) (N=23)	N.S., t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1998[706,707] (continued)	TEP vs. Lichtenstein	Pain	Pain: needed analgesia for >2 weeks	NR	0% (0/22)	9% (2/23)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.21)[@]	
	TEP vs. Lichtenstein	ADV	Atrial fibrillation	recovery room	0% (0/22)	4% (1/23)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.63)[@]	
	TEP vs. Lichtenstein	ADV	Femoral numbness	recovery room	0% (0/22)	9% (2/23)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.21)[@]	
	TEP vs. Lichtenstein	ADV	Inguinal or scrotal bruising	one week	27% (6/22)	39% (9/23)	NS based on OR=0.58 (95% CI: 0.17 to 2.05)[@]	
	TEP vs. Lichtenstein	ADV	Nausea	recovery room	23% (5/22)	4% (1/23)	NS based on OR=6.47 (95% CI: 0.69 to 60.68)[@]	
	TEP vs. Lichtenstein	ADV	Nerve irritation ileoinguinal	one week	0% (0/22)	9% (2/23)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.21)[@]	
	TEP vs. Lichtenstein	ADV	Post spinal typotonia	recovery room	0% (0/22)	4% (1/23)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.63)[@]	
	TEP vs. Lichtenstein	ADV	Scrotal swelling	one week	14% (3/22)	22% (5/23)	NS based on OR=0.57 (95% CI: 0.12 to 2.73)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	one week	5% (1/22)	0% (0/23)	n.s. based on OR=3.28 (95% CI: 0.13 to 84.88)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1998[706,707] (continued)	TEP vs. Lichtenstein	ADV	Tachycardia	recovery room	5% (1/22)	0% (0/23)	n.s. based on OR=3.28 (95% CI: 0.13 to 84.88)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	recovery room	0% (0/22)	4% (1/23)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.63)[@]	
	TEP vs. Lichtenstein	ADV	Wound erythema	one week	0% (0/22)	9% (2/23)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.21)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	one week	9% (2/22)	0% (0/23)	n.s. based on OR=5.73 (95% CI: 0.26 to 126.43)[@]	
	TEP vs. Lichtenstein	ADV	Inguinal numbness	1-2 months	0% (0/22)	13% (3/23)	n.s. based on OR=0.13 (95% CI: 0.01 to 2.68)[@]	
	TEP vs. Lichtenstein	ADV	Nerve neuralgia Ileoinguinal	1-2 months	0% (0/22)	4% (1/23)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.63)[@]	
	TEP vs. Lichtenstein	ADV	Testicular numbness	1-2 months	5% (1/22)	0% (0/23)	n.s. based on OR=3.28 (95% CI: 0.13 to 84.88)[@]	
Heikkinen et al., 1998[706,708]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 17 months (Range: 2-36)	0% (0/20)	0% (0/20)	n.s. based on OR=1 (95% CI: 0.02 to 52.85)[@]	
	TAPP vs. Lichtenstein	HOSP	Among those who did not need a hospital overnight, the number of hours in the hospital	NA	Median: 6.5 (Range: 4-9.75) (N=10)	Median: 3.5 (Range: 1.75-5.75) (N=18)	p<0.001, Mann Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1998[706,708] (continued)	TAPP vs. Lichtenstein	HOSP	At least one night in hospital	NA	44% (8/18)	10% (2/20)	p<0.05 based on OR=7.2 (95% CI: 1.27 to 40.68)[@]	
	TAPP vs. Lichtenstein	RTDA	Return to normal life (days)	NA	Median: 14 (Range: 1-31) (N=18)	Median: 21 (Range: 3-62) (N=20)	N.S., Mann Whitney	
	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	Median: 14 (Range: 7-28) (N=18)	Median: 21 (Range: 1-42) (N=20)	p<0.007, Mann Whitney	Subgroups: The difference was 14 vs. 21 for those doing heavy work, 14 vs. 21 for those doing medium work, and 10.5 vs. 14 for those doing light work
	TAPP vs. Lichtenstein	Pain	Pain for >1 month	postoperative	0% (0/20)	5% (1/20)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.26)[@]	
	TAPP vs. Lichtenstein	Pain	Pain in right shoulder	postoperative	5% (1/20)	0% (0/20)	n.s. based on OR=3.15 (95% CI: 0.12 to 82.17)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of capsules of ketoprofen 100 mg	First two weeks	Median: 10 (Range: 0-56) (N=20)	Median: 10 (Range: 1-47) (N=20)	NR	
	TAPP vs. Lichtenstein	Pain	Pain: VAS	Overall average across the first two weeks	Median: 2 (Range: 1-3.8) (N=20)	Median: 2.1 (Range: 1.3-4.2) (N=20)	p=0.53 Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain: duration of analgesia (days)	NA	Median: 4 (Range: 0-21) (N=20)	Median: 6 (Range: 1-38) (N=20)	p=0.22 Mann Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 1998[706,708] (continued)	TAPP vs. Lichtenstein	Pain	Pain: needed analgesia for >2 weeks	NR	5% (1/20)	5% (1/20)	NS based on OR=1 (95% CI: 0.06 to 17.18)[@]	
	TAPP vs. Lichtenstein	ADV	Bleeding inferior epigastric vein requiring ligation	postoperative	0% (0/20)	5% (1/20)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.26)[@]	
	TAPP vs. Lichtenstein	ADV	Hematoma with evacuation	postoperative	0% (0/20)	5% (1/20)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.26)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal or inguinal numbness	postoperative	0% (0/20)	10% (2/20)	n.s. based on OR=0.18 (95% CI: 0.01 to 4.01)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal or inguinal swelling	postoperative	5% (1/20)	15% (3/20)	NS based on OR=0.3 (95% CI: 0.03 to 3.15)[@]	
	TAPP vs. Lichtenstein	ADV	Seroma with aspiration	postoperative	5% (1/20)	0% (0/20)	NS based on OR=3.15 (95% CI: 0.12 to 82.17)[@]	
	TAPP vs. Lichtenstein	ADV	Testicular hypersensibility or pain	postoperative	5% (1/20)	5% (1/20)	NS based on OR=1 (95% CI: 0.06 to 17.18)[@]	
	TAPP vs. Lichtenstein	ADV	Transient meralgia paresthetica	postoperative	5% (1/20)	0% (0/20)	NS based on OR=3.15 (95% CI: 0.12 to 82.17)[@]	
Johansson et al., 1999[712,713]	TAPP vs. OPM	RC	Hernia recurrence	six months	1% (2/207)	4% (8/199)	NS based on OR=0.23 (95% CI: 0.05 to 1.11)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	RC	Hernia recurrence	one year	2% (4/199)	6% (11/192)	NS based on OR=0.34 (95% CI: 0.11 to 1.08)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTDA	Mild discomfort restricting physical activity at 7 days	one week	55% (113/207)	66% (132/199)	p=0.04 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTDA	Moderate discomfort restricting physical activity	one week	0% (0/207)	0% (0/199)	p=0.04 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTDA	No discomfort restricting physical activity (higher % is better)	one week	41% (85/207)	29% (57/199)	p=0.04 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTDA	Severe discomfort restricting physical activity	one week	5% (10/207)	6% (11/199)	p=0.04 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTDA	Time until full recovery (days)	one week	27% (55/207)	17% (34/199)	p<0.05 based on OR=1.76 (95% CI: 1.09 to 2.84)[@]	Ns estimated by ECRI Institute based on Table 5

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	RTDA	No discomfort restricting physical activity (higher % is better)	two months	96% (199/207)	93% (185/199)	p=n.s. Fisher's exact test	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTDA	Time until full recovery (days)	NA	18.4 (SD: NR) (N=207)	24.2 (SD: NR) (N=199)	p<0.001 for the ratio of the natural logarithm of recovery times; 95% CI: around the ratio of 1.32 was 1.12 to 1.53	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTW	Return to work within 7 days (higher % is better)	one week	27% (55/207)	16% (31/199)	p<0.05 based on OR=1.96 (95% CI: 1.2 to 3.21)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTW	Return to work within 8 weeks (higher % is better)	two months	99% (204/207)	96% (192/199)	NS based on OR=2.48 (95% CI: 0.63 to 9.73)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	RTW	Return to work (days)	NA	14.7 (SD: NR) (N=207)	17.7 (SD: NR) (N=199)	p=0.05 for the ratio of the natural logarithm of sick leave times; 95% CI: around the ratio of 1.20 was 1.00 to 1.39	Ns estimated by ECRI Institute based on Table 5

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	Pain	Pain mild	one week	20% (42/207)	32% (64/199)	p=0.02 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	Pain	Pain moderate	one week	9% (18/207)	8% (16/199)	p=0.02 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	Pain	Pain none (higher % is better)	one week	71% (146/207)	60% (119/199)	p=0.02 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	Pain	Pain severe	one week	0% (1/207)	0% (0/199)	p=0.02 Wilcoxon rank sum test comparing the groups on this ordered response variable	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	Pain	Pain/ tenderness	<8 weeks postoperative	5% (10/207)	1% (1/199)	p<0.05 based on OR=10.05 (95% CI: 1.27 to 79.26)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	Pain	Pain/ tenderness resulting in reoperation	<8 weeks postoperative	0% (1/207)	0% (0/199)	n.s. based on OR=2.9 (95% CI: 0.12 to 71.57)[@]	Ns estimated by ECRI Institute based on Table 5

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	Pain	Pain/ tenderness	one year	3% (5/199)	1% (2/192)	NS based on OR=2.45 (95% CI: 0.47 to 12.77)[@]	Ns estimated by ECRI Institute based on Table 5 and assuming that the 23 patients without one-year followup were evenly distributed among the three groups
	TAPP vs. OPM	ADV	Bleeding	perioperative	1% (2/207)	1% (1/199)	NS based on OR=1.93 (95% CI: 0.17 to 21.47)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Nerve divided	perioperative	0% (0/207)	0% (0/199)	n.s. based on OR=0.96 (95% CI: 0.02 to 48.69)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Urinary bladder injury	perioperative	1% (2/207)	0% (0/199)	n.s. based on OR=4.85 (95% CI: 0.23 to 101.74)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Allergic exanthema	<8 weeks postoperative	0% (1/207)	0% (0/199)	n.s. based on OR=2.9 (95% CI: 0.12 to 71.57)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Hematoma	<8 weeks postoperative	9% (19/207)	14% (28/199)	NS based on OR=0.62 (95% CI: 0.33 to 1.15)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Hematoma resulting in reoperation	<8 weeks postoperative	1% (2/207)	1% (2/199)	n.s. based on OR=0.96 (95% CI: 0.13 to 6.89)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Hematuria	<8 weeks postoperative	0% (1/207)	0% (0/199)	n.s. based on OR=2.9 (95% CI: 0.12 to 71.57)[@]	Ns estimated by ECRI Institute based on Table 5

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	ADV	Infection, deep	<8 weeks postoperative	0% (0/207)	0% (0/199)	n.s. based on OR=0.96 (95% CI: 0.02 to 48.69)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Infection, superficial	<8 weeks postoperative	0% (0/207)	1% (1/199)	n.s. based on OR=0.32 (95% CI: 0.01 to 7.87)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Local swelling	<8 weeks postoperative	2% (4/207)	0% (0/199)	n.s. based on OR=8.82 (95% CI: 0.47 to 164.96)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Omental herniation port	<8 weeks postoperative	0% (1/207)	0% (0/199)	n.s. based on OR=2.9 (95% CI: 0.12 to 71.57)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Omental herniation port resulting in reoperation	<8 weeks postoperative	0% (1/207)	0% (0/199)	n.s. based on OR=2.9 (95% CI: 0.12 to 71.57)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Secretion wound	<8 weeks postoperative	0% (0/207)	1% (1/199)	n.s. based on OR=0.32 (95% CI: 0.01 to 7.87)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Seroma/hydrocele	<8 weeks postoperative	6% (12/207)	5% (9/199)	NS based on OR=1.3 (95% CI: 0.54 to 3.15)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Seroma/hydrocele resulting in reoperation	<8 weeks postoperative	0% (1/207)	0% (0/199)	NS based on OR=2.9 (95% CI: 0.12 to 71.57)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Unclear fever	<8 weeks postoperative	0% (1/207)	1% (1/199)	NS based on OR=0.96 (95% CI: 0.06 to 15.47)[@]	Ns estimated by ECRI Institute based on Table 5

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	ADV	Urinary retention	<8 weeks postoperative	2% (4/207)	1% (1/199)	NS based on OR=3.9 (95% CI: 0.43 to 35.21)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Urinary tract infection	<8 weeks postoperative	0% (0/207)	1% (1/199)	NS based on OR=0.32 (95% CI: 0.01 to 7.87)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Venous thromboembolism	<8 weeks postoperative	0% (0/207)	1% (1/199)	NS based on OR=0.32 (95% CI: 0.01 to 7.87)[@]	Ns estimated by ECRI Institute based on Table 5
	TAPP vs. OPM	ADV	Incisional hernia	one year	1% (1/199)	1% (1/192)	NS based on OR=0.96 (95% CI: 0.06 to 15.53)[@]	Ns estimated by ECRI Institute based on Table 5 and assuming that the 23 patients without one-year followup were evenly distributed among the three groups
	TAPP vs. OPM	ADV	Infection, superficial	one year	1% (1/199)	1% (1/192)	NS based on OR=0.96 (95% CI: 0.06 to 15.53)[@]	Ns estimated by ECRI Institute based on Table 5 and assuming that the 23 patients without one-year followup were evenly distributed among the three groups

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Johansson et al., 1999[712,713] (continued)	TAPP vs. OPM	ADV	Pulmonary embolism	one year	0% (0/199)	0% (0/192)	NS based on OR=0.96 (95% CI: 0.02 to 48.88)[@]	Ns estimated by ECRI Institute based on Table 5 and assuming that the 23 patients without one-year followup were evenly distributed among the three groups
	TAPP vs. OPM	ADV	Seroma/ hydrocele	one year	1% (1/199)	0% (0/192)	NS based on OR=2.91 (95% CI: 0.12 to 71.86)[@]	Ns estimated by ECRI Institute based on Table 5 and assuming that the 23 patients without one-year followup were evenly distributed among the three groups
	TAPP vs. OPM	ADV	Wound healing problems	one year	1% (1/199)	0% (0/192)	NS based on OR=2.91 (95% CI: 0.12 to 71.86)[@]	Ns estimated by ECRI Institute based on Table 5 and assuming that the 23 patients without one-year followup were evenly distributed among the three groups
Khoury et al., 1998[718]	TEP vs. Mesh plug	RC	Hernia recurrence	one year	1% (2/150)	3% (4/142)	NS based on OR=0.47 (95% CI: 0.08 to 2.59)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Khoury et al., 1998[718] (continued)	TEP vs. Mesh plug	RC	Hernia recurrence	Median: 17 months (Range: 2-36)	2% (3/150)	3% (4/142)	NS based on OR=0.7 (95% CI: 0.15 to 3.2)[@]	
	TEP vs. Mesh plug	HOSP	At least one night in hospital	NA	0% (0/150)	1% (1/142)	NS based on OR=0.31 (95% CI: 0.01 to 7.76)[@]	
	TEP vs. Mesh plug	RTW	Time to return to work (days)	NA	Median: 8 (Range: 5-13) (N=150)	Median: 15 (Range: 11-21) (N=142)	p<0.01 by t test	
	TEP vs. Mesh plug	Pain	Inguinal pain	postoperative	2% (3/150)	4% (5/142)	NS based on OR=0.56 (95% CI: 0.13 to 2.38)[@]	
	TEP vs. Mesh plug	Pain	Pain: need for analgesia, number of tablets (acetaminophen + codeine)	postoperative	4 (SD: NR) (N=150)	9 (SD: NR) (N=142)	NR	
	TEP vs. Mesh plug	Pain	Pain: VAS score	postoperative	3 (SD: NR) (N=150)	7 (SD: NR) (N=142)	p<0.01 by t test	
	TEP vs. Mesh plug	ADV	Hematoma	postoperative	4% (6/150)	4% (6/142)	NS based on OR=0.94 (95% CI: 0.3 to 3)[@]	
	TEP vs. Mesh plug	ADV	Major complications requiring reintervention or admission	postoperative	0% (0/150)	0% (0/142)	NS based on OR=0.95 (95% CI: 0.02 to 48.04)[@]	
	TEP vs. Mesh plug	ADV	Mortality	postoperative	0% (0/150)	0% (0/142)	NS based on OR=0.95 (95% CI: 0.02 to 48.04)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Khoury et al., 1998[718] (continued)	TEP vs. Mesh plug	ADV	Swelling of cord	postoperative	7% (11/150)	15% (22/142)	p<0.05 based on OR=0.43 (95% CI: 0.2 to 0.93)[@]	
	TEP vs. Mesh plug	ADV	Wound infection	postoperative	0% (0/150)	0% (0/142)	NS based on OR=0.95 (95% CI: 0.02 to 48.04)[@]	
Koninger et al., 2004[726]	TAPP vs. Lichtenstein	Pain	Pain "I do not feel as well as I used to due to pain in the groin"	Median: 4.33 years (Range: 3.8 to 5)	2% (2/81)	13% (10/76)	p<0.05 based on OR=0.17 (95% CI: 0.04 to 0.79)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I find myself limited in daily life and social activities (walking, carrying bags of groceries, dancing)"	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	0% (0/76)	NS based on OR=0.94 (95% CI: 0.02 to 47.9)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I find myself limited in sports"	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	5% (4/76)	NS based on OR=0.1 (95% CI: 0.01 to 1.87)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I have abandoned sporting activities"	Median: 4.33 years (Range: 3.8 to 5)	1% (1/81)	3% (2/76)	NS based on OR=0.46 (95% CI: 0.04 to 5.21)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I have moderate pain"	Median: 4.33 years (Range: 3.8 to 5)	1% (1/81)	5% (4/76)	NS based on OR=0.23 (95% CI: 0.02 to 2.06)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I have severe pain in the operated-on groin"	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	4% (3/76)	NS based on OR=0.13 (95% CI: 0.01 to 2.54)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I only have slight discomfort" (higher % is better)	Median: 4.33 years (Range: 3.8 to 5)	15% (12/81)	24% (18/76)	NS based on OR=0.56 (95% CI: 0.25 to 1.26)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koninger et al., 2004[726] (continued)	TAPP vs. Lichtenstein	Pain	Pain "Pain usually occurs with medium physical stress (going upstairs or downstairs, entering a car, dancing, etc)"	Median: 4.33 years (Range: 3.8 to 5)	1% (1/81)	7% (5/76)	NS based on OR=0.18 (95% CI: 0.02 to 1.56)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "Pain usually occurs with mild physical exercise (walking without heavy load)"	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	4% (3/76)	NS based on OR=0.13 (95% CI: 0.01 to 2.54)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "Since the operation I have been unable to go to work"	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	3% (2/76)	NS based on OR=0.18 (95% CI: 0.01 to 3.87)[@]	
	TAPP vs. Lichtenstein	Pain	Pain at rest	Median: 4.33 years (Range: 3.8 to 5)	1% (1/81)	3% (2/76)	NS based on OR=0.46 (95% CI: 0.04 to 5.21)[@]	
	TAPP vs. Lichtenstein	Pain	Pain but it is not related to physical exercise	Median: 4.33 years (Range: 3.8 to 5)	5% (4/81)	7% (5/76)	NS based on OR=0.74 (95% CI: 0.19 to 2.86)[@]	
	TAPP vs. Lichtenstein	Pain	Pain none (higher % is better)	Median: 4.33 years (Range: 3.8 to 5)	84% (68/81)	68% (52/76)	p<0.05 based on OR=2.41 (95% CI: 1.12 to 5.19)[@]	
	TAPP vs. Lichtenstein	Pain	Pain "I feel pain only under severe physical stress (carrying heavy loads, intensive sporting activities)" (higher % is better)	Median: 4.33 years (Range: 3.8 to 5)	9% (7/81)	13% (10/76)	NS based on OR=0.62 (95% CI: 0.22 to 1.73)[@]	
	TAPP vs. Lichtenstein	ADV	Foreign body sensation	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	0% (0/76)	NS based on OR=0.94 (95% CI: 0.02 to 47.9)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koninger et al., 2004[726] (continued)	TAPP vs. Lichtenstein	ADV	Stiffness or rigidity in the region of the mesh	Median: 4.33 years (Range: 3.8 to 5)	0% (0/81)	0% (0/76)	NS based on OR=0.94 (95% CI: 0.02 to 47.9)[@]	
Lal et al., 2003[729]	TEP vs. Lichtenstein	RC	Hernia recurrence	Mean: 13 months (Range: 9-18)	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	1.48 (Range: 1-2 days) (N=25)	1.4 (Range: 1-2 days) (N=25)	p=NS	
	TEP vs. Lichtenstein	HOSP	Hospital stay 1 day (higher % is better)	NA	52% (13/25)	60% (15/25)	NS based on OR=0.72 (95% CI: 0.24 to 2.21)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay 2 days	NA	48% (12/25)	40% (10/25)	NS based on OR=1.38 (95% CI: 0.45 to 4.25)[@]	
	TEP vs. Lichtenstein	RTW	Return to manual work (days)	NA	12.13 (SD: 5.1) (N=15)	20.93 (SD: 4.0) (N=15)	p<0.001, Mann-Whitney	
	TEP vs. Lichtenstein	RTW	Return to office work (days)	NA	13.8 (SD: 9.6) (N=10)	16.8 (SD: 3.7) (N=10)	p<0.05, Mann-Whitney	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	12.8 (SD: 7.1) (N=25)	19.3 (SD: 4.3) (N=25)	p<0.001, Mann-Whitney	
	TEP vs. Lichtenstein	Pain	Pain: VAS	12 hours	2.64 (SD: 1.4) (N=25)	3.52 (SD: 1.7) (N=25)	p<0.04, Mann-Whitney	
	TEP vs. Lichtenstein	Pain	Pain: VAS	one day	1.76 (SD: 1.4) (N=25)	2.74 (SD: 1.5) (N=25)	p<0.01, Mann-Whitney	
	TEP vs. Lichtenstein	Pain	Pain: VAS	two days	1.4 (SD: 1.5) (N=25)	1.8 (SD: 1.0) (N=25)	p=0.06, Mann-Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lal et al., 2003[729] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS	three days	0.72 (SD: 1.4) (N=25)	1.08 (SD: 1.1) (N=25)	p=0.06, Mann-Whitney	
	TEP vs. Lichtenstein	Pain	Neuralgia	postoperative	8% (2/25)	0% (0/25)	n.s. based on OR=5.43 (95% CI: 0.25 to 118.96)[@]	
	TEP vs. Lichtenstein	Pain	Pain: Number of 50 mg Voveran tablets	one week	2.6 (SD: 2.29) (N=25)	5.76 (SD: 3.49) (N=25)	p<0.001, Mann-Whitney	
	TEP vs. Lichtenstein	Pain	Pain: VAS	one week	0.36 (SD: 0.8) (N=25)	0.6 (SD: 1.0) (N=25)	p=N.S., Mann-Whitney	
	TEP vs. Lichtenstein	ADV	Minor peritoneal breach	Intraoperative	20% (5/25)	0% (0/25)	n.s. based on OR=13.68 (95% CI: 0.71 to 262.19)[@]	
	TEP vs. Lichtenstein	ADV	Minor wound infection	postoperative	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
	TEP vs. Lichtenstein	ADV	Scrotal hematoma	postoperative	0% (0/25)	8% (2/25)	n.s. based on OR=0.18 (95% CI: 0.01 to 4.04)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	postoperative	12% (3/25)	0% (0/25)	n.s. based on OR=7.93 (95% CI: 0.39 to 162.07)[@]	
	TEP vs. Lichtenstein	ADV	Subcutaneous emphysema subsiding within 24 hours	postoperative	24% (6/25)	0% (0/25)	n.s. based on OR=17 (95% CI: 0.9 to 320.38)[@]	
	TEP vs. Lichtenstein	ADV	Transient pneumoscrotum	postoperative	16% (4/25)	0% (0/25)	n.s. based on OR=10.67 (95% CI: 0.54 to 209.66)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736]	TEP vs. Lichtenstein	RC	Hernia recurrence	one year	1% (3/264)	2% (5/231)	NS based on OR=0.52 (95% CI: 0.12 to 2.2)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	Median: 49 months	4% (10/264)	3% (7/231)	NS based on OR=1.26 (95% CI: 0.47 to 3.37)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	1.6 (SD: NR) (N=323)	1.6 (SD: NR) (N=317)	p=0.6, Mann Whitney	
	TEP vs. Lichtenstein	RTDA	Problem to bow and pick up	one week	56% (180/322)	73% (227/311)	p=0.042, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to carry 5 kg for 10 meters	one week	42% (135/322)	57% (177/311)	p=0.001, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to get dressed/ undressed	one week	21% (68/322)	42% (131/311)	p=0.037, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	RTDA	Problem to get in/ out of bed	one week	20% (64/322)	40% (124/311)	p=0.086, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to walk	one week	24% (77/322)	54% (168/311)	p=0.013, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to walk fast	one week	83% (267/322)	94% (292/311)	p=0.023, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to bow and pick up	four weeks	18% (51/282)	26% (70/269)	p=0.042, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	RTDA	Problem to carry 5 kg for 10 meters	four weeks	11% (31/282)	23% (62/269)	p=0.001, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to get dressed/ undressed	four weeks	2% (6/282)	6% (16/269)	p=0.037, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to get in/ out of bed	four weeks	2% (6/282)	4% (11/269)	p=0.086, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTDA	Problem to walk	four weeks	7% (20/282)	14% (38/269)	p=0.013, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	RTDA	Problem to walk fast	four weeks	50% (141/282)	61% (164/269)	p=0.023, chi square test, but it is unclear whether this analysis included multiple timepoints	Count estimates from reported percentage in Table 3
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	7 (SD: NR) (N=322)	9.8 (SD: NR) (N=311)	p=0.01 Mann Whitney	Converted to days from reported weeks
	TEP vs. Lichtenstein	Pain	Pain: need for analgesics (scale not reported)	one day	NR (SD: NR) (N=323)	NR (SD: NR) (N=317)	Less in TEP group, p=0.001	
	TEP vs. Lichtenstein	Pain	Pain: VAS	one day	3.3 (SD: NR) (N=323)	4.7 (SD: NR) (N=317)	"overall" p<0.001, not clear if this analysis included multiple timepoints	
	TEP vs. Lichtenstein	Pain	Pain: need for analgesics (scale not reported)	two days	NR (SD: NR) (N=323)	NR (SD: NR) (N=317)	Less in TEP group, p=0.003	
	TEP vs. Lichtenstein	Pain	Pain: VAS	two days	2.4 (SD: NR) (N=323)	3.7 (SD: NR) (N=317)	"overall" p<0.001, not clear if this analysis included multiple timepoints	
	TEP vs. Lichtenstein	Pain	Pain: need for analgesics (scale not reported)	three days	NR (SD: NR) (N=323)	NR (SD: NR) (N=317)	Less in TEP group, p=0.001	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	Pain	Pain: VAS	three days	1.8 (SD: NR) (N=323)	2.9 (SD: NR) (N=317)	"overall" p<0.001, not clear if this analysis included multiple timepoints	
	TEP vs. Lichtenstein	Pain	Pain: VAS	one week	1.2 (SD: NR) (N=322)	1.9 (SD: NR) (N=311)	"overall" p<0.001, not clear if this analysis included multiple timepoints	
	TEP vs. Lichtenstein	Pain	Pain: VAS	four weeks	0.4 (SD: NR) (N=282)	0.6 (SD: NR) (N=269)	"overall" p<0.001, not clear if this analysis included multiple timepoints	
	TEP vs. Lichtenstein	Pain	Pain: any	six weeks	23% (64/282)	32% (87/269)	p<0.05 based on OR=0.61 (95% CI: 0.42 to 0.9)[@]	
	TEP vs. Lichtenstein	Pain	Pain: any	one year	25% (65/264)	28% (65/231)	NS based on OR=0.83 (95% CI: 0.56 to 1.25)[@]	
	TEP vs. Lichtenstein	Pain	Pain: at the scar	one year	2% (6/264)	6% (15/231)	p<0.05 based on OR=0.33 (95% CI: 0.13 to 0.88)[@]	
	TEP vs. Lichtenstein	Pain	Pain: Chronic pain requiring reoperation	Median: 49 months	0% (1/264)	0% (1/231)	NS based on OR=0.87 (95% CI: 0.05 to 14.06)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	ADV	Airway infection	early postoperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	
	TEP vs. Lichtenstein	ADV	Allergic reaction to Kefzol	perioperative	0% (0/323)	0% (1/317)	NS based on OR=0.33 (95% CI: 0.01 to 8.04)[@]	
	TEP vs. Lichtenstein	ADV	Arrhythmia	perioperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	
	TEP vs. Lichtenstein	ADV	Bladder lesion	perioperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	
	TEP vs. Lichtenstein	ADV	Epididymitis	early postoperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	
	TEP vs. Lichtenstein	ADV	Epigastric vessel bleeding	perioperative	4% (12/323)	1% (4/317)	NS based on OR=3.02 (95% CI: 0.96 to 9.46)[@]	
	TEP vs. Lichtenstein	ADV	Flebitis	early postoperative	1% (2/323)	0% (1/317)	NS based on OR=1.97 (95% CI: 0.18 to 21.82)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	early postoperative	21% (67/323)	21% (65/317)	NS based on OR=1.01 (95% CI: 0.69 to 1.49)[@]	
	TEP vs. Lichtenstein	ADV	Hypercapnia	perioperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	ADV	Hypertension	perioperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	
	TEP vs. Lichtenstein	ADV	Ligation vas deferens	perioperative	0% (1/323)	0% (0/317)	NS based on OR=2.95 (95% CI: 0.12 to 72.78)[@]	
	TEP vs. Lichtenstein	ADV	Material failure	perioperative	1% (2/323)	0% (0/317)	NS based on OR=4.94 (95% CI: 0.24 to 103.26)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	early postoperative	6% (20/323)	8% (24/317)	NS based on OR=0.81 (95% CI: 0.44 to 1.49)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	early postoperative	2% (6/323)	0% (1/317)	NS based on OR=5.98 (95% CI: 0.72 to 49.97)[@]	
	TEP vs. Lichtenstein	ADV	Urinary tract infection	early postoperative	2% (5/323)	0% (1/317)	NS based on OR=4.97 (95% CI: 0.58 to 42.77)[@]	
	TEP vs. Lichtenstein	ADV	Wound dehiscence	early postoperative	1% (3/323)	1% (2/317)	NS based on OR=1.48 (95% CI: 0.25 to 8.9)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection light	early postoperative	2% (6/323)	3% (11/317)	NS based on OR=0.53 (95% CI: 0.19 to 1.44)[@]	
	TEP vs. Lichtenstein	ADV	Impaired inguinal sensibility	one year	7% (19/264)	30% (69/231)	p<0.05 based on OR=0.18 (95% CI: 0.11 to 0.31)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langeveld et al., 2010[736] (continued)	TEP vs. Lichtenstein	ADV	Bleeding requiring reoperation	Median: 49 months	0% (1/264)	0% (1/231)	NS based on OR=0.87 (95% CI: 0.05 to 14.06)[@]	
	TEP vs. Lichtenstein	ADV	Femoral hernia requiring reoperation	Median: 49 months	0% (1/264)	0% (1/231)	NS based on OR=0.87 (95% CI: 0.05 to 14.06)[@]	
	TEP vs. Lichtenstein	ADV	Fibrosis scar requiring reoperation	Median: 49 months	0% (1/264)	0% (1/231)	NS based on OR=0.87 (95% CI: 0.05 to 14.06)[@]	
	TEP vs. Lichtenstein	ADV	Micturation/ erection problems	Median: 49 months	2% (5/264)	2% (5/231)	NS based on OR=0.87 (95% CI: 0.25 to 3.05)[@]	
Lau et al., 2006[739]	TEP vs. Lichtenstein	RC	Hernia recurrence	one year	0% (0/91)	0% (0/83)	NS based on OR=0.91 (95% CI: 0.02 to 46.51)[@]	
	TEP vs. Lichtenstein	HOSP	At least one night in hospital	NA	2% (2/100)	1% (1/100)	NS based on OR=2.02 (95% CI: 0.18 to 22.65)[@]	
	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	0.154 (SD: 0.045) (N=100)	0.154 (SD: 0.045) (N=100)	p=0.701, t-test	Converted to days from reported hours
	TEP vs. Lichtenstein	RTDA	Time to urinate (hours)	NA	3.7 (SD: 1.08) (N=100)	3.7 (SD: 1.09) (N=100)	p=0.703, t-test	
	TEP vs. Lichtenstein	RTDA	Time to walk (hours)	NA	2.6 (SD: 0.68) (N=100)	2.6 (SD: 0.6) (N=100)	p=0.730, t-test	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	8.6 (SD: 4.8) (N=44)	14 (SD: 11) (N=39)	p=0.006 t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lau et al., 2006[739] (continued)	TEP vs. Lichtenstein	Pain	Pain VAS at rest	same day of operation	2 (95% CI: 1.6 to 2.4) (N=100)	2.6 (95% CI: 2.1 to 3.1) (N=100)	p<0.05, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	one day	2.1 (95% CI: 1.8 to 2.5) (N=100)	2.8 (95% CI: 2.4 to 3.3) (N=100)	p<0.05, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	same day of operation	3.5 (95% CI: 3 to 4) (N=100)	3.4 (95% CI: 2.8 to 4) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	one day	3.5 (95% CI: 3 to 3.9) (N=100)	3.6 (95% CI: 3.1 to 4.2) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	two days	1.8 (95% CI: 1.5 to 2.1) (N=100)	2.2 (95% CI: 1.8 to 2.6) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	two days	2.9 (95% CI: 2.4 to 3.3) (N=100)	3.2 (95% CI: 2.7 to 3.7) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lau et al., 2006[739] (continued)	TEP vs. Lichtenstein	Pain	Pain VAS at rest	three days	1.5 (95% CI: 1.1 to 1.8) (N=100)	1.8 (95% CI: 1.4 to 2.1) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	three days	2.4 (95% CI: 2 to 2.9) (N=100)	2.7 (95% CI: 2.2 to 3.1) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	four days	1.1 (95% CI: 0.9 to 1.4) (N=100)	1.5 (95% CI: 1.3 to 1.9) (N=100)	p<0.05, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	four days	2.2 (95% CI: 1.8 to 2.6) (N=100)	2.4 (95% CI: 2 to 2.7) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	five days	0.9 (95% CI: 0.6 to 1.1) (N=100)	1.3 (95% CI: 1 to 1.5) (N=100)	p<0.05, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	five days	1.7 (95% CI: 1.3 to 2.1) (N=100)	2.1 (95% CI: 1.8 to 2.4) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lau et al., 2006[739] (continued)	TEP vs. Lichtenstein	Pain	Pain VAS at rest	six days	0.7 (95% CI: 0.5 to 1) (N=100)	1.1 (95% CI: 0.9 to 1.4) (N=100)	p<0.05, t-test	Means and 95% CIs estimated based on Figure 2 of the article
	TEP vs. Lichtenstein	Pain	Pain VAS on coughing	six days	1.4 (95% CI: 1.1 to 1.7) (N=100)	1.8 (95% CI: 1.5 to 2.2) (N=100)	p NS, t-test	Means and 95% CIs estimated based on Figure 3 of the article
	TEP vs. Lichtenstein	Pain	Pain: any chronic pain	one year	10% (9/91)	22% (18/83)	p<0.05 based on OR=0.4 (95% CI: 0.17 to 0.94)[@]	
	TEP vs. Lichtenstein	Pain	Pain: Chronic pain requiring oral analgesia	one year	3% (3/91)	10% (8/83)	NS based on OR=0.32 (95% CI: 0.08 to 1.25)[@]	
	TEP vs. Lichtenstein	ADV	Urinary bladder injury	intraoperative	0% (0/100)	1% (1/100)	NS based on OR=0.33 (95% CI: 0.01 to 8.2)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	postoperative	0% (0/100)	1% (1/100)	NS based on OR=0.33 (95% CI: 0.01 to 8.2)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	postoperative	14% (14/100)	8% (8/100)	NS based on OR=1.87 (95% CI: 0.75 to 4.68)[@]	
	TEP vs. Lichtenstein	ADV	Superficial wound dehiscence	postoperative	0% (0/100)	3% (3/100)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.72)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lau et al., 2006[739] (continued)	TEP vs. Lichtenstein	ADV	Transient lateral thigh numbness	postoperative	1% (1/100)	0% (0/100)	n.s. based on OR=3.03 (95% CI: 0.12 to 75.28)[@]	
	TEP vs. Lichtenstein	ADV	Urinary tract infection	postoperative	0% (0/100)	1% (1/100)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.2)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	postoperative	0% (0/100)	2% (2/100)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.14)[@]	
MRC et al., 1999[747,753-760]	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	RC	hernia recurrence	one year	2% (7/362)	0% (0/349)	n.s. based on OR=14.75 (95% CI: 0.84 to 259.2)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	HOSP	Hospital stay (days)	NA	Median: 1 (IQR: 1 to 1) (N=462)	Median: 1 (IQR: 1 to 2) (N=453)	p=0.008 Mann Whitney	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	RTDA	Time to be able to enjoy usual interests or hobbies (days)	NA	Median: 14 (IQR: 10 to 30) (N=284)	Median: 21 (IQR: 10 to 42) (N=254)	p=0.049 log rank test	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	RTDA	Time to be able to enjoy usual sex life (days)	NA	Median: 18 (IQR: 10 to 34) (N=208)	Median: 21 (IQR: 14 to 40) (N=206)	p=0.245 log rank test	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	RTDA	Time to be able to enjoy usual social life (days)	NA	Median: 10 (IQR: 7 to 21) (N=314)	Median: 14 (IQR: 7 to 28) (N=276)	p=0.010 log rank test	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	RTDA	Time to be able to look after the house (days)	NA	Median: 10 (IQR: 6 to 21) (N=273)	Median: 14 (IQR: 7 to 27) (N=263)	p=0.004 log rank test	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	RTW	Return to work (days)	NA	Median: 28 (IQR: 14 to 42) (N=162)	Median: 42 (IQR: 21 to 61) (N=153)	p=0.001 log rank test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	SFN	Satisfaction: recovery faster than expected (higher % is better)	three years	59% (200/338)	45% (140/309)	p<0.05 based on OR=1.75 (95% CI: 1.28 to 2.39)[@]	Counts calculated based on reported percentages
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	SFN	Satisfaction: very satisfied with the appearance of operation scars (higher % is better)	three years	82% (278/338)	71% (218/309)	p<0.05 based on OR=1.93 (95% CI: 1.33 to 2.8)[@]	Counts calculated based on reported percentages
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	SFN	Satisfaction: would recommend the operation they received to another person (higher % is better)	three years	91% (309/338)	91% (282/309)	NS based on OR=1.02 (95% CI: 0.59 to 1.77)[@]	Counts calculated based on reported percentages
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	SFN	Satisfaction:described life as “much better” (higher % is better)	three years	62% (211/338)	61% (190/309)	NS based on OR=1.04 (95% CI: 0.76 to 1.43)[@]	Counts calculated based on reported percentages
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: VAS at rest	six hours	Median: 12 (IQR: 6.8 to 20) (N=60)	Median: 19 (IQR: 7.5 to 37) (N=60)	p=0.02 Mann Whitney	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: VAS at rest	six hours	Median: 21.5 (IQR: 9.8 to 32.5) (N=60)	Median: 25 (IQR: 14.8 to 52.5) (N=60)	p=0.04 Mann Whitney	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: still using oral analgesia	one day	68% (21/31)	85% (28/33)	NS based on OR=0.38 (95% CI: 0.11 to 1.26)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: VAS when moving	one day	Median: 35 (IQR: 17.5 to 62) (N=60)	Median: 63 (IQR: 23.2 to 81) (N=60)	p=0.0002 Mann Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: VAS when moving	one day	Median: 48.5 (IQR: 22.7 to 61.5) (N=60)	Median: 73.5 (IQR: 43.8 to 84.2) (N=60)	p=0.0039 Mann Whitney	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: still using oral analgesia	three days	48% (15/31)	70% (23/33)	NS based on OR=0.41 (95% CI: 0.15 to 1.13)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: still using oral analgesia	one week	52% (31/60)	63% (38/60)	NS based on OR=0.62 (95% CI: 0.3 to 1.28)[@]	Counts calculated based on reported percentages
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: any in the past week	one year	29% (113/394)	37% (133/362)	p<0.05 based on OR=0.69 (95% CI: 0.51 to 0.94)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: any	one year	28% (108/390)	36% (129/362)	p<0.05 based on OR=0.69 (95% CI: 0.51 to 0.94)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: mild	one year	11% (43/390)	15% (55/362)	chi square test of linear trend comparing groups, X^2=2.11, p=0.146	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: severe	one year	4% (15/390)	1% (5/362)	chi square test of linear trend comparing groups, X^2=2.11, p=0.146	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very mild	one year	13% (50/390)	18% (66/362)	chi square test of linear trend comparing groups, X^2=2.11, p=0.146	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very severe	one year	0% (0/390)	1% (3/362)	chi square test of linear trend comparing groups, X^2=2.11, p=0.146	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in testicles: any	one year	21% (82/390)	19% (68/362)	NS based on OR=1.15 (95% CI: 0.8 to 1.65)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: severe groin pain in the last week	one year	0% (0/394)	1% (3/362)	NS based on OR=0.13 (95% CI: 0.01 to 2.53)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: testicles	one year	22% (82/372)	19% (68/349)	NS based on OR=1.17 (95% CI: 0.81 to 1.68)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: any	two years	24% (87/358)	29% (95/323)	NS based on OR=0.77 (95% CI: 0.55 to 1.08)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: mild	two years	8% (28/358)	10% (33/323)	chi square test of linear trend comparing groups, X^2=1.90, p=0.169	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: severe	two years	2% (8/358)	2% (8/323)	chi square test of linear trend comparing groups, X^2=1.90, p=0.169	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very mild	two years	14% (50/358)	16% (53/323)	chi square test of linear trend comparing groups, X^2=1.90, p=0.169	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very severe	two years	0% (1/358)	0% (1/323)	chi square test of linear trend comparing groups, X^2=1.90, p=0.169	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in testicles: any	two years	19% (68/358)	19% (60/323)	NS based on OR=1.03 (95% CI: 0.7 to 1.51)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: any	three years	20% (68/337)	27% (82/309)	NS based on OR=0.7 (95% CI: 0.48 to 1.01)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: mild	three years	9% (30/337)	12% (38/309)	chi square test of linear trend comparing groups, X^2=4.03, p=0.045	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: severe	three years	1% (3/337)	2% (6/309)	chi square test of linear trend comparing groups, X^2=4.03, p=0.045	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very mild	three years	10% (35/337)	12% (38/309)	chi square test of linear trend comparing groups, X^2=4.03, p=0.045	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very severe	three years	0% (0/337)	0% (0/309)	chi square test of linear trend comparing groups, X^2=4.03, p=0.045	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in testicles: any	three years	19% (63/337)	16% (50/309)	NS based on OR=1.19 (95% CI: 0.79 to 1.79)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: any	five years	18% (51/282)	20% (54/269)	NS based on OR=0.88 (95% CI: 0.57 to 1.35)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: mild	five years	7% (20/282)	10% (26/269)	chi square test of linear trend comparing groups, X^2=0.30, p=0.583	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: severe	five years	2% (6/282)	1% (4/269)	chi square test of linear trend comparing groups, X^2=0.30, p=0.583	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very mild	five years	9% (25/282)	9% (24/269)	chi square test of linear trend comparing groups, X^2=0.30, p=0.583	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in groin: very severe	five years	0% (0/282)	0% (0/269)	chi square test of linear trend comparing groups, X^2=0.30, p=0.583	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	Pain	Pain: in testicles: any	five years	18% (52/282)	13% (34/269)	NS based on OR=1.56 (95% CI: 0.98 to 2.5)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Bladder injury	Intraoperative	0% (1/462)	0% (0/453)	NS based on OR=2.95 (95% CI: 0.12 to 72.56)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Damage to vas deferens or testicular vessels	Intraoperative	1% (5/462)	1% (3/453)	NS based on OR=1.64 (95% CI: 0.39 to 6.91)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Diathermy burn	Intraoperative	0% (1/462)	0% (1/453)	NS based on OR=0.98 (95% CI: 0.06 to 15.72)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Epigastric vessel injury	Intraoperative	3% (16/462)	0% (1/453)	p<0.05 based on OR=16.22 (95% CI: 2.14 to 122.79)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Lateral cutaneous nerve injury	Intraoperative	0% (1/462)	0% (0/453)	NS based on OR=2.95 (95% CI: 0.12 to 72.56)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Left common iliac artery injury	Intraoperative	0% (1/462)	0% (0/453)	NS based on OR=2.95 (95% CI: 0.12 to 72.56)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Small bowel injury	Intraoperative	0% (0/462)	0% (1/453)	NS based on OR=0.33 (95% CI: 0.01 to 8.03)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Any complications	one week	30% (108/361)	44% (155/356)	p<0.05 based on OR=0.55 (95% CI: 0.41 to 0.75)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Chest infection	one week	1% (5/361)	3% (11/356)	NS based on OR=0.44 (95% CI: 0.15 to 1.28)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Deep vein thrombosis	one week	0% (0/361)	0% (1/356)	NS based on OR=0.33 (95% CI: 0.01 to 8.07)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Genital oedema/ orchitis/epididymitis	one week	7% (27/361)	10% (34/356)	NS based on OR=0.77 (95% CI: 0.45 to 1.3)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Necrosis of uvula	one week	0% (1/361)	0% (0/356)	NS based on OR=2.97 (95% CI: 0.12 to 73.07)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Scrotal hematoma	one week	5% (18/361)	5% (19/356)	NS based on OR=0.93 (95% CI: 0.48 to 1.8)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Scrotal hydrocele	one week	1% (5/361)	1% (3/356)	NS based on OR=1.65 (95% CI: 0.39 to 6.97)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Small bowel obstruction	one week	0% (1/361)	0% (0/356)	NS based on OR=2.97 (95% CI: 0.12 to 73.07)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Urinary retention	one week	3% (10/361)	2% (7/356)	NS based on OR=1.42 (95% CI: 0.53 to 3.77)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Urinary tract infection	one week	1% (2/361)	1% (2/356)	NS based on OR=0.99 (95% CI: 0.14 to 7.04)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Wound hematoma	one week	7% (27/361)	16% (56/356)	p<0.05 based on OR=0.43 (95% CI: 0.27 to 0.7)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Wound infection	one week	3% (10/361)	3% (11/356)	NS based on OR=0.89 (95% CI: 0.37 to 2.13)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Wound seroma	one week	7% (24/361)	11% (38/356)	NS based on OR=0.6 (95% CI: 0.35 to 1.02)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	New contralateral hernia	one year	3% (10/362)	4% (12/339)	NS based on OR=0.77 (95% CI: 0.33 to 1.82)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin in the past week	one year	18% (71/394)	40% (143/362)	p<0.05 based on OR=0.34 (95% CI: 0.24 to 0.47)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: any	one year	18% (71/392)	40% (143/361)	p<0.05 based on OR=0.34 (95% CI: 0.24 to 0.47)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: extreme	one year	1% (2/392)	1% (4/361)	chi square test of linear trend comparing groups, X^2=29.97, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: moderate	one year	4% (16/392)	7% (27/361)	chi square test of linear trend comparing groups, X^2=29.97, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: quite a lot	one year	2% (8/392)	4% (16/361)	chi square test of linear trend comparing groups, X^2=29.97, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: slight	one year	11% (45/392)	27% (96/361)	chi square test of linear trend comparing groups, X^2=29.97, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness down thigh in the past week	one year	14% (56/394)	11% (40/362)	NS based on OR=1.33 (95% CI: 0.86 to 2.06)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness down thigh: any	one year	14% (56/392)	11% (40/361)	NS based on OR=1.34 (95% CI: 0.87 to 2.06)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	paraumbilical hernia	one year	0% (1/362)	0% (0/339)	NS based on OR=2.82 (95% CI: 0.11 to 69.4)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Port site hernia	one year	1% (2/362)	0% (0/339)	NS based on OR=4.71 (95% CI: 0.23 to 98.44)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Testicular atrophy	one year	1% (2/337)	1% (3/334)	NS based on OR=0.66 (95% CI: 0.11 to 3.97)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Wound sinus	one year	0% (0/362)	0% (0/339)	NS based on OR=0.94 (95% CI: 0.02 to 47.33)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: any	two years	14% (51/358)	36% (115/322)	p<0.05 based on OR=0.3 (95% CI: 0.21 to 0.43)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: extreme	two years	0% (1/358)	1% (2/322)	chi square test of linear trend comparing groups, X^2=36.01, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: moderate	two years	2% (7/358)	6% (20/322)	chi square test of linear trend comparing groups, X^2=36.01, p<0.001	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: quite a lot	two years	1% (3/358)	3% (9/322)	chi square test of linear trend comparing groups, X^2=36.01, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: slight	two years	11% (40/358)	26% (84/322)	chi square test of linear trend comparing groups, X^2=36.01, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness down thigh: any	two years	12% (43/358)	11% (36/322)	NS based on OR=1.08 (95% CI: 0.68 to 1.74)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: any	three years	14% (48/339)	27% (82/309)	p<0.05 based on OR=0.46 (95% CI: 0.31 to 0.68)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: extreme	three years	0% (1/339)	1% (2/309)	chi square test of linear trend comparing groups, X^2=16.19, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: moderate	three years	2% (7/339)	4% (11/309)	chi square test of linear trend comparing groups, X^2=16.19, p<0.001	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: quite a lot	three years	1% (2/339)	3% (10/309)	chi square test of linear trend comparing groups, X^2=16.19, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: slight	three years	11% (38/339)	19% (59/309)	chi square test of linear trend comparing groups, X^2=16.19, p<0.001	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness down thigh: any	three years	9% (32/339)	9% (29/309)	NS based on OR=1.01 (95% CI: 0.59 to 1.71)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: any	five years	13% (36/283)	25% (67/271)	p<0.05 based on OR=0.44 (95% CI: 0.28 to 0.69)[@]	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: extreme	five years	0% (1/283)	0% (0/271)	chi square test of linear trend comparing groups, X^2=7.15, p=0.007	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: moderate	five years	2% (5/283)	2% (6/271)	chi square test of linear trend comparing groups, X^2=7.15, p=0.007	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
MRC et al., 1999[747,753-760] (continued)	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: quite a lot	five years	1% (4/283)	2% (6/271)	chi square test of linear trend comparing groups, X^2=7.15, p=0.007	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness around groin: slight	five years	9% (26/283)	20% (55/271)	chi square test of linear trend comparing groups, X^2=7.15, p=0.007	
	TAPP/TEP vs. Lichtenstein/Stoppa/ other open repair	ADV	Numbness down thigh: any	five years	10% (29/283)	9% (24/271)	NS based on OR=1.18 (95% CI: 0.67 to 2.07)[@]	
Neumayer et al., 2004[762-768]	Primary hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	two years	10% (79/781)	4% (30/756)	p<0.05 based on OR=2.17 (95% CI: 1.48 to 3.19)[@]	This analysis was based on the original treatment assignment, not necessarily what people received. This includes only those who had received the study operation for primary hernia.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	two years	10% (87/862)	5% (41/834)	p<0.05 based on OR=2.72 (95% CI: 1.77 to 4.2)[@]	This analysis was based on the original treatment assignment, not necessarily what people received. This includes some who had received the study operation for recurrent hernia (81 in the laparoscopic group and 78 in the open group)
	Primary hernia: TAPP/TEP vs. Lichtenstein	HOSP	Outpatient visit # days	three months	4.9 (SD: 7) (N=687)	4.2 (SD: 4.9) (N=708)	p=0.05 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	HOSP	Outpatient visits	three months	7.7 (SD: 12.2) (N=687)	6.5 (SD: 10.2) (N=708)	p=0.06 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	HOSP	Inpatient visit # days	two years	3.4 (SD: 22.6) (N=687)	2.6 (SD: 12.2) (N=708)	p=0.45 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	HOSP	Outpatient visit # days	two years	20.9 (SD: 30.6) (N=687)	19.6 (SD: 27.9) (N=708)	p=0.25 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	HOSP	Outpatient visits	two years	33.7 (SD: 47.6) (N=687)	31.3 (SD: 43.7) (N=708)	p=0.26 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	0.4 (SD: 3.8) (N=687)	0.3 (SD: 2.6) (N=708)	p=0.08 Wilcoxon	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	RTDA	Return to normal activities (days)	NA	Median: 4 (SD: NR) (Ns NR)	Median: 5 (SD: NR) (Ns NR)	Adjusted Hazard ratio: 1.2, 95% CI: 1.1 to 1.3, favoring the laparoscopic group	
	Primary hernia: TAPP/TEP vs. Lichtenstein	RTDA	Return to sexual activities (days)	NA	Median: 14 (SD: NR) (Ns NR)	Median: 14 (SD: NR) (Ns NR)	NR	
	Primary hernia: TAPP/TEP vs. Lichtenstein	RTW	Return to work (days)	NA	13.3 (SD: 10.1) (N=687)	14.8 (SD: 10.8) (N=708)	p=0.05 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	QOL	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL) (higher number is better)	six months	0.85; Median: 0.89 (IQR: 0.77 to 0.97) (N=687)	0.83; Median: 0.86 (IQR: 0.73 to 0.95) (N=708)	p=0.002 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	QOL	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL) (higher number is better)	one year	0.86; Median: 0.89 (IQR: 0.77 to 0.96) (N=687)	0.8416; Median: 0.88 (IQR: 0.74 to 0.96) (N=708)	p=0.011 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	QOL	QOL: Accumulated QALYs over two years (one the scale of years) (higher number is better)	two years	1.6171 (SD: NR) (N=687)	1.6032 (SD: NR) (N=708)	p=0.31 Wilcoxon. 95% CI: around the difference between groups was -0.0135 to +0.0405 (positive difference favors laparoscopy)	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	QOL	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL) (higher number is better)	two years	0.84; Median: 0.88 (IQR: 0.76 to 0.96) (N=687)	0.83; Median: 0.87 (IQR: 0.72 to 0.95) (N=708)	p=0.05 Wilcoxon	
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Neuralgia or other pain	immediate postop	4% (42/989)	4% (36/994)	NS based on OR=1.18 (95% CI: 0.75 to 1.86)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS at rest	day of surgery	Difference of 10.2 on a 150-point scale (see comments) (95% CI: 4.8 to 15.6) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Pain was measured on a 0-150 scale; this was multipled by 2/3 in order to change the data to a 0-100 scale

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during normal activities	day of surgery	Difference: 10.3 (95% CI: 5 to 15.6) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during work or exercise	day of surgery	Difference: 3.4 (95% CI: -14.4 to 21.2) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS worst pain	day of surgery	Difference: 9.2 (95% CI: 3.3 to 15.1) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain: Chronic groin pain	short-term postoperative	2% (23/989)	2% (19/993)	NS based on OR=1.22 (95% CI: 0.66 to 2.26)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain: chronic leg pain	short-term postoperative	1% (13/989)	1% (10/993)	NS based on OR=1.31 (95% CI: 0.57 to 3)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS at rest	two weeks	Difference: 6.1 (95% CI: 1.7 to 10.5) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during normal activities	two weeks	Difference: 6 (95% CI: 1.5 to 10.5) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during work or exercise	two weeks	Difference: 9.4 (95% CI: 0.4 to 18.4) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS worst pain	two weeks	Difference: 8.3 (95% CI: 3.1 to 13.5) (Ns NR)	See other group.	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Neuralgia or other pain	long-term	10% (97/989)	14% (142/994)	p<0.05 based on OR=0.65 (95% CI: 0.5 to 0.86)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS at rest	three months	Difference: 0.8; this group Mean: 8.1 (95% CI: -2.9 to 4.1 between groups; This group SD: 21.1) (N=687)	See other group; this group Mean: 8.9 (See other group; This group SD: 18.7) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during normal activities	three months	Difference: 0.8; this group Mean: 10.1 (95% CI: -6 to 2.8 between groups; This group SD: 23.6) (N=687)	See other group; this group Mean: 10.2 (See other group; This group SD: 19.9) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during work or exercise	three months	Difference: 0.8; this group Mean: 30.9 (95% CI: -9 to 3.6 between groups; This group SD: 135.6) (N=687)	See other group; this group Mean: 21.7 (See other group; This group SD: 84.5) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS worst pain	three months	Difference 0.8; this group Mean: 10.9 (95% CI: -4.3 to 5.9 between groups; This group SD: 25.3) (N=687)	See other group; this group Mean: 12.3 (See other group; This group SD: 24.9) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain: Chronic groin pain	long-term	5% (53/989)	8% (82/993)	p<0.05 based on OR=0.63 (95% CI: 0.44 to 0.9)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain: chronic leg pain	long-term	2% (18/989)	2% (17/993)	NS based on OR=1.06 (95% CI: 0.55 to 2.08)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS at rest	six months	Difference: 0.5 (95% CI: -3.2 to 4.2) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during normal activities	six months	Difference: -2.9 (95% CI: -7.4 to 1.6) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during work or exercise	six months	Difference: -4 (95% CI: -10.5 to 2.5) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS worst pain	six months	Difference: -1.3 (95% CI: -6.5 to 3.9) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS at rest	one year	Difference: 0.9 (95% CI: -2.7 to 4.5) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during normal activities	one year	Difference: -1.1 (95% CI: -5.5 to 3.3) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during work or exercise	one year	Difference: -2.2 (95% CI: -8.2 to 3.8) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS worst pain	one year	Difference: 0.3 (95% CI: -4.7 to 5.3) (Ns NR)	See other group.	See reported confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS at rest	two years	Difference: 0.8; this group Mean: 4.9 (95% CI: -3.3 to 3.7 between groups; This group SD: 13) (N=687)	See other group; this group Mean: 5.6 (See other group; This group SD: 15) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during normal activities	two years	Difference: 0.8; this group Mean: 6.9 (95% CI: -6 to 2.6 between groups; This group SD: 19.4) (N=687)	See other group; this group Mean: 7.4 (See other group; This group SD: 18.5) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS during work or exercise	two years	Difference: 0.8; this group Mean: 12.6 (95% CI: -8.3 to 3.7 between groups; This group SD: 65.8) (N=687)	See other group; this group Mean: 11.2 (See other group; This group SD: 25.4) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain VAS worst pain	two years	Difference: 0.8; this group Mean: 6.4 (95% CI: -4.6 to 5.2 between groups; This group SD: 17.6) (N=687)	See other group; this group Mean: 8.3 (See other group; This group SD: 22.3) (N=708)	See confidence interval.	This is the difference between groups; a postive number indicates more pain in the open group. Estimated based on Figure 2 in the publication. Pain was measured on a 0-150 scale.
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Anesthesia related complications	Intraoperative	1% (8/989)	1% (6/993)	NS based on OR=1.34 (95% CI: 0.46 to 3.88)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Anesthesia related complications	Intraoperative	1% (13/989)	1% (8/994)	NS based on OR=1.64 (95% CI: 0.68 to 3.98)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Bleeding	Intraoperative	0% (3/989)	0% (1/993)	NS based on OR=3.02 (95% CI: 0.31 to 29.07)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Injury to nerve	Intraoperative	0% (1/989)	1% (7/993)	NS based on OR=0.14 (95% CI: 0.02 to 1.16)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Injury to vas deferens	Intraoperative	0% (0/989)	0% (1/993)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Injury to vascular structure	Intraoperative	1% (5/989)	0% (0/993)	NS based on OR=11.1 (95% CI: 0.61 to 201.03)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Other intraoperative problems	Intraoperative	1% (10/989)	0% (2/994)	p<0.05 based on OR=5.07 (95% CI: 1.11 to 23.18)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Peritoneal defect over mesh	Intraoperative	2% (15/989)	0% (0/994)	p<0.05 based on OR=31.64 (95% CI: 1.89 to 529.48)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Spermatic cord injury	Intraoperative	0% (1/989)	1% (8/994)	p<0.05 based on OR=0.12 (95% CI: 0.02 to 1)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Vessel injury	Intraoperative	1% (10/989)	0% (1/994)	p<0.05 based on OR=10.14 (95% CI: 1.3 to 79.39)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Hematoma or seroma	immediate postop	16% (162/989)	14% (135/994)	NS based on OR=1.25 (95% CI: 0.97 to 1.6)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Orchitis	immediate postop	1% (14/989)	1% (11/994)	NS based on OR=1.28 (95% CI: 0.58 to 2.84)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Other immediate postoperative problems	immediate postop	2% (22/989)	1% (6/994)	p<0.05 based on OR=3.75 (95% CI: 1.51 to 9.28)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Urinary retention	immediate postop	3% (28/989)	2% (22/994)	NS based on OR=1.29 (95% CI: 0.73 to 2.27)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Urinary tract infection	immediate postop	1% (10/989)	0% (4/994)	NS based on OR=2.53 (95% CI: 0.79 to 8.09)[@]	Calculated based on reported percentage

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Wound infection	immediate postop	1% (10/989)	1% (14/994)	NS based on OR=0.72 (95% CI: 0.32 to 1.62)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Any life-threatening complications	any postoperative	1% (9/989)	0% (1/994)	p<0.05 based on OR=9.12 (95% CI: 1.15 to 72.12)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Hernia site infection	short-term postoperative	1% (5/989)	1% (13/993)	NS based on OR=0.38 (95% CI: 0.14 to 1.08)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Life-threatening anaphylactic drug reaction	any postoperative	0% (1/989)	0% (0/994)	NS based on OR=3.02 (95% CI: 0.12 to 74.18)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Life-threatening hemorrhage requiring reoperation	any postoperative	0% (2/989)	0% (0/994)	NS based on OR=5.04 (95% CI: 0.24 to 105.02)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Life-threatening myocardial infarction, ischemia, or arrthmia	any postoperative	0% (3/989)	0% (1/994)	NS based on OR=3.02 (95% CI: 0.31 to 29.1)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Life-threatening port site hernia	any postoperative	0% (2/989)	0% (0/994)	NS based on OR=5.04 (95% CI: 0.24 to 105.02)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Life-threatening respiratory insufficiency	any postoperative	0% (1/989)	0% (0/994)	NS based on OR=3.02 (95% CI: 0.12 to 74.18)[@]	Calculated based on specific complications reported
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Scrotal hematoma	short-term postoperative	6% (57/989)	3% (34/993)	p<0.05 based on OR=1.73 (95% CI: 1.12 to 2.66)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Seroma or hydrocele	short-term postoperative	4% (44/989)	3% (31/993)	NS based on OR=1.44 (95% CI: 0.9 to 2.31)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Trocar site infection	short-term postoperative	1% (5/989)	0% (0/993)	NS based on OR=11.1 (95% CI: 0.61 to 201.03)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Wound hematoma	short-term postoperative	6% (57/989)	6% (63/993)	NS based on OR=0.9 (95% CI: 0.62 to 1.31)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Mortality related to surgery	within 30 days	0% (2/989)	0% (0/994)	NS based on OR=5.04 (95% CI: 0.24 to 105.02)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Hematoma or seroma	long-term	9% (89/989)	3% (30/994)	p<0.05 based on OR=3.18 (95% CI: 2.08 to 4.85)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Hernia site infection	long-term	0% (1/989)	0% (4/993)	NS based on OR=0.25 (95% CI: 0.03 to 2.24)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Infection	long-term	0% (4/989)	1% (6/994)	NS based on OR=0.67 (95% CI: 0.19 to 2.38)[@]	Calculated based on reported percentage
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Orchitis	long-term	1% (9/989)	0% (3/993)	NS based on OR=3.03 (95% CI: 0.82 to 11.23)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Orchitis or other testicular problems	long-term	2% (19/989)	2% (22/994)	NS based on OR=0.87 (95% CI: 0.47 to 1.61)[@]	Calculated based on reported percentage

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Neumayer et al., 2004[762-768] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Other complications	long-term	2% (18/989)	2% (18/994)	NS based on OR=1.01 (95% CI: 0.52 to 1.94)[@]	Calculated based on specific complications reported
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Scrotal hematoma	long-term	1% (11/989)	1% (7/993)	NS based on OR=1.58 (95% CI: 0.61 to 4.1)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Seroma or hydrocele	long-term	3% (29/989)	1% (12/993)	p<0.05 based on OR=2.47 (95% CI: 1.25 to 4.87)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Trocar site infection	long-term	0% (3/989)	0% (0/993)	NS based on OR=7.05 (95% CI: 0.36 to 136.66)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Wound hematoma	long-term	1% (12/989)	0% (2/993)	p<0.05 based on OR=6.09 (95% CI: 1.36 to 27.26)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Mortality	two years	3% (32/989)	3% (34/994)	NS based on OR=0.94 (95% CI: 0.58 to 1.54)[@]	
	Primary hernia: TAPP/TEP vs. Lichtenstein	ADV	Mortality related to surgery	two years	0% (3/989)	0% (1/994)	NS based on OR=3.02 (95% CI: 0.31 to 29.1)[@]	
Paganini et al., 1998[783]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 28 months (25th percentile 24.9, 75th percentile 30.9)	4% (2/52)	0% (0/56)	NS based on OR=5.59 (95% CI: 0.26 to 119.31)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paganini et al., 1998[783] (continued)	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, p=0.880, either t test or Wilcoson, did not report which	
	TAPP vs. Lichtenstein	HOSP	Hospital stay: discharge <24 hours (higher % is better)	NA	2% (1/52)	2% (1/56)	NS based on OR=1.08 (95% CI: 0.07 to 17.7)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay: discharge >48 hours	NA	33% (17/52)	27% (15/56)	NS based on OR=1.33 (95% CI: 0.58 to 3.04)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay: discharge between 24 and 36 hours	NA	19% (10/52)	20% (11/56)	NS based on OR=0.97 (95% CI: 0.38 to 2.53)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay: discharge between 36 and 48 hours	NA	46% (24/52)	52% (29/56)	NS based on OR=0.8 (95% CI: 0.37 to 1.7)[@]	
	TAPP vs. Lichtenstein	RTDA	Time to eating	in-hospital	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, p=0.242, either t-test or Wilcoson, did not report which	
	TAPP vs. Lichtenstein	RTDA	Time to passing stool	in-hospital	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, p=0.077, either t-test or Wilcoson, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paganini et al., 1998[783] (continued)	TAPP vs. Lichtenstein	RTDA	Time to walk	in-hospital	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, p=0.494, either t-test or Wilcoson, did not report which	
	TAPP vs. Lichtenstein	RTDA	Return to sports (days)	NA	Median: 20 (25th: 10; 75th: 30) (N=52)	Median: 20 (25th: 7; 75th: 30) (N=56)	NR	
	TAPP vs. Lichtenstein	RTDA	Return to unrestricted activity (days)	NA	Median: 15 (25th: 10; 75th: 25) (N=52)	Median: 14 (25th: 7; 75th: 30) (N=56)	NR	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score at rest	six hours	Median: 3 (25th: 2; 75th: 4.5) (N=52)	Median: 3 (25th: 2; 75th: 4) (N=56)	p=0.57, either t-test or Wilcoxon, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score at rest	nine hours	Median: 3 (25th: 2; 75th: 4) (N=52)	Median: 3 (25th: 2; 75th: 4) (N=56)	p=0.15, either t-test or Wilcoxon, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score at rest	one day	Median: 2 (25th: 2; 75th: 3) (N=52)	Median: 2 (25th: 1; 75th: 3) (N=56)	p=0.26, either t-test or Wilcoxon, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paganini et al., 1998[783] (continued)	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, number of placebo tablets taken	between one and two days	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, but more placebo tablets were taken by the open surgery group, p=0.008, either t-test or Wilcoson, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score at rest	two days	Median: 2 (25th: 1; 75th: 3) (N=52)	Median: 1 (25th: 1; 75th: 2) (N=56)	p=0.02, either t-test or Wilcoxon, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain inguinal region	one week	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, p=0.027, more pain in the open group, either t-test or Wilcoson, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score at rest	one week	Median: 1 (25th: 1; 75th: 2) (N=52)	Median: 1 (25th: 1; 75th: 2) (N=56)	p=0.68, either t-test or Wilcoxon, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paganini et al., 1998[783] (continued)	TAPP vs. Lichtenstein	Pain	Pain discomforting during the night	three months	NR (SD: NR) (N=52)	NR (SD: NR) (N=56)	Data not reported, p=0.017, more pain in the laparoscopic group, either t-test or Wilcoson, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain distressing	between one week and three months	6% (3/52)	11% (6/56)	NS based on OR=0.51 (95% CI: 0.12 to 2.16)[@]	
	TAPP vs. Lichtenstein	ADV	Retroperitoneal hematoma	intraoperative	2% (1/52)	0% (0/56)	NS based on OR=3.29 (95% CI: 0.13 to 82.61)[@]	
	TAPP vs. Lichtenstein	ADV	Wound edema	two days	6% (3/52)	2% (1/56)	NS based on OR=3.37 (95% CI: 0.34 to 33.44)[@]	
	TAPP vs. Lichtenstein	ADV	Wound redness	two days	8% (4/52)	2% (1/56)	NS based on OR=4.58 (95% CI: 0.5 to 42.42)[@]	
	TAPP vs. Lichtenstein	ADV	Hematoma	in-hospital	8% (4/52)	14% (8/56)	NS based on OR=0.5 (95% CI: 0.14 to 1.77)[@]	
	TAPP vs. Lichtenstein	ADV	Hydrocele	in-hospital	2% (1/52)	4% (2/56)	NS based on OR=0.53 (95% CI: 0.05 to 6.02)[@]	
	TAPP vs. Lichtenstein	ADV	Paresthesia	in-hospital	10% (5/52)	9% (5/56)	NS based on OR=1.09 (95% CI: 0.3 to 3.99)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paganini et al., 1998[783] (continued)	TAPP vs. Lichtenstein	ADV	Seroma	in-hospital	8% (4/52)	0% (0/56)	NS based on OR=10.48 (95% CI: 0.55 to 199.69)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention requiring insertion of a bladder catheter	postoperative	12% (6/52)	5% (3/56)	NS based on OR=2.3 (95% CI: 0.55 to 9.74)[@]	
	TAPP vs. Lichtenstein	ADV	Hardening in the inguinal region	three months	4% (2/52)	21% (12/56)	p<0.05 based on OR=0.15 (95% CI: 0.03 to 0.69)[@]	
	TAPP vs. Lichtenstein	ADV	Mortality	Median: 28 months	0% (0/52)	0% (0/56)	NS based on OR=1.08 (95% CI: 0.02 to 55.22)[@]	
Pavlidis et al., 2002[786]	TAPP vs. Patch	RC	Hernia recurrence	Mean: 12.7 months (Range: 1-24)	0% (0/46)	2% (1/64)	NS based on OR=0.46 (95% CI: 0.02 to 11.43)[@]	
	TAPP vs. Patch	HOSP	LOS, days	Postoperative	1.4 (Range: 1-4) (N=46)	1.8 (Range: 1-6) (N=64)	p=ns, t test	
	TAPP vs. Patch	RTW	Return to work, days	Mean: 12.7 months (Range: 1-24)	6.3 (Range: 4-14) (N=46)	7.3 (Range: 6-18) (N=64)	p=ns, t test	
	TAPP vs. Patch	Pain	No analgesic use, % (higher % is better)	Postoperative	67% (31/46)	55% (35/64)	NS based on OR=1.71 (95% CI: 0.78 to 3.77)[@]	
	TAPP vs. Patch	Pain	Non-opioid analgesic, %	Postoperative	24% (11/46)	31% (20/64)	NS based on OR=0.69 (95% CI: 0.29 to 1.63)[@]	
	TAPP vs. Patch	Pain	Opioids	Postoperative	48% (22/46)	41% (26/64)	NS based on OR=1.34 (95% CI: 0.62 to 2.88)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pavlidis et al., 2002[786] (continued)	TAPP vs. Patch	ADV	Complications, %	Mean: 12.7 months (Range: 1-24)	2% (1/46)	3% (2/64)	NS based on OR=0.69 (95% CI: 0.06 to 7.83)[@]	
	TAPP vs. plug-and-patch	RC	Hernia recurrence	Mean: 12.7 months (Range: 1-24)	0% (0/46)	2% (1/65)	NS based on OR=0.46 (95% CI: 0.02 to 11.6)[@]	
	TAPP vs. plug-and-patch	HOSP	LOS, days	Postoperative	1.4 (Range: 1-4) (N=46)	2 (Range: 1-7) (N=65)	p=ns, t test	
	TAPP vs. plug-and-patch	RTW	Return to work, days	Mean: 12.7 months (Range: 1-24)	6.3 (Range: 4-14) (N=46)	7.9 (Range: 5-17) (N=65)	p=ns, t test	
	TAPP vs. plug-and-patch	Pain	No analgesic use, % (higher % is better)	Postoperative	67% (31/46)	52% (34/65)	NS based on OR=1.88 (95% CI: 0.86 to 4.13)[@]	
	TAPP vs. plug-and-patch	Pain	Non-opioid analgesic, %	Postoperative	24% (11/46)	40% (26/65)	NS based on OR=0.47 (95% CI: 0.2 to 1.09)[@]	
	TAPP vs. plug-and-patch	Pain	Opioids	Postoperative	48% (22/46)	34% (22/65)	NS based on OR=1.79 (95% CI: 0.83 to 3.88)[@]	
	TAPP vs. plug-and-patch	ADV	Complications, %	Mean: 12.7 months (Range: 1-24)	2% (1/46)	5% (3/65)	NS based on OR=0.46 (95% CI: 0.05 to 4.56)[@]	
Payne et al., 1994[787]	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 10 months (Range: 7-18)	0% (0/48)	0% (0/52)	n.s. based on OR=1.08 (95% CI: 0.02 to 55.63)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Payne et al., 1994[787]	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	0.21 (SD: NR) (N=48)	0.2 (SD: NR) (N=52)	NS	Converted to days from reported hours. The mean number of days was identical regardless of whether the patients with recurrent hernias were included or excluded from the calculation
	TAPP vs. Lichtenstein	RTW	Return to manual work (days)	NA	11.7 (SD: NR) (N=18)	23 (SD: NR) (N=15)	p<0.002	
	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	9.2 (SD: NR) (N=48)	18.3 (SD: NR) (N=52)	NS	This includes primary hernias as well as recurrent hernias
	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	8.9 (SD: NR) (N=42)	18 (SD: NR) (N=50)	Specifically for primary hernias, controlling for job function, the difference was statistically significant (p<0.001)	This includes only patients with primary hernia
	TAPP vs. Lichtenstein	Pain	Pain: Groin: >1 month	postoperative	0% (0/48)	8% (4/52)	n.s. based on OR=0.11 (95% CI: 0.01 to 2.12)[@]	
	TAPP vs. Lichtenstein	ADV	Bleeding leading to scrotal hematoma	postoperative	4% (2/48)	0% (0/52)	n.s. based on OR=5.65 (95% CI: 0.26 to 120.63)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Payne et al., 1994[787] (continued)	TAPP vs. Lichtenstein	ADV	Internal hernia	postoperative	2% (1/48)	0% (0/52)	n.s. based on OR=3.32 (95% CI: 0.13 to 83.37)[@]	
	TAPP vs. Lichtenstein	ADV	Nerve entrapment	postoperative	0% (0/48)	0% (0/52)	n.s. based on OR=1.08 (95% CI: 0.02 to 55.63)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	postoperative	2% (1/48)	8% (4/52)	NS based on OR=0.26 (95% CI: 0.03 to 2.37)[@]	
	TAPP vs. Lichtenstein	ADV	Wound infection	postoperative	0% (0/48)	2% (1/52)	n.s. based on OR=0.35 (95% CI: 0.01 to 8.9)[@]	
Picchio et al., 1999[789]	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	2.3 (SEM: 0.1) (N=52)	2.2 (SEM: 0.1) (N=52)	p=0.38 t-test	
	TAPP vs. Lichtenstein	RTDA	Time to both pain free-normal activities and work (days)	NA	45.5 (SEM: 1.4) (N=52)	42.7 (SEM: 0.7) (N=52)	p=0.04 t-test	Converted from weeks to days by ECRI Institute
	TAPP vs. Lichtenstein	RTDA	Time to sexual intercourse (days)	NA	13.5 (SEM: 0.7) (N=52)	13.1 (SEM: 0.5) (N=52)	p=0.61 t-test	
	TAPP vs. Lichtenstein	RTDA	Time to walk (days)	NA	7 (SEM: 0.2) (N=52)	6.9 (SEM: 0.2) (N=52)	p=0.88 t-test	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score	one day	3.1 (SEM: 0.2) (N=52)	2.7 (SEM: 0.2) (N=52)	p=0.14 Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesis intramuscular diclofena: number who did not need any	two days	40% (21/52)	50% (26/52)	NS based on OR=0.68 (95% CI: 0.31 to 1.47)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Picchio et al., 1999[789] (continued)	TAPP vs. Lichtenstein	Pain	Pain: need for analgesis intramuscular diclofena: number who needed one dose	two days	40% (21/52)	31% (16/52)	NS based on OR=1.52 (95% CI: 0.68 to 3.42)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesis intramuscular diclofena: number who needed three or more doses	two days	4% (2/52)	2% (1/52)	NS based on OR=2.04 (95% CI: 0.18 to 23.22)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesis intramuscular diclofena: number who needed two doses	two days	15% (8/52)	17% (9/52)	NS based on OR=0.87 (95% CI: 0.31 to 2.46)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: VAS score	two days	2.3 (SEM: 0.2) (N=52)	1.8 (SEM: 0.1) (N=52)	p<0.03 Mann Whitney	
	TAPP vs. Lichtenstein	Pain	Groin discomfort or pain	either intraoperative or postoperative	10% (5/52)	8% (4/52)	NS based on OR=1.28 (95% CI: 0.32 to 5.05)[@]	
	TAPP vs. Lichtenstein	Pain	Numbness/neuralgia	either intraoperative or postoperative	6% (3/52)	6% (3/52)	NS based on OR=1 (95% CI: 0.19 to 5.2)[@]	
	TAPP vs. Lichtenstein	ADV	Scrotal hematoma	either intraoperative or postoperative	2% (1/52)	4% (2/52)	NS based on OR=0.49 (95% CI: 0.04 to 5.58)[@]	
	TAPP vs. Lichtenstein	ADV	Seroma of cord	either intraoperative or postoperative	6% (3/52)	0% (0/52)	NS based on OR=7.42 (95% CI: 0.37 to 147.43)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Picchio et al., 1999[789] (continued)	TAPP vs. Lichtenstein	ADV	Trocar site hematoma/ bruising	either intraoperative or postoperative	4% (2/52)	8% (4/52)	NS based on OR=0.48 (95% CI: 0.08 to 2.74)[@]	
Pokorny et al., 2008)[791,792]	TAPP vs. Lichtenstein	RC	Hernia recurrence	three years	5% (4/85)	0% (0/65)	NS based on OR=7.23 (95% CI: 0.38 to 136.8)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia	perioperative	12% (10/84)	2% (1/63)	p<0.05 based on OR=8.38 (95% CI: 1.04 to 67.28)[@]	
	TAPP vs. Lichtenstein	Pain	Neuralgia	long-term	0% (0/85)	0% (0/66)	NS based on OR=0.78 (95% CI: 0.02 to 39.72)[@]	
	TAPP vs. Lichtenstein	Pain	Pain persistent	long-term	4% (3/85)	6% (4/66)	NS based on OR=0.57 (95% CI: 0.12 to 2.63)[@]	
	TAPP vs. Lichtenstein	ADV	Any complications	intraoperative	8% (7/87)	1% (1/67)	NS based on OR=5.78 (95% CI: 0.69 to 48.14)[@]	
	TAPP vs. Lichtenstein	ADV	Spermatic cord injury	intraoperative	0% (0/87)	0% (0/67)	NS based on OR=0.77 (95% CI: 0.02 to 39.38)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary bladder injury	intraoperative	0% (0/87)	0% (0/67)	NS based on OR=0.77 (95% CI: 0.02 to 39.38)[@]	
	TAPP vs. Lichtenstein	ADV	Any complications	perioperative	32% (27/84)	16% (10/63)	p<0.05 based on OR=2.51 (95% CI: 1.11 to 5.68)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pokorny et al., 2008[791,792] (continued)	TAPP vs. Lichtenstein	ADV	Hematoma	perioperative	8% (7/84)	5% (3/63)	NS based on OR=1.82 (95% CI: 0.45 to 7.33)[@]	
	TAPP vs. Lichtenstein	ADV	Seroma	perioperative	8% (7/84)	3% (2/63)	NS based on OR=2.77 (95% CI: 0.56 to 13.83)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	perioperative	4% (3/84)	3% (2/63)	NS based on OR=1.13 (95% CI: 0.18 to 6.97)[@]	
	TAPP vs. Lichtenstein	ADV	Wound infection	perioperative	0% (0/84)	3% (2/63)	NS based on OR=0.15 (95% CI: 0.01 to 3.09)[@]	
	TAPP vs. Lichtenstein	ADV	Any complications	long-term	7% (6/85)	18% (12/66)	p<0.05 based on OR=0.34 (95% CI: 0.12 to 0.97)[@]	
	TAPP vs. Lichtenstein	ADV	Foreign body sensation	long-term	2% (2/85)	2% (1/66)	NS based on OR=1.57 (95% CI: 0.14 to 17.66)[@]	
	TAPP vs. Lichtenstein	ADV	Hydrocele	long-term	1% (1/85)	2% (1/66)	NS based on OR=0.77 (95% CI: 0.05 to 12.61)[@]	
	TAPP vs. Lichtenstein	ADV	Hypesthesia	long-term	0% (0/85)	6% (4/66)	NS based on OR=0.08 (95% CI: 0 to 1.54)[@]	
	TAPP vs. Lichtenstein	ADV	Impotence	long-term	0% (0/85)	0% (0/66)	NS based on OR=0.78 (95% CI: 0.02 to 39.72)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pokorny et al., 2008[791,792] (continued)	TAPP vs. Lichtenstein	ADV	Meterosensitivity	long-term	0% (0/85)	3% (2/66)	NS based on OR=0.15 (95% CI: 0.01 to 3.2)[@]	
	TAPP vs. Lichtenstein	ADV	Penis edema	long-term	0% (0/85)	0% (0/66)	NS based on OR=0.78 (95% CI: 0.02 to 39.72)[@]	
	TAPP vs. Lichtenstein	ADV	Testicular atrophy	long-term	0% (0/85)	0% (0/66)	NS based on OR=0.78 (95% CI: 0.02 to 39.72)[@]	Estimated based on Figure 1 in the article
	TEP vs. Lichtenstein	RC	Hernia recurrence	three years	9% (2/23)	0% (0/65)	NS based on OR=15.23 (95% CI: 0.7 to 329.87)[@]	
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia	perioperative	0% (0/35)	2% (1/63)	NS based on OR=0.59 (95% CI: 0.02 to 14.79)[@]	
	TEP vs. Lichtenstein	Pain	Neuralgia	long-term	0% (0/34)	0% (0/66)	NS based on OR=1.93 (95% CI: 0.04 to 99.26)[@]	
	TEP vs. Lichtenstein	Pain	Pain persistent	long-term	9% (3/34)	6% (4/66)	NS based on OR=1.5 (95% CI: 0.32 to 7.12)[@]	
	TEP vs. Lichtenstein	ADV	Any complications	intraoperative	0% (0/35)	1% (1/67)	NS based on OR=0.62 (95% CI: 0.02 to 15.73)[@]	
	TEP vs. Lichtenstein	ADV	Spermatic cord injury	intraoperative	0% (0/35)	0% (0/67)	NS based on OR=1.9 (95% CI: 0.04 to 97.87)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pokorny et al., 2008[791,792] (continued)	TEP vs. Lichtenstein	ADV	Urinary bladder injury	intraoperative	0% (0/35)	0% (0/67)	NS based on OR=1.9 (95% CI: 0.04 to 97.87)[@]	
	TEP vs. Lichtenstein	ADV	Any complications	perioperative	17% (6/35)	16% (10/63)	NS based on OR=1.1 (95% CI: 0.36 to 3.32)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma	perioperative	6% (2/35)	5% (3/63)	NS based on OR=1.21 (95% CI: 0.19 to 7.62)[@]	
	TEP vs. Lichtenstein	ADV	Seroma	perioperative	3% (1/35)	3% (2/63)	NS based on OR=0.9 (95% CI: 0.08 to 10.26)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	perioperative	9% (3/35)	3% (2/63)	NS based on OR=2.86 (95% CI: 0.45 to 18)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	perioperative	0% (0/35)	3% (2/63)	NS based on OR=0.35 (95% CI: 0.02 to 7.42)[@]	
	TEP vs. Lichtenstein	ADV	Any complications	long-term	21% (7/34)	18% (12/66)	NS based on OR=1.17 (95% CI: 0.41 to 3.3)[@]	
	TEP vs. Lichtenstein	ADV	Foreign body sensation	long-term	6% (2/34)	2% (1/66)	NS based on OR=4.06 (95% CI: 0.35 to 46.49)[@]	
	TEP vs. Lichtenstein	ADV	Hydrocele	long-term	0% (0/34)	2% (1/66)	NS based on OR=0.63 (95% CI: 0.03 to 15.95)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pokorny et al., 2008[791,792] (continued)	TEP vs. Lichtenstein	ADV	Hypesthesia	long-term	6% (2/34)	6% (4/66)	NS based on OR=0.97 (95% CI: 0.17 to 5.58)[@]	
	TEP vs. Lichtenstein	ADV	Impotence	long-term	0% (0/34)	0% (0/66)	NS based on OR=1.93 (95% CI: 0.04 to 99.26)[@]	
	TEP vs. Lichtenstein	ADV	Meterosensitivity	long-term	0% (0/34)	3% (2/66)	NS based on OR=0.37 (95% CI: 0.02 to 8.01)[@]	
	TEP vs. Lichtenstein	ADV	Penis edema	long-term	0% (0/34)	0% (0/66)	NS based on OR=1.93 (95% CI: 0.04 to 99.26)[@]	
	TEP vs. Lichtenstein	ADV	Testicular atrophy	long-term	0% (0/34)	0% (0/66)	NS based on OR=1.93 (95% CI: 0.04 to 99.26)[@]	Estimated based on Figure 1 in the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813]	Primary hernia: Lichtenstein vs. mesh plug	RC	Hernia recurrence	five years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 0.999 (95% CI: 0.868 to 1.164)	NS according to the 95% CI:	Adjusted for age, whether the hernia was primary or recurrent (11.7% of these operations were on recurrent hernias), and whether the patient had experienced postoperative complications (8.5% had). Hazard ratios higher than 1.0 favor the Lichtenstein group.
	Primary hernia: Lichtenstein vs. mesh plug	Pain	Pain: felt pain within the past week	between 2 and 3 years	32% (365/1,140)	32% (137/434)	NS based on OR=1.02 (95% CI: 0.81 to 1.29)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: Lichtenstein vs. mesh plug	Pain	Pain: in pain now	between 2 and 3 years	28% (328/1,152)	27% (117/435)	NS based on OR=1.08 (95% CI: 0.84 to 1.39)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
	Primary hernia: Lichtenstein vs. OPM	RC	Hernia recurrence	five years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 1.126 (95% CI: 0.851 to 1.491)	NS according to the 95% CI	Adjusted for age, whether the hernia was primary or recurrent (11.7% of these operations were on recurrent hernias), and whether the patient had experienced postoperative complications (8.5% had). Hazard ratios higher than 1.0 favor the Lichtenstein group.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: Lichtenstein vs. OPM	Pain	Pain: felt pain within the past week	between 2 and 3 years	32% (365/1,140)	27% (3/11)	NS based on OR=1.26 (95% CI: 0.33 to 4.76)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
	Primary hernia: Lichtenstein vs. OPM	Pain	Pain: in pain now	between 2 and 3 years	28% (328/1,152)	17% (2/12)	NS based on OR=1.99 (95% CI: 0.43 to 9.13)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: Mesh plug vs. OPM	RC	Hernia recurrence	five years	Compared to Lichtenstein: Hazard ratio: 0.999 (95% CI: 0.868 to 1.164)	Compared to Lichtenstein: Hazard ratio: 1.126 (95% CI: 0.851 to 1.491)	Neither group differed from Lichtenstein, based on 95% CI:s	Adjusted for age, whether the hernia was primary or recurrent (11.7% of these operations were on recurrent hernias), and whether the patient had experienced postoperative complications (8.5% had). Hazard ratios higher than 1.0 favor the Lichtenstein group.
	Primary hernia: Mesh plug vs. OPM	Pain	Pain: felt pain within the past week	between 2 and 3 years	32% (137/434)	27% (3/11)	NS based on OR=1.23 (95% CI: 0.32 to 4.71)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: Mesh plug vs. OPM	Pain	Pain: in pain now	between 2 and 3 years	27% (117/435)	17% (2/12)	NS based on OR=1.84 (95% CI: 0.4 to 8.52)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
	Primary hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	five years	Compared to Lichtenstein: Hazard ratio 1.177 (95% CI: 1.025 to 1.352)	This was the reference operation	p<0.05 according to the 95% CI	This was adjusted for age, whether the hernia was primary or recurrent (11.7% of these operations were on recurrent hernias), and whether the patient had experienced postoperative complications (8.5% had). Hazard ratios higher than 1.0 favor the Lichtenstein group.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain: felt pain within the past week	between 2 and 3 years	24% (23/94)	32% (365/1,140)	NS based on OR=0.69 (95% CI: 0.42 to 1.12)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
	Primary hernia: TAPP/TEP vs. Lichtenstein	Pain	Pain: in pain now	between 2 and 3 years	21% (20/97)	28% (328/1,152)	NS based on OR=0.65 (95% CI: 0.39 to 1.08)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: TAPP/TEP vs. mesh plug	RC	Hernia recurrence	five years	Compared to Lichtenstein: Hazard ratio: 1.177 (95% CI: 1.025 to 1.352)	Compared to Lichtenstein: Hazard ratio: 0.999 (95% CI: 0.868 to 1.164)	group 1 p<0.05 vs Lichtenstein, but group 2 NS from Lichtenstein, according to 95% CI:s	Adjusted for age, whether the hernia was primary or recurrent (11.7% of these operations were on recurrent hernias), and whether the patient had experienced postoperative complications (8.5% had). Hazard ratios higher than 1.0 favor the Lichtenstein group.
	Primary hernia: TAPP/TEP vs. mesh plug	Pain	Pain: felt pain within the past week	between 2 and 3 years	24% (23/94)	32% (137/434)	NS based on OR=0.7 (95% CI: 0.42 to 1.17)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: TAPP/TEP vs. mesh plug	Pain	Pain: in pain now	between 2 and 3 years	21% (20/97)	27% (117/435)	NS based on OR=0.71 (95% CI: 0.41 to 1.21)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
	Primary hernia: TAPP/TEP vs. OPM	RC	Hernia recurrence	five years	Compared to Lichtenstein: Hazard ratio: 1.177 (95% CI: 1.025 to 1.352)	Compared to Lichtenstein: Hazard ratio: 1.126 (95% CI: 0.851 to 1.491)	group 1 $p<0.05$ vs Lichtenstein, but group 2 NS from Lichtenstein, according to 95% CI:s	Adjusted for age, whether the hernia was primary or recurrent (11.7% of these operations were on recurrent hernias), and whether the patient had experienced postoperative complications (8.5% had). Hazard ratios higher than 1.0 favor the Lichtenstein group.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Primary hernia: TAPP/TEP vs. OPM	Pain	Pain: felt pain within the past week	between 2 and 3 years	24% (23/94)	27% (3/11)	NS based on OR=0.86 (95% CI: 0.21 to 3.53)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
	Primary hernia: TAPP/TEP vs. OPM	Pain	Pain: in pain now	between 2 and 3 years	21% (20/97)	17% (2/12)	NS based on OR=1.3 (95% CI: 0.26 to 6.41)[@]	Estimated count based on the percentages reported in Figure 2 of the article. These are unadjusted counts. Study reported that in multivariate analyses, no specific technique was associated with lower or higher rates of chronic pain.
Simmermacher et al., 2000[814]	TEP vs. Ugahary	ADV	Bleeding	perioperative	3% (2/80)	2% (2/82)	NS based on OR=1.03 (95% CI: 0.14 to 7.46)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Simmermacher et al., 2000[814] (continued)	TEP vs. Ugahary	ADV	Infection	early postoperative	0% (0/80)	1% (1/82)	NS based on OR=0.34 (95% CI: 0.01 to 8.41)[@]	
	TEP vs. Ugahary	ADV	Inguinal swelling	early postoperative	3% (2/80)	7% (6/82)	NS based on OR=0.32 (95% CI: 0.06 to 1.66)[@]	
	TEP vs. Ugahary	ADV	Other complications (specifics not reported)	perioperative	6% (5/80)	4% (3/82)	NS based on OR=1.76 (95% CI: 0.41 to 7.6)[@]	
	TEP vs. Ugahary	ADV	Peritoneal tear	perioperative	8% (6/80)	4% (3/82)	NS based on OR=2.14 (95% CI: 0.52 to 8.85)[@]	
	TEP vs. Ugahary	ADV	Urinary retention	early postoperative	1% (1/80)	0% (0/82)	NS based on OR=3.11 (95% CI: 0.12 to 77.56)[@]	
Singh et al., 2011[815]	TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	Median 22 months (range 10-30)	0% (0/60)	0% (0/57)		
	TAPP/TEP vs. Lichtenstein	Pain	Pain during rest (scale of pain not reported)	one day	3.0 (SD: 1.2) (N=60)	4.4 (SD: 1.7) (N=57)	p<0.001, test not reported	
	TAPP/TEP vs. Lichtenstein	Pain	Pain during rest (scale of pain not reported)	seven days	2.1 (SD: NR) (N=60)	2.8 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during rest (scale of pain not reported)	six weeks	0.9 (SD: NR) (N=60)	1.5 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during rest (scale of pain not reported)	three months	0.4 (SD: 0.9) (N=60)	0.8 (SD: 1.4) (N=57)	p=0.1, test not reported	
	TAPP/TEP vs. Lichtenstein	Pain	Pain during rest (scale of pain not reported)	six months	0.2 (SD: NR) (N=60)	0.7 (SD: NR) (N=57)	NR	Estimated from Figure 4 in the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Singh et al., 2011[815] (continued)	TAPP/TEP vs. Lichtenstein	Pain	Pain during rest (scale of pain not reported)	one year	0 (SD: NR) (N=NR)	0.7 (SD: NR) (N=NR)	p=0.1, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during normal activities (scale of pain not reported)	one day	2.8 (SD: NR) (N=60)	3.9 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during normal activities (scale of pain not reported)	seven days	2 (SD: NR) (N=60)	2.8 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during normal activities (scale of pain not reported)	six weeks	1 (SD: NR) (N=60)	1.8 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during normal activities (scale of pain not reported)	three months	0.6 (SD: NR) (N=60)	1.2 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during normal activities (scale of pain not reported)	six months	0.4 (SD: NR) (N=60)	0.9 (SD: NR) (N=57)	NR	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during normal activities (scale of pain not reported)	one year	0.2 (SD: NR) (N=NR)	0.9 (SD: NR) (N=NR)	p=0.04, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during strenuous activity (scale of pain not reported)	seven days	1.8 (SD: NR) (N=60)	4.2 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during strenuous activity (scale of pain not reported)	six weeks	1.7 (SD: NR) (N=60)	2.9 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during strenuous activity (scale of pain not reported)	three months	1.2 (SD: NR) (N=60)	1.8 (SD: NR) (N=57)	p=0.04, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during strenuous activity (scale of pain not reported)	six months	0.9 (SD: NR) (N=60)	1.6 (SD: NR) (N=57)	p=0.04, test not reported	Estimated from Figure 4 in the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Singh et al., 2011[815] (continued)	TAPP/TEP vs. Lichtenstein	Pain	Pain during strenuous activity (scale of pain not reported)	one year	0.9 (SD: NR) (N=NR)	1.6 (SD: NR) (N=NR)	p=0.03, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during last 24 hours (scale of pain not reported)	one day	2.8 (SD: NR) (N=60)	4.3 (SD: NR) (N=57)	NR	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during last 24 hours (scale of pain not reported)	seven days	2.1 (SD: NR) (N=60)	3.5 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during last 24 hours (scale of pain not reported)	six weeks	1.1 (SD: NR) (N=60)	1.7 (SD: NR) (N=57)	p<0.001, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during last 24 hours (scale of pain not reported)	three months	0.6 (SD: NR) (N=60)	1.3 (SD: NR) (N=57)	p=0.63, test not reported	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during last 24 hours (scale of pain not reported)	six months	0.4 (SD: NR) (N=60)	0.9 (SD: NR) (N=57)	NR	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Pain during last 24 hours (scale of pain not reported)	one year	0.2 (SD: NR) (N=NR)	0.9 (SD: NR) (N=NR)	NR	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Analgesia parenteral, % needing >1 day	early postoperative	40% (24/60)	14% (8/57)	NR	Estimated from Figure 4 in the article
	TAPP/TEP vs. Lichtenstein	Pain	Analgesia oral, # days	early postoperative	7 (range 5-21)	10 (range 5-120)	p=0.02 either t-test or Mann-Whitney, did not report which	
	TAPP/TEP vs. Lichtenstein	Pain	% in pain during normal activities	one week	68% (41/60)	83% (47/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Epigastric vessel injury	Intraoperative	3% (2/60)	0% (0/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Testicular injury	Intraoperative	0% (0/60)	2% (1/57)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Singh et al., 2011[815] (continued)	TAPP/TEP vs. Lichtenstein	ADV	Wound infection, any	One week	3% (2/60)	9% (5/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Wound infection, superficial incisional	One week	3% (2/60)	6% (3/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Wound infection, deep incisional	One week	0% (0/60)	4% (2/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Wound infection, deep space	One week	0% (0/60)	0% (0/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Seroma	One week	13% (8/60)	2% (1/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Seroma	Three months	0% (0/60)	0% (0/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Cord edema	One week	13% (8/60)	35% (20/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Bruise	One week	7% (4/60)	11% (6/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Numbness	One week	5% (3/60)	11% (6/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Testicular pain	One week	2% (1/60)	11% (6/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Hydrocele	One week	3% (3/60)	2% (1/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Orchitis	One week	2% (1/60)	0% (/57)		
	TAPP/TEP vs. Lichtenstein	ADV	Ecchymosis	One week	10% (6/60)	6% (3/57)		
Vatansev et al., 2002[826]	TEP vs. Lichtenstein	Pain	Pain: need for analgesia meperidin mg in 24 hours	one day	196.6 (SD: 148.8) (N=20)	253.9 (SD: 129.3) (N=24)	No p value reported specifically for any pairwise comparison	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Vatansev et al., 2002[826] (continued)	TEP vs. Nyhus	Pain	Pain: need for analgesia meperidin mg in 24 hours	one day	196.6 (SD: 148.8) (N=20)	382.9 (SD: 189.1) (N=21)	No p value reported specifically for any pairwise comparison	
Wara et al., 2005[829-834]	TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	between 0 and 3 years	0% (0/254)	1% (167/16,463)	NS based on OR=0.19 (95% CI: 0.01 to 3.08)[@]	Restricted to unilateral indirect primary hernia
	TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	between 0 and 3 years	1% (2/179)	3% (409/13,303)	NS based on OR=0.36 (95% CI: 0.09 to 1.44)[@]	Restricted to unilateral direct primary hernia
	TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	between 0 and 3 years	3.7% (62/1,677)	2.0% (611/30,946)	p<0.05 based on OR=1.91 (95% CI: 1.46 to 2.49)	Combined data on all primary hernia from Table 2 of the article
Zieren et al., 1998[838,839]	TAPP vs. Mesh plug	RC	Hernia recurrence	Median: 25 months (SD: 7)	0% (0/75)	0% (0/75)	NS based on OR=1 (95% CI: 0.02 to 51.06)[@]	
	TAPP vs. Mesh plug	HOSP	Hospital stay (days)	NA	3 (SD: 2) (N=80)	2 (SD: 1) (N=80)	No p value reported for this two-group comparison	
	TAPP vs. Mesh plug	RTDA	Return to daily activities (days)	NA	3 (SD: 2) (N=80)	4 (SD: 2) (N=80)	No p value reported for this two-group comparison	
	TAPP vs. Mesh plug	RTW	Return to work (days)	NA	16 (SD: 8) (N=80)	18 (SD: 7) (N=80)	No p value reported for this two-group comparison	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Zieren et al., 1998[838,839] (continued)	TAPP vs. Mesh plug	Pain	Pain: VAS	day of surgery	4.6 (SD: NR) (N=80)	3.7 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: VAS	one day	3.9 (SD: NR) (N=80)	4.2 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: VAS	two days	3.6 (SD: NR) (N=80)	3.8 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: VAS	three days	3 (SD: NR) (N=80)	3.3 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Zieren et al., 1998[838,839] (continued)	TAPP vs. Mesh plug	Pain	Pain: VAS	four days	2.6 (SD: NR) (N=80)	2.8 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: VAS	five days	2.2 (SD: NR) (N=80)	2.3 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: VAS	six days	1.9 (SD: NR) (N=80)	1.8 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: need for analgesia, number of grams Metamizol	postoperative	4.2 (SD: 1.4) (N=80)	4.9 (SD: 1.9) (N=80)	No p value reported for this two-group comparison	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Zieren et al., 1998[838,839] (continued)	TAPP vs. Mesh plug	Pain	Pain: VAS	one week	2 (SD: NR) (N=80)	1.5 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Persistent pain	postoperative	4% (3/80)	3% (2/80)	NS based on OR=1.52 (95% CI: 0.25 to 9.35)[@]	
	TAPP vs. Mesh plug	Pain	Pain: VAS	eight days	1.7 (SD: NR) (N=80)	1.4 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: VAS	nine days	1.2 (SD: NR) (N=80)	0.9 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Zieren et al., 1998[838,839] (continued)	TAPP vs. Mesh plug	Pain	Pain: VAS	10 days	0.6 (SD: NR) (N=80)	0.4 (SD: NR) (N=80)	NR	Values estimated based on the Figure in the article. Error bars were provided in the graph but these were undefined.
	TAPP vs. Mesh plug	Pain	Pain: need for analgesia, number of days	NA	2 (SD: 4) (N=80)	3 (SD: 7) (N=80)	No p value reported for this two-group comparison	
	TAPP vs. Mesh plug	ADV	Epigastric vessel bleeding	intraoperative	3% (2/80)	0% (0/80)	NS based on OR=5.13 (95% CI: 0.24 to 108.52)[@]	
	TAPP vs. Mesh plug	ADV	Hematoma	postoperative	8% (6/80)	6% (5/80)	NS based on OR=1.22 (95% CI: 0.36 to 4.16)[@]	
	TAPP vs. Mesh plug	ADV	Seroma	postoperative	5% (4/80)	3% (2/80)	NS based on OR=2.05 (95% CI: 0.37 to 11.54)[@]	
	TAPP vs. Mesh plug	ADV	Urinary retention	postoperative	3% (2/80)	1% (1/80)	NS based on OR=2.03 (95% CI: 0.18 to 22.8)[@]	
	TAPP vs. Mesh plug	ADV	Wound infection	postoperative	0% (0/80)	3% (2/80)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.13)[@]	

Key Question 2b Tables

Table 19. Key Question 2b: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Champault et al., 1997[651-654]	France	Paris University Hospital	1	RCT	Stoppa vs. TEP	50	7/1991 to 3/1995	University hospital	NR
Douek et al., 2003[674,675]	United Kingdom	North Middlesex University Hospital and Whipps Cross University Hospital	2	RCT	Lichtenstein vs. TAPP	403	5/1995 to 12/1996	University hospital	Medical Research Council, Frank Taylor Memorial Trust, and National Health Service Research and Development grants
Ozmen et al., 2010[779]	Turkey	Ankara Numune Teaching and Research Hospital	1	RCT	Stoppa vs. TEP	64	4/2003 to 4/2007	University hospital	NR
Sarli et al., 2001[801]	Italy	Parma University School of Medicine	1	RCT	Lichtenstein vs. TAPP	43	1/1994 to 2/1997	University hospital	NR
Suter et al., 2002[819,820]	Switzerland	NR	NR	RCT	Stoppa vs. TEP	39	12/1996 to 10/1999	NR	Supported in part by a grant from Ethicon Endo-Surgery, Spreitenbach, Switzerland
Wara et al., 2005[829-834]	Denmark	78 throughout Denmark	78	Non-randomized comparative study	Lichtenstein vs. TAPP/TEP	67,306 repairs in the registry; 3,202 patients' data included for this Key Question	1/1/1998 to 12/31/2005	76% hospital departments, 24% private clinics	Danish Institute for Health Technology Assessment and the Danish Research Council. SWEDISH: National Board of Health and Welfare and the Federation of County Councils in Sweden

Table 20. Key Question 2b: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Champault et al., 1997[651-654]					x		x		x						x	
Douek et al., 2003[674,675]									x							
Ozmen et al., 2010[779]		x														
Sarli et al., 2001[801]		x	x		x					x		x			x	
Suter et al., 2002[819,820]		x													x	
Wara, 2008[829-834]																

Table 21. Key Question 2b: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Champault et al., 1997[651-654]	40-75	x			x		x	x			x	x			
Douek et al., 2003[674,675]	18+				x					x					
Ozmen et al., 2010[779]	18+				x	3+	x								
Sarli et al., 2001[801]	Adults			x	x	3+				x	x				
Suter et al., 2002[819,820]	35+				x	3+	x								
Wara, 2008[829-834]	Adults														

Table 22. Key Question 2b: Patient enrollment criteria, other

Study	Other enrollment criteria
Champault et al., 1997[651-654]	Excluded poor cardiorespiratory status, cirrhosis, coagulopathy, glaucoma, pelvic irradiation, body mass index more than 30 (however this stated criterion was not applied uniformly because 31% of patients (31/100) had a body mass index greater than 30). Appendectomy was not an exclusion
Douek et al., 2003[674,675]	Excluded those with psychological complaints, or had a poor understanding of English
Ozmen et al., 2010[779]	Excluded previous lower abdominal preperitoneal surgery
Sarli et al., 2001[801]	Excluded anyone who had been referred by their general practitioner to receive a specific type of procedure.
Suter et al., 2002[819,820]	No other criteria
Wara, 2008[829-834]	Authors included all repairs that were in the database, which represents 98% of all hernia repairs performed in Denmark

Table 23. Key Question 2b: Treatment details

Study	Treatment A	Treatment B
Champault et al., 1997[651-654]	TEP, prior experience with TEP of this surgeon was 50 cases (to confirm feasibility and serve as a training period for the members of the surgical team). General anesthesia, direct inflation of the Retzius space using carbon dioxide with a Veress needle. One mesh if unilateral, two if bilateral. mesh was polypropylene (Ethicon) slit on the lower edge to allow passage of the spermatic cord, mesh not fixed. First 11 patients had 11x6 cm mesh, last 89 patients had 15x13 cm mesh.	Stoppa (prior Stoppa experience of surgeons not reported), general anesthesia, dissection of the preperitoneal space from one psoas muscle to the other, Dacron mesh (Ethicon) 30x15 cm with a lower edge slit to allow passage of the spermatic cord, mesh not fixed.
Douek et al., 2003[674,675]	TAPP, general anesthesia, 10x15 cm polypropylene mesh (Prolene, Ethicon), stapled in position with the EMS multifeed staple gun. Peritoneum was replaced to exclude the mesh from the cavity and stapled in position. For bilateral cases, either two meshes were used, or a single 28x10 cm mesh.	Lichtenstein, local anesthesia, no other details reported
Ozmen et al., 2010[779]	TEP as described by Begin using four trocars, general anesthesia. Insufflation with 12 nnHG carbon dioxide after balloon dissection. Both sides of the hernial sac were reduced and 10x15 cm Prolene mesh (Ethicon) inserted without making any keyhole and fixed to Cooper's ligament, the anterior abdominal wall, and the iliopsoas muscles using a total of 5-8 tacks.	Stoppa method using a giant V-shaped polypropylene mesh (Ethicon). general anesthesia. Hernial sac reduced or ligated. 10x15 cm Prolene mesh fixed to the pubis and Cooper's ligament with 1 or 2 stitches.
Sarli et al., 2001[801]	TAPP "bikini mesh" repair. Pneumoperitoneum was established. Peritoneum overlying the inguinal regions was divded transversely from the medial umbilical ligament to a point on the iliopubic tract 2 cm lateral to the internal inguinal ring. Upper and lower peritoneal flaps created. Single piece of polypropylene mesh 30x10 cm (no splits) to cover the spermatic cords, spermatic vessels, and all hernial orifices, passing into the cave of Retzius between the bladder and the pubis. mesh tacked to Cooper's ligament and transversalis fascia using 4-6 titanium staples at each side. mesh was fully reperitonealized.	Lichtenstein as described by Amid. No mesh details provided.
Suter et al., 2002[819,820]	TEP as described by Begin using four trocars, maximum insufflation pressure of 10 mmHG, and two slit 14x14 cm polypropylene meshes (Ethicon)	Stoppa method using a giant V-shaped polypropylene mesh (Ethicon).
Wara, 2008[829-834]	TAPP in 91.7%; TEP in 8.3%. "Six of 33 hospital departments reported more than 50 laparoscopic repairs per year whereas 21 departments performed fewer than 20 repairs annually."	Lichtenstein, no other details reported

Table 24. Key Question 2b: Baseline characteristics

Study	Characteristic	Group A	Group B	Comments
Champault et al., 1997[651-654]	% bilateral	41% (21/51)	49% (24/49)	
	% direct	71% (36/51)	80% (39/49)	
	% femoral	0% (0/51)	0% (0/49)	
	% indirect	29% (15/51)	20% (10/49)	
	% irreducible	0% (0/51)	0% (0/49)	
	% large inguinoscrotal hernia	0% (0/51)	0% (0/49)	
	% primary	61% (31/51)	53% (26/49)	
	% recurrent	39% (20/51)	47% (23/49)	
	% strangulated	0% (0/51)	0% (0/49)	
	% male	100% (51/51)	100% (49/49)	
	% smoking	41% (21/51)	57% (28/49)	
	% with body mass index greater than 30	33% (17/51)	29% (14/49)	
	Age	57.2 (SD: 40.74) (N=51)	61.3 (SD: 43.77) (N=49)	
	% ASA score 1	27% (14/51)	24% (12/49)	
	% ASA score 2	67% (34/51)	67% (33/49)	
	% ASA score 3	6% (3/51)	8% (4/49)	

Study	Characteristic	Group A	Group B	Comments
Champault et al., 1997[651-654] (continued)	% ASA score 4	0% (0/51)	0% (0/49)	
	% prostatism	27% (14/51)	18% (9/49)	
Douek et al., 2003[674,675]	% bilateral	12% (23/200)	12% (24/200)	This study reported a subgroup analysis of these bilateral patients
	% femoral	0% (0/200)	0% (0/200)	
	% recurrent	11% (21/200)	10% (19/200)	
	% symptoms urinary	7% (14/200)	9% (17/200)	
	Surface area in square meters	1.88 (Range: 1.48 to 2.24) (N=200)	1.86 (Range: 1.39 to 2.42) (N=200)	
	% work either unemployed, retired, or housework	36% (72/200)	36% (72/200)	
	% work employed by a company	48% (96/200)	50% (99/200)	
	% work self employed	16% (31/200)	15% (29/200)	
	Age	Median: 52.5 (Range: 19 to 83) (N=200)	Median: 51.5 (Range: 19 to 80) (N=200)	
	% ASA score 1 or 2	97% (193/200)	95% (190/200)	
	% hypertension	16% (32/200)	8% (16/200)	
	% previous lower abdominal surgery	29% (57/200)	28% (56/200)	
	% taking regular analgesia or NSAID	14% (28/200)	14% (27/200)	
	SF-36 bodily pain	61.5 (NR) (N=197)	64.5 (NR) (N=195)	

Study	Characteristic	Group A	Group B	Comments
Douek et al., 2003[674,675] (continued)	SF-36 general health	74.1 (NR) (N=196)	71.8 (NR) (N=195)	
	SF-36 mental health	73.9 (NR) (N=197)	74.9 (NR) (N=195)	
	SF-36 physical functioning	74.9 (NR) (N=194)	79.3 (NR) (N=195)	
	SF-36 role limitation, emotional	78.3 (NR) (N=192)	80.5 (NR) (N=194)	
	SF-36 role limitation, physical	65.8 (NR) (N=192)	68.3 (NR) (N=194)	
	SF-36 social functioning	83.8 (NR) (N=197)	84 (NR) (N=195)	
	SF-36 vitality	62.2 (NR) (N=197)	64.6 (NR) (N=195)	
Ozmen et al., 2010[779]	% Nyhus type 1	14% (9/64)	13% (8/64)	N is hernias
	% Nyhus type 2	48% (31/64)	45% (29/64)	N is hernias
	% Nyhus type 3a	17% (11/64)	20% (13/64)	N is hernias
	% Nyhus type 3b	11% (7/64)	11% (7/64)	N is hernias
	% Nyhus type 3c	5% (3/64)	3% (2/64)	N is hernias
	% Nyhus type 4	5% (3/64)	8% (5/64)	N is hernias
	% unilateral	0% (0/32)	0% (0/32)	
	% male	91% (29/32)	97% (31/32)	

Study	Characteristic	Group A	Group B	Comments
Ozmen et al., 2010[779] (continued)	Age	Median: 43 (Range: 19 to 75) (N=32)	Median: 48 (Range: 22 to 71) (N=32)	
Sarli et al., 2001[801]	% irreducible	0% (0/20)	0% (0/23)	
	% Nyhus type 1	0% (0/20)	0% (0/23)	
	% Nyhus type 2	125% (25/20)	126% (29/23)	
	% Nyhus type 3a	55% (11/20)	65% (15/23)	
	% Nyhus type 3b	0% (0/20)	0% (0/23)	
	% Nyhus type 3c	15% (3/20)	9% (2/23)	
	% Nyhus type 4	0% (0/20)	0% (0/23)	
	% recurrent	0% (0/20)	0% (0/23)	
	% scrotal massive	0% (0/20)	0% (0/23)	
	% sliding	0% (0/20)	0% (0/23)	
	% unilateral	0% (0/20)	0% (0/23)	
	% male	100% (20/20)	100% (23/23)	
	Age	48.7 (SD: 14.8) (N=20)	49.4 (SD: 15.1) (N=23)	
	Height (cm)	173 (SD: 6.7) (N=20)	175 (SD: 5.9) (N=23)	
	Weight (kg)	74 (SD: 14.2) (N=20)	78 (SD: 16.1) (N=23)	

Study	Characteristic	Group A	Group B	Comments
Sarli et al., 2001[801] (continued)	% ASA score 1	50% (10/20)	48% (11/23)	
	% ASA score 2	50% (10/20)	52% (12/23)	
	% congential hernia	0% (0/20)	0% (0/23)	
	Pain VAS	Median: 1 (Range: 1-2) (N=20)	Median: 1 (Range: 1-2) (N=23)	
Suter et al., 2002[819,820]	% inguinoscrotal hernia, large	0% (0/19)	0% (0/20)	
	% unilateral	0% (0/19)	0% (0/20)	
	% male	95% (18/19)	100% (20/20)	
	Age	63 (Range: 36082) (N=19)	57 (Range: 36-91) (N=20)	
	ASA score	1.6 (NR) (N=19)	1.68 (NR) (N=20)	
Wara, 2008[829-834]	% bilateral	49% (1,757/3,606)	4% (1,451/39,537)	
	% bilateral primary	35% (1,253/3,606)	3% (1,260/39,537)	
	% bilateral primary hernia and both were direct	18% (644/3,606)	2% (710/39,537)	
	% bilateral primary hernia and both were indirect	7% (250/3,606)	0% (192/39,537)	
	% bilateral primary hernia, mixed procedure	0% (9/3,606)	0% (80/39,537)	
	% bilateral primary hernia, one indirect and one direct	5% (166/3,606)	0% (107/39,537)	
	% bilateral primary hernia, other	5% (184/3,606)	0% (171/39,537)	

Study	Characteristic	Group A	Group B	Comments
Wara, 2008[829-834] (continued)	% recurrent	52% (1,865/3,606)	12% (4,824/39,537)	
	% recurrent bilateral hernia, mixed procedures	0% (6/3,606)	0% (19/39,537)	
	% recurrent bilateral hernia, uniform procedure	14% (498/3,606)	0% (172/39,537)	
	% recurrent unilateral	38% (1,361/3,606)	12% (4,633/39,537)	
	% unilateral primary	14% (488/3,606)	85% (33,453/39,537)	
	% unilateral primary direct	5% (179/3,606)	34% (13,303/39,537)	
	% unilateral primary indirect	7% (254/3,606)	42% (16,463/39,537)	
	% unilateral primary other	1% (46/3,606)	5% (2,100/39,537)	
	% unilateral primary pantaloon	0% (9/3,606)	4% (1,587/39,537)	
	% male	95% (3,423/3,606)	94% (37,140/39,537)	
	Age	Median: 58 (Range: 18-93) (N=3,606)	Median: 60 (Range: 18-99) (N=39,537)	

Table 25. Key Question 2b: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Champault et al., 1997[651-654]	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Douek et al., 2003[674,675]	Among those with bilateral hernia, return to social activities (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
	Among those with bilateral hernia, return to usual activities around the house (days)	NA	Y	Y	Y	Y	Y	Y	N	?	Y	Y	N	N	Y	Y	Y	Mod.
Ozmen et al., 2010[779]	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Sarli et al., 2001[801]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	More than one night in the hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain any	During the first seven days	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain lasting occuring more than one week after surgery	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain right shoulder tip	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	six hours	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	12 hours	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one day	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain: discomforting pain in at least one inguinal region	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Sarli et al., 2001[801] (continued)	Pain: need for analgesia: number of intramuscular injections of 30 mg Ketorlac	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Suter et al., 2002[819,820]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Return to normal activities (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain maximum VAS	same day of operation	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain maximum VAS	one day	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain maximum VAS	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of doses of 500 mg mefanamic acid	same day of operation	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of doses of 500 mg mefanamic acid	one day	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of doses of 500 mg mefanamic acid	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of doses of 500 mg parecetamol	same day of operation	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of doses of 500 mg parecetamol	one day	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Suter et al., 2002[819,820] (continued)	Pain: need for analgesia, number of doses of 500 mg parecetamol	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of mg of morphine	same day of operation	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of mg of morphine	one day	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of mg of morphine	two days	Y	Y	Y	Y	Y	Y	?	?	?	?	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
Wara et al., 2005[829-834]	Hernia recurrence	between 0 and 3 years	N	N	Y	N	N	?	?	?	Y	N	N	?	?	Y	Y	High
	Hernia recurrence	between 0 and 3 years	N	N	Y	N	N	?	?	?	Y	N	N	?	?	Y	Y	High

Table 26. Key Question 2b: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Champault et al., 1997[651-654]	Bilateral hernia: TEP vs. Stoppa	HOSP	Hospital stay (days)	NA	2.8 (Range: 1-6) (N=21)	8.2 (Range: 6-12) (N=24)	p=0.001 either t-test or Mann Whitney, did not report which	Bilateral hernia only.
Douek et al., 2003[674,675]	Bilateral hernia: TAPP vs. Lichtenstein	RTDA	Among those with bilateral hernia, return to social activities (days)	NA	Median: 5 (SD: NR) (N=20)	Median: 13.5 (SD: NR) (N=24)	Adjusted Hazard ratio: 0.23 (95% CI: 0.12 to 0.45)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
	Bilateral hernia: TAPP vs. Lichtenstein	RTDA	Among those with bilateral hernia, return to usual activities around the house (days)	NA	Median: 3 (SD: NR) (N=20)	Median: 6 (SD: NR) (N=24)	Adjusted Hazard ratio: 0.26 (95% CI: 0.13 to 0.54)	Adjusted for age, sex, total body surface area, ASA score, unilateral/bilateral, and primary/recurrent. Ratios less than 1.0 suggests shorter recovery time in the laparoscopy group
Ozmen et al., 2010[779]	TEP vs. Stoppa	HOSP	Hospital stay (days)	NA	1.2 (Range: 1-3) (N=32)	2.2 (Range: 1-4) (N=32)	p NS, Mann Whitney U test	
	TEP vs. Stoppa	ADV	Epigastric vessel bleeding	intraoperative	6% (2/32)	0% (0/32)	n.s. based on OR=5.33 (95% CI: 0.25 to 115.5)[@]	
	TEP vs. Stoppa	ADV	Preperitoneal tear	intraoperative	3% (1/32)	0% (0/32)	n.s. based on OR=3.1 (95% CI: 0.12 to 78.87)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ozmen et al., 2010[779] (continued)	TEP vs. Stoppa	ADV	Scrotal hematoma	postoperative	3% (1/32)	3% (1/32)	NS based on OR=1 (95% CI: 0.06 to 16.71)[@]	
	TEP vs. Stoppa	ADV	Seroma	postoperative	3% (1/32)	6% (2/32)	NS based on OR=0.48 (95% CI: 0.04 to 5.62)[@]	
	TEP vs. Stoppa	ADV	Trocar "side" hematoma (not trocar site)	postoperative	3% (1/32)	0% (0/32)	n.s. based on OR=3.1 (95% CI: 0.12 to 78.87)[@]	
	TEP vs. Stoppa	ADV	Trocar "side" infection (not trocar site)	postoperative	6% (2/32)	0% (0/32)	n.s. based on OR=5.33 (95% CI: 0.25 to 115.5)[@]	
	TEP vs. Stoppa	ADV	Urinary retention	postoperative	0% (0/32)	9% (3/32)	n.s. based on OR=0.13 (95% CI: 0.01 to 2.62)[@]	
	TEP vs. Stoppa	ADV	Wound infection	postoperative	0% (0/32)	6% (2/32)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.07)[@]	
	TEP vs. Stoppa	ADV	Any complications	Median: 1.5 years (Range: 9 months to 42 months)	0% (0/32)	0% (0/32)	n.s. based on OR=1 (95% CI: 0.02 to 51.94)[@]	
Sarli et al., 2001[801]	TAPP vs. Lichtenstein	RC	Hernia recurrence	one year	0% (0/20)	4% (1/23)	n.s. based on OR=0.37 (95% CI: 0.01 to 9.49)[@]	
	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	Median: 2 (SD: NR) (N=20)	Median: 2 (SD: NR) (N=23)	p NS by either Wilcoxon or t-test (not reported which)	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sarli et al., 2001[801] (continued)	TAPP vs. Lichtenstein	HOSP	More than one night in the hospital	NA	65% (13/20)	96% (22/23)	p<0.05 based on OR=0.08 (95% CI: 0.01 to 0.77)@	
	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	Median: 16 (Range: 7-32) (N=20)	Median: 30 (Range: 10-54) (N=23)	p<0.05 by either Wilcoxon or t-test (not reported which)	
	TAPP vs. Lichtenstein	Pain	Pain VAS	six hours	Median: 3 (25th Median: 1; 75th Median: 2) (N=20)	Median: 4 (25th 2; 75th 6) (N=23)	p NS by either Wilcoxon or t-test (not reported which)	
	TAPP vs. Lichtenstein	Pain	Pain VAS	12 hours	Median: 3 (SD: NR) (N=20)	Median: 4 (SD: NR) (N=23)	p NS by either Wilcoxon or t-test (not reported which)	
	TAPP vs. Lichtenstein	Pain	Pain VAS	one day	Median: 1 (25th 0.9; 75th 2.4) (N=20)	Median: 4 (25th 2; 75th 6) (N=23)	p=0.001 by either Wilcoxon or t-test (not reported which)	
	TAPP vs. Lichtenstein	Pain	Pain VAS	two days	Median: 1 (SD: NR) (N=20)	Median: 3 (SD: NR) (N=23)	p=0.001 by either Wilcoxon or t-test (not reported which)	
	TAPP vs. Lichtenstein	Pain	Pain any	During the first seven days	65% (13/20)	70% (16/23)	NS based on OR=0.81 (95% CI: 0.23 to 2.92)@	
	TAPP vs. Lichtenstein	Pain	Pain lasting occuring more than one week after surgery	postoperative	15% (3/20)	52% (12/23)	p<0.05 based on OR=0.16 (95% CI: 0.04 to 0.71)@	
	TAPP vs. Lichtenstein	Pain	Pain right shoulder tip	postoperative	25% (5/20)	0% (0/23)	NS based on OR=16.68 (95% CI: 0.86 to 323.55)@	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sarli et al., 2001[801] (continued)	TAPP vs. Lichtenstein	Pain	Pain VAS	one week	Median: 1 (SD: NR) (N=20)	Median: 2 (SD: NR) (N=23)	p=0.001 by either Wilcoxon or t test (not reported which)	
	TAPP vs. Lichtenstein	Pain	Pain: discomforting pain in at least one inguinal region	one week	5% (1/20)	35% (8/23)	p<0.05 based on OR=0.1 (95% CI: 0.01 to 0.88)@	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia: number of intramuscular injections of 30 mg Ketorlac	postoperative	0.9 (SD: NR) (N=20)	2.4 (SD: NR) (N=23)	p<0.05 by either Wilcoxon or t test (not reported which)	
	TAPP vs. Lichtenstein	ADV	Any complications	intraoperative	0% (0/20)	0% (0/23)	NS based on OR=1.15 (95% CI: 0.02 to 60.41)@	
	TAPP vs. Lichtenstein	ADV	Hematoma	in-hospital	5% (1/20)	17% (4/23)	NS based on OR=0.25 (95% CI: 0.03 to 2.45)@	
	TAPP vs. Lichtenstein	ADV	Mortality	in-hospital	0% (0/20)	0% (0/23)	NS based on OR=1.15 (95% CI: 0.02 to 60.41)@	
	TAPP vs. Lichtenstein	ADV	Paresthesia	in-hospital	5% (1/20)	4% (1/23)	NS based on OR=1.16 (95% CI: 0.07 to 19.8)@	
	TAPP vs. Lichtenstein	ADV	Seroma	in-hospital	10% (2/20)	0% (0/23)	n.s. based on OR=6.35 (95% CI: 0.29 to 140.55)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	in-hospital	15% (3/20)	0% (0/23)	n.s. based on OR=9.4 (95% CI: 0.46 to 194.01)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sarli et al., 2001[801] (continued)	TAPP vs. Lichtenstein	ADV	Wound infection	in-hospital	0% (0/20)	13% (3/23)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.94)[@]	
Suter et al., 2002[819,820]	TEP vs. Stoppa	RC	Hernia recurrence	one year	5% (1/19)	0% (0/20)	n.s. based on OR=3.32 (95% CI: 0.13 to 86.75)@	
	TEP vs. Stoppa	HOSP	Hospital stay (days)	NA	2.2 (Range: 2-4) (N=19)	2.7 (Range: 2-4) (N=20)	p=0.02 t-test	
	TEP vs. Stoppa	RTDA	Return to normal activities (days)	NA	16 (Range: 11-27) (N=19)	31 (Range: 14-57) (N=20)	p=0.001 t-test	
	TEP vs. Stoppa	Pain	Pain maximum VAS	one day	3.3 (Range: 0-9) (N=19)	3.36 (Range: 0-8) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain maximum VAS	same day of operation	3.67 (Range: 0-10) (N=19)	5.39 (Range: 0-8) (N=20)	p=0.05 t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of doses of 500 mg mefanamic acid	same day of operation	0.85 (Range: 0-3) (N=19)	0.81 (Range: 0-3) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of doses of 500 mg mefanamic acid	one day	1.1 (Range: 0-4) (N=19)	1.31 (Range: 0-4) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of doses of 500 mg parecetamol	same day of operation	1.6 (Range: 0-4) (N=19)	1.57 (Range: 0-5) (N=20)	p NS t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Suter et al., 2002[819,820] (continued)	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of doses of 500 mg parecetamol	one day	1.95 (Range: 0-4) (N=19)	2.31 (Range: 0-6) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of mg of morphine	one day	1.4 (Range: 0-15) (N=19)	0.81 (Range: 0-7.5) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of mg of morphine	same day of operation	3.1 (Range: 0-24) (N=19)	4.36 (Range: 0-17.5) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain maximum VAS	two days	2.27 (Range: 0-8) (N=19)	2.65 (Range: 0-8) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of doses of 500 mg mefanamic acid	two days	0.75 (Range: 0-4) (N=19)	0.73 (Range: 0-3) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of doses of 500 mg parecetamol	two days	1 (Range: 0-4) (N=19)	1.36 (Range: 0-4) (N=20)	p NS t-test	
	TEP vs. Stoppa	Pain	Pain: need for analgesia, number of mg of morphine	two days	0.05 (Range: 0-7.5) (N=19)	0.52 (Range: 0-10) (N=20)	p NS t-test	
	TEP vs. Stoppa	ADV	Any complications	intraoperative	0% (0/19)	0% (0/20)	n.s. based on OR=1.05 (95% CI: 0.02 to 55.63)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Wara et al., 2005[829-834]	TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	Between 0 and 3 years	4.2% (73/1748)	3.5% (48/1371)	n.s. based on OR=1.20 (95% CI: 0.83 to 1.74)[@]	Combined data from Table 3 in the article

Key Question 2c Tables

Table 27. Key Question 2c: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Beets et al., 1999[629]	The Netherlands	University Hospital of Maastricht	1	Randomized trial	Stoppa vs. TAPP	79	11/1993 to 3/1996	University hospital	NR
Champault et al., 1997[651-654]	France	Paris University Hospital	1	Randomized trial	Stoppa vs. TEP	50	7/1991 to 3/1995	University hospital	NR
Dedemadi et al., 2006[669]	Greece	Korgialenio-Benakio Red Cross Hospital	1	Randomized trial	Lichtenstein vs. TAPP vs. TEP	82	2/1999 to 11/2004	Non-university hospital	NR
Eklund et al., 2007[683]	Sweden	7 centers in Sweden	7	Randomized trial	Lichtenstein vs. TAPP	147	4/1993 to 5/1996	Four large county hospitals, two university hospitals, one local hospital	Three sources: Ethicon EndoSurgery, Johnson & Johnson Company, and Stig and Ragna Gorthon Foundation. Authors also stated that "Ethicon did not have any involvement in the design or performance of the study or in the data analysis."
Kouhia et al., 2009[727]	Finland	North Carelia Central Hospital	1	Randomized trial	Lichtenstein vs. TEP	99	2/1997 to 2/2002	general surgery clinic	North Carelia Central Hospital and University of Kuopio Computing Center
Neumayer et al., 2004[762-768]	USA	14 VA medical centers	14	Randomized trial	Lichtenstein vs. TAPP/TEP	184 recurrent	1/1999 to 11/2001	Non-university hospitals	Cooperative Studies Program of the Department of Veterans Affairs Office of Research and Development

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Sevonius et al., 2009[535,805-813]	Sweden	95% of all hospitals in Sweden	NR	Non-randomized comparative study	Numerous comparisons	174,527 hernias in the registry; approximately 10,827 patients' data included for this Key Question, basedon 12,104 recurrent repairs)	1992 to 2006	57% of repairs performed in medium-sized non-teaching hospitals; 32% performed in small-sized non-teaching hospitals; 11% performed in teaching hospitals	Sweden's National Board of Health and Welfare, the Swedish Association of Local Authorities, and by the County Council of Jämtland
Wara et al., 2005[829-834]	Denmark	78 throughout Denmark	78	Non-randomized comparative study	Lichtenstein vs. TAPP/TEP	67,306 repairs in the registry; 6,689 patients' data included for this Key Question	1/1/1998 to 12/31/2005	76% hospital departments, 24% private clinics	Danish Institute for Health Technology Assessment and the Danish Research Council. SWEDISH: National Board of Health and Welfare and the Federation of County Councils in Sweden

Table 28. Key Question 2c: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Beets et al., 1999[629]	x														x	
Champault et al., 1997[651-654]					x		x		x						x	
Dedemadi et al., 2006[669]	x				x											
Eklund et al., 2007[683]	x			x										x		
Kouhia et al., 2009[727]	x			x												x
Neumayer et al., 2004[762-768]							x									
Sevonius et al., 2009[535,805-813]																
Wara, 2008[829-834]																

Table 29. Key Question 2c: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Beets et al., 1999[629]	20-80				x	4+	x			x	x			x	
Champault et al., 1997[651-654]	40-75	x			x		x	x			x	x			
Dedemadi et al., 2006[669]	Adults			x	x	3+			x		x		x		
Eklund et al., 2007[683]	30-70	x			x	4+		x							x
Kouhia et al., 2009[727]	Adults			x											
Neumayer et al., 2004[762-768]	18+	x			x	4+	x	x							
Sevonius et al., 2009[535,805-813]	15+														
Wara, 2008[829-834]	Adults														

Table 30. Key Question 2c: Patient enrollment criteria, other

Study	Other enrollment criteria
Beets et al., 1999[629]	Appendectomy was not an exclusion. Excluded concomitant surgery, previous preperitoneal hernia repair, ambulatory treatment, regional anesthesia, those who had experienced their hernia recurrence in the context of a separate clinical trial
Champault et al., 1997[651-654]	Excluded poor cardiorespiratory status, cirrhosis, coagulopathy, glaucoma, pelvic irradiation, body mass index more than 30 (however this stated criterion was not applied uniformly because 31% of patients (31/100) had a body mass index greater than 30). Appendectomy was not an exclusion
Dedemadi et al., 2006[669]	Excluded those unwilling to be randomized
Eklund et al., 2007[683]	Excluded prior herniorraphies before the age of 16, unagle to participate in postoperative evaluation because of drug abuse/psychiatric disorders/language difficulties, violations to study protocol (did not report what specific violations warranted exclusion), participating surgeon not available, "medical reasons" (did not report whether medical reasons in addition to those specified above would warrant exclusion)
Kouhia et al., 2009[727]	Excluded any noninguinal hernia, other surgical problems in the inguinal area that required treatment
Neumayer et al., 2004[762-768]	Excluded hernia undetected on physical examination, presence of bowel obstruction/strangulation/peritonitis/perforation, contraindications to pelvic laparoscopy such as previous pelvic surgical procedures, previous mesh hernia repair, life expectancy less than two years, participation in another clinical trial.
Sevonius et al., 2009[535,805-813]	Groin repairs in Sweden. One of the publications excluded those without recurrent hernia,[805] and another excluded those with recurrent or bilateral hernia.[808]
Wara, 2008[829-834]	Authors included all repairs that were in the database, which represents 98% of all hernia repairs performed in Denmark

Table 31. Key Question 2c: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D
Beets et al., 1999[629]	TAPP, general anesthesia. Each procedure was performed either by a surgical resident assisted by one of four laparoscopic surgeons, or by one of these same four surgeons, who had "varying experience in laparoscopic hernia repair" (authors did not report the number of prior procedures they had performed). 71% of the procedures were performed by non-trainees. Carbon dioxide pneumoperitoneum. Direct sac is reduce, indirect sac is reduced and dissected off the vas deferens and testicular vessels. 10x15 cm polypropylene mesh (Prolene, Ethicon) with rounded edges placed over the inguinofemoral area, widely overlapping the edges of the hernial defect. mesh not anchored by staples or sutures.	Stoppa method (termed "giant prosthetic reinforcement of the visceral sac" by the authors), general anesthesia. Each procedure was performed by either a surgical resident assisted by one of five surgeons, or one of those same five surgeons (prior experience with this procedure was not reported). 35% of the procedures were performed by non-trainees. Large polypropylene mesh 26x18 cm (Marlex, CR Bard) with two vertical slits of approximatley 10 cm in the upper border, positioned around the spermatic cords. Vertical slits were closed with running nonabsorbable sutures; mesh covers both inguinofemoral areas.	NA	NA
Champault et al., 1997[651-654]	TEP, prior experience with TEP of this surgeon was 50 cases (to confirm feasibility and serve as a training period for the members of the surgical team). general anesthesia, direct inflation of the Retzius space using carbon dioxide with a Veress needle. One mesh if unilateral, two if bilateral . mesh was polypropylene (Ethicon) slit on the lower edge to allow passage of the spermatic cord, mesh not fixed. First 11 patients had 11x6 cm mesh, last 89 patients had 15x13 cm mesh.	Stoppa (prior Stoppa experience of surgeons not reported), general anesthesia, dissection of the preperitoneal space from one psoas muscle to the other, Dacron mesh (Ethicon) 30x15 cm with a lower edge slit to allow passage of the spermatic cord, mesh not fixed.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Dedemadi et al., 2006[669]	TAPP, general anesthesia, dissection deep to the obturator vessels in the space of Retzius. mesh crossing the mdline, extending into the space of Retzius, and covring the cord structures extending laterally to the internal ring. mesh anchored to Cooper's ligament as well as superomedially and superolaterally.	TEP, general anesthesia. Balloon dissecting for preperitoneal space. Coopers ligament dissected, exposing of Hesselbach's triangle posteriorly. Nonabsorbable mesh positioned from the symphysis pubis to the ventral and lateral abdominal wall. mesh is held in place simply by the dorece of the peritoneum lying against the abdominal wall after desufflation.	Lichtenstein, general anesthesia. Dissection is not performed in the typical way because of the previous repair. mesh was left in situ in two patients with a previous open Lichtenstein. Direct sacs are inverted and imbricated with a nonabsorbable suture to flatten the posterior wall. Indirect sacs are dissected from the cord up to the extraperitoneal fat, then either excised or inverted, with a mesh cone inserted in the deep inguinal ring. Polypropylene mesh onlay applied to the posterior wall and tucked under the superior leaf of the external oblique, overlapping Poupart's ligament. Inferomedial corner of the mesh is sutured to the tissues overlying the pubic tubercle. One or two sutures are used where the tails of the mesh cross lateral to the cord.	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Eklund et al., 2007[683]	TAPP, 12 surgeons, all had "special training" in this technique. Authors did not report the number of prior TAPPs these surgeons had performed before the study started. general anesthesia. Pneumoperitoneum established using the Veress technique. Indirect sac was either inverted or divided; direct sac was always inverted. Preperitoneal dissection 4-5 cm in all directions from the hernial orifice, inferiorly below the ileopubic tract and Cooper's ligament, laterally along the spermatic vessels, and medially along the vas deferens. Polypropylene mesh (Prolene, Ethicon) 7x12cm attached using a stapler (EMS multifeed staplegun). 90% of meshes were tailored to the individual patient. Stapled placed on Cooper's ligament along the medial border on the posterior side of the rectus abdominis muscle and superiorly on both sides of the epigastric vessels. mesh tailoring was permitted.	Lichtenstein, 13 surgeons, all "experienced" in open hernia repair, and to these surgeons the Lichtenstein technique was described by videotape. Authors did not report the number of prior Lichtensteins these surgeons had performed before the study started. 59% had general anesthesia, 28% had spinal anesthesia, and 12% had epidural anesthesia. Indirect and direct sacs were resected or invaginated. Polypropylene mesh (Prolene, Ethicon) 4.5 to 9.5 cm. 90% of meshes were tailored to the individual patient. Inferiorly, mesh was anchored with a running 2/0 polypropylene suture, starting just cranial to the tuberculum pubicum along the inguinal ligament. Nonresorbable interruted sutures placed medically and superiorly. Slit in the mesh to permit passge for the spermatic cord and the ilioinguinal nerve. Lateral to the cord, suture placed through the lower rims of the two tails and the inguinal ligament to close the slit. mesh tailoring was permitted.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Kouhia et al., 2009[727]	TEP, general anesthesia, procedures performed by consultants in gastrointestinal surgery, and all of them performed both study procedures. Prior experience in laparoscopic hernia repair of these surgeons was not reported. TEP as described by Heikkinen. Polypropylene monofilament mesh, tackers (Origin Tacker System, OMS-TTS, Medsystems) were used to attach the mesh in all but 3 patients. In those 3, mesh attachment was considered unnecessary.	Lichtenstein, spinal anesthesia. Polypropylene monofilament mesh, attached with stitches.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Neumayer et al., 2004[762-768]	90% TEP, 10% TAPP. TAPP was the method of Fitzgibbons; TEP was the method of Smith. 99.1% had general anesthesia; 0.7% had regional anesthesia; 0.2% had local anesthesia. Specific meshes not reported, but there was a minimum mesh size (not reported) and a minimum overlap beyond a direct defect. 78 surgeons; 26% (20) had at least 250 prior laparoscopic repairs (did not report whether these were always the same as those performed in the study), and the other 74% (58) had more than 25 but fewer than 250 prior laparoscopic hernia repairs (did not report the average number). Surgeons submitted a videotape of a previously performed laparoscopic hernia procedure that was reviewed by a surgeon on the study committee. Attending surgeon was present through the procedure if he/she was not the one performing the procedure. Techniques were agreed upon beforehand and clarified with videos from the American College of Surgery.	Lichtenstein as described by Amid. 61% had general anesthesia; 27.5% had regional anesthesia; 11.5% had local anesthesia. Specific meshes not reported, but there was a minimum mesh size (not reported) and a minimum overlap beyond a direct defect. 117 surgeons, and most had substantial prior experience (84% or 635/756 primary hernias repaired with the open procedure were performed by surgeons with at least 250 prior open hernia operations). All had performed at least 25 prior open hernia procedures. Techniques were agreed upon beforehand and clarified with videos from the American College of Surgery.	NA	NA

Study	Treatment A	Treatment B	Treatment C	Treatment D
Sevonius et al., 2009[535,805-813]	"Laparoscopic"; some TAPP, some TEP, did not report the ratio, or any other procedural details.	Lichtenstein. The publication by Novik et al., 2011[811] detailed fixation methods from 82,015 procedures: nonabsorbable sutures in 95.7% (78,867); long-term absorbable sutures in 2.4% (1,938); short-term absorbable sutures in 1.5% (1,210); Staples or tacks in 0.1% (75); glue in 0.017% (14); no fixation in 0.2% (151).	"Plug," no other details reported	Open preperitoneal mesh, no other details reported
Wara, 2008[829-834]	TAPP in 91.7%; TEP in 8.3%. "Six of 33 hospital departments reported more than 50 laparoscopic repairs per year whereas 21 departments performed fewer than 20 repairs annually."	Lichtenstein, no other details reported	NA	NA

Table 32. Key Question 2c: Baseline characteristics

Study	Characteristic	Group A	Group B	Group C	Comments
Beets et al., 1999[629]	% bilateral, both sides recurrent	24% (10/42)	11% (4/37)		
	% bilateral, one side recurrent, the other side primary	10% (4/42)	30% (11/37)		
	% giant scrotal hernia	0% (0/42)	0% (0/37)		
	% recurrent	100% (42/42)	100% (37/37)		
	% unilateral recurrent	67% (28/42)	59% (22/37)		
	% male	98% (41/42)	97% (36/37)		
	% physically active	79% (33/42)	78% (29/37)		
	% work any	38% (16/42)	43% (16/37)		
	Age	58 (SD: 12) (N=42)	57 (SD: 13) (N=37)		
	BMI (kg/m^2)	24.2 (SD: 2.9) (N=42)	25.1 (SD: 2.8) (N=37)		
	% with one or more of the following: prostatism, chronic lung disease, constipation, or strenuous physical labor	24% (10/42)	30% (11/37)		
Champault et al., 1997[651-654]	% bilateral	41% (21/51)	49% (24/49)		
	% direct	71% (36/51)	80% (39/49)		
	% femoral	0% (0/51)	0% (0/49)		
	% indirect	29% (15/51)	20% (10/49)		

Study	Characteristic	Group A	Group B	Group C	Comments
Champault et al., 1997[651-654] (continued)	% irreducible	0% (0/51)	0% (0/49)		
	% large inguinoscrotal hernia	0% (0/51)	0% (0/49)		
	% primary	61% (31/51)	53% (26/49)		
	% recurrent	39% (20/51)	47% (23/49)		
	% strangulated	0% (0/51)	0% (0/49)		
	% male	100% (51/51)	100% (49/49)		
	% smoking	41% (21/51)	57% (28/49)		
	% with body mass index greater than 30	33% (17/51)	29% (14/49)		
	Age	57.2 (SD: 40.74) (N=51)	61.3 (SD: 43.77) (N=49)		
	% ASA score 1	27% (14/51)	24% (12/49)		
	% ASA score 2	67% (34/51)	67% (33/49)		
	% ASA score 3	6% (3/51)	8% (4/49)		
	% ASA score 4	0% (0/51)	0% (0/49)		
	% prostatism	27% (14/51)	18% (9/49)		
Dedemadi et al., 2006[669]	% bilateral	4% (1/24)	4% (1/26)	6% (2/32)	
	% femoral	4% (1/24)	0% (0/26)	0% (0/32)	
	% irreducible	0% (0/24)	0% (0/26)	0% (0/32)	

Study	Characteristic	Group A	Group B	Group C	Comments
Dedemadi et al., 2006[669] (continued)	% Nyhus type 1	0% (0/24)	0% (0/26)	0% (0/32)	
	% Nyhus type 2 recurrent	58% (14/24)	62% (16/26)	56% (18/32)	
	% Nyhus type 3a recurrent	29% (7/24)	31% (8/26)	31% (10/32)	
	% Nyhus type 3c recurrent	13% (3/24)	8% (2/26)	13% (4/32)	
	% recurrent, two or more prior operations	13% (3/24)	12% (3/26)	16% (5/32)	
	% symptoms bulge	96% (23/24)	100% (26/26)	97% (31/32)	
	% symptoms irreducible	4% (1/24)	4% (1/26)	9% (3/32)	
	% symptoms pain	54% (13/24)	54% (14/26)	50% (16/32)	
	% male	100% (24/24)	100% (26/26)	100% (32/32)	
	% work manual	25% (6/24)	27% (7/26)	25% (8/32)	
	% work mixed manual office	29% (7/24)	27% (7/26)	25% (8/32)	
	% work office	29% (7/24)	31% (8/26)	31% (10/32)	
	% work retired	17% (4/24)	15% (4/26)	19% (6/32)	
	Age	Entire study 65 (Range: 28-92) (N=50)			
	Body surface area	Entire study 1.75 (SD: 5) (N=50)			
	Weight (kg)	Entire study 78 (SD: 15.9) (N=50)			

Study	Characteristic	Group A	Group B	Group C	Comments
Dedemadi et al., 2006[669] (continued)	% use of analgesics	4% (1/24)	4% (1/26)	6% (2/32)	
Eklund et al., 2007[683]	% bilateral	0% (0/73)	0% (0/74)		
	% recurrent, one prior operations	86% (63/73)	72% (53/74)		
	% recurrent, two or more prior operations	12% (9/73)	24% (18/74)		
	% scrotal	0% (0/73)	0% (0/74)		
	% size not visible but palpable	19% (14/73)	30% (22/74)		
	% size visible	79% (58/73)	70% (52/74)		
	% male	100% (73/73)	100% (74/74)		
	% smoking	25% (18/73)	19% (14/74)		
	% work exertion heavy	16% (12/73)	26% (19/74)		
	% work exertion moderate	23% (17/73)	12% (9/74)		
	% work exertion slight	40% (29/73)	36% (27/74)		
	% work retired	18% (13/73)	23% (17/74)		
	% work unemployed	3% (2/73)	3% (2/74)		
	Age	52 (SD: 10.4) (N=73)	55 (SD: 11.3) (N=74)		
	Height (cm)	179 (SD: 6.4) (N=73)	178 (SD: 7.2) (N=74)		

Study	Characteristic	Group A	Group B	Group C	Comments
Eklund et al., 2007[683] (continued)	Weight (kg)	79 (SD: 9.3) (N=73)	80 (SD: 10.3) (N=74)		
	% ASA score 1	85% (62/73)	84% (62/74)		
	% ASA score 2	14% (10/73)	14% (10/74)		
	% ASA score 3	1% (1/73)	3% (2/74)		
	% comorbidity any condition(s)	4% (3/73)	0% (0/74)		
	Combined functional index score (ranges from 3-9)	Median: 3 (Range: 3-6) (N=73)	Median: 3 (Range: 3-6) (N=74)		
Kouhia et al., 2009[727]	% bilateral	0% (0/49)	0% (0/47)		
	% combined medial/lateral	4% (2/49)	6% (3/47)		
	% femoral	0% (0/49)	0% (0/47)		
	% irreducible	2% (1/49)	0% (0/47)		
	% lateral hernia	33% (16/49)	43% (20/47)		
	% Medial	29% (14/49)	34% (16/47)		
	% recurrent, one prior operations	88% (43/49)	89% (42/47)		
	% recurrent, three prior operations	2% (1/49)	4% (2/47)		
	% recurrent, two prior operations	10% (5/49)	6% (3/47)		
	% scrotal	12% (6/49)	19% (9/47)		

Study	Characteristic	Group A	Group B	Group C	Comments
Kouhia et al., 2009[727] (continued)	Time from last year repair (years)	13.1 (SD: 14) (N=49)	11.3 (SD: 13) (N=47)		
	% male	96% (47/49)	98% (46/47)		
	% smoking	16% (8/49)	26% (12/47)		
	% work light	61% (30/49)	55% (26/47)		
	% work physical	39% (19/49)	45% (21/47)		
	Age	57.8 (SD: 12.6) (N=49)	55.8 (SD: 12.8) (N=47)		
	BMI (kg/m^2)	25.2 (SD: 3.2) (N=49)	25.6 (SD: 2.7) (N=47)		
	% anticoagulant medication	20% (10/49)	17% (8/47)		
	% ASA score 1	35% (17/49)	38% (18/47)		
	% ASA score 2	47% (23/49)	40% (19/47)		
	% ASA score 3	18% (9/49)	21% (10/47)		
	% asymptomatic	0% (0/49)	0% (0/47)		
	% comorbidity asthma	8% (4/49)	9% (4/47)		
	% comorbidity cardiovascular	35% (17/49)	28% (13/47)		
	% comorbidity diabetes	2% (1/49)	9% (4/47)		
	% first hernia repair was herniotomy	4% (2/49)	4% (2/47)		

Study	Characteristic	Group A	Group B	Group C	Comments
Kouhia et al., 2009[727] (continued)	% first hernia repair was open mesh plasty	12% (6/49)	13% (6/47)		
	% first hernia repair was TEP	0% (0/49)	2% (1/47)		
	% first hernia repair was tissue plasty	80% (39/49)	81% (38/47)		
	% previous abdominal surgery	29% (14/49)	21% (10/47)		
	% symptom bulging and pain	80% (39/49)	77% (36/47)		
	% symptom bulging but no pain	16% (8/49)	23% (11/47)		
	% symptom pain but no bulging	2% (1/49)	0% (0/47)		
Neumayer et al., 2004[762-768]	% bilateral	18% (175/989)	18% (178/994)		
	% duration <6 weeks	9% (89/989)	10% (97/994)		
	% duration >one year	35% (348/989)	36% (358/994)		
	% duration 6 weeks to one year	49% (488/989)	47% (463/994)		
	% duration unknown	6% (64/989)	8% (76/994)		
	% obstructed	0% (0/989)	0% (0/994)		
	% primary	90% (893/989)	91% (906/994)		
	% recurrent	10% (96/989)	9% (88/994)		
	% strangulated	0% (0/989)	0% (0/994)		
	% unilateral	82% (814/989)	82% (816/994)		

Study	Characteristic	Group A	Group B	Group C	Comments
Neumayer et al., 2004[762-768] (continued)	% alcohol >2 drinks/day	14% (136/989)	16% (159/994)		
	% male	100% (989/989)	100% (994/994)		
	% race asian	0% (1/989)	0% (2/994)		
	% race black	22% (219/989)	20% (202/994)		
	% race multiracial	3% (26/989)	3% (30/994)		
	% race unknown	1% (13/989)	1% (12/994)		
	% race white	74% (731/989)	75% (748/994)		
	% smoking	40% (400/989)	43% (426/994)		
	Age	58.6 (SD: 12.8) (N=989)	58.4 (SD: 12.7) (N=994)		
	Height (inches)	69.8 (SD: 2.8) (N=813)	69.9 (SD: 2.7) (N=808)		
	Highest educational grade completed	12.7 (SD: 2.4) (N=813)	12.7 (SD: 2.4) (N=808)		
	Weight (pounds)	178.5 (SD: 30.6) (N=813)	177.8 (SD: 28.7) (N=808)		
	% ASA score 1	35% (343/989)	34% (334/994)		
	% ASA score 2	47% (463/989)	48% (474/994)		
	% ASA score 3	19% (183/989)	19% (186/994)		
	% comorbidity chronic cough	9% (90/989)	8% (79/994)		

Study	Characteristic	Group A	Group B	Group C	Comments
Neumayer et al., 2004[762-768] (continued)	% comorbidity congestive heart failure	1% (5/989)	0% (1/994)		
	% comorbidity diabetes	6% (61/989)	5% (46/994)		
	% comorbidity hypertension	34% (339/989)	36% (354/994)		
	% comorbidity prior myocardial infarction	0% (2/989)	0% (3/994)		
	% comorbidity prostatism	18% (177/989)	17% (169/994)		
	% comorbidity severe chronic obstructive pulmonary disease	5% (48/989)	5% (50/994)		
	QOL: Health Utilities Index 2 score (scale Range: 0-1.0 where higher scores indicated better QOL)	0.79; Median: 0.81 (IQR: 0.71 to 0.90) (N=687)	0.77; Median: 0.78 (IQR: 0.68 to 0.88) (N=708)		
	SF-36 bodily pain	45.2 (SD: 10.6) (N=687)	44 (SD: 10.3) (N=708)		
	SF-36 general health	51.3 (SD: 9.4) (N=687)	50.4 (SD: 10) (N=708)		
	SF-36 mental health	49.6 (SD: 11.3) (N=687)	48.7 (SD: 11.3) (N=708)		
	SF-36 physical functioning	44.8 (SD: 10.3) (N=687)	43.2 (SD: 10.7) (N=708)		
	SF-36 role limitation, emotional	46 (SD: 12.7) (N=687)	44 (SD: 13.3) (N=708)		
	SF-36 role limitation, physical	42.7 (SD: 11.5) (N=687)	41.2 (SD: 11.5) (N=708)		
	SF-36 social functioning	47.5 (SD: 10.7) (N=687)	46 (SD: 11.3) (N=708)		

Study	Characteristic	Group A	Group B	Group C	Comments
Neumayer et al., 2004[762-768] (continued)	SF-36 vitality	52.4 (SD: 10.4) (N=687)	50.9 (SD: 10.9) (N=708)		
Sevonius et al., 2009[535,805-813]	% emergency hernia	Entire study 8% (1,328/16,648)			Reported by Sevonius.[805]
	Years since previous repair	Entire study: 2.45 (SD: 2.25) (N=16,648)			Converted from reported days. Baseline data only reported for combined treatment groups. Reported by Sevonius.[805]
	% male	Entire study 95% (15,791/16,648)			Reported by Sevonius.[805]
	Age	Entire study: 64 (SD: 14) (N=16,648)			Reported by Sevonius.[805]
	% testicular atrophy or absense of testicals	Entire study 4% (669/16,648)			Reported by Sevonius.[805]
Wara, 2008[829-834]	% bilateral	49% (1757/3,606)	4% (1451/39,537)		
	% bilateral primary	35% (1253/3,606)	3% (1260/39,537)		
	% bilateral primary hernia and both were direct	18% (644/3,606)	2% (710/39,537)		
	% bilateral primary hernia and both were indirect	7% (250/3,606)	0% (192/39,537)		
	% bilateral primary hernia, mixed procedure	0% (9/3,606)	0% (80/39,537)		
	% bilateral primary hernia, one indirect and one direct	5% (166/3,606)	0% (107/39,537)		
	% bilateral primary hernia, other	5% (184/3,606)	0% (171/39,537)		
	% recurrent	52% (1865/3,606)	12% (4824/39,537)		
	% recurrent bilateral hernia, mixed procedures	0% (6/3,606)	0% (19/39,537)		

Study	Characteristic	Group A	Group B	Group C	Comments
Wara, 2008[829-834] (continued)	% recurrent bilateral hernia, uniform procedure	14% (498/3,606)	0% (172/39,537)		
	% recurrent unilateral	38% (1,361/3,606)	12% (4,633/39,537)		
	% unilateral primary	14% (488/3,606)	85% (33,453/39,537)		
	% unilateral primary direct	5% (179/3,606)	34% (13,303/39,537)		
	% unilateral primary indirect	7% (254/3,606)	42% (16,463/39,537)		
	% unilateral primary other	1% (46/3,606)	5% (2,100/39,537)		
	% unilateral primary pantaloon	0% (9/3,606)	4% (1,587/39,537)		
	% male	95% (3,423/3,606)	94% (37,140/39,537)		
	Age	Median: 58 (Range: 18-93) (N=3,606)	Median: 60 (Range: 18-99) (N=39,537)		

Table 33. Key Question 2c: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Beets et al., 1999[629]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	Y	Y	Y	Y	Mod.
	Hernia recurrence	Mean: 34 months, Range: 6-50	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	Y	?	Y	Y	Mod.
	hospital stay less than 24 hours	NA	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	Y	Y	Y	Y	Mod.
	Return to physical activities (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	N	Y	Y	Y	Mod.
	Pain 1-4 scale where 1=no pain, 2=mild, 3=moderate, 4=severe	During the first seven days	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Pain chronic minor	Mean: 34 months, Range: 6-50	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	?	Y	Y	Mod.
	Pain chronic severe	Mean: 34 months, Range: 6-50	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	?	Y	Y	Mod.
	Pain VAS	During the first seven days	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, number of tablets of 1,000 mg paracetamol	During the first seven days	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Painful testicle	postoperative	Y	Y	Y	Y	Y	Y	?	?	?	N	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	N	?	Y	Y	Y	Y	Mod.
Champault et al., 1997[651-654]	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
Dedemadi et al., 2006[669]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	?	?	Mod.
	Hernia recurrence	Median: 3 years, SD: 1.6	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	?	Y	Y	Mod.
	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	?	?	Mod.
	Hernia recurrence	three years	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	?	?	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Dedemadi et al., 2006[669] (continued)	Hospital stay more than 36 hours	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Return to full ordinary and professional activities (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	six hours	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	12 hours	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	one day	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	two days	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	seven days	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	20 days	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, days needed, oral paracetamol	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, grams paracetamol	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Testicular pain	perioperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	Y	Y	Mod.
	Neuralgia	perioperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
Eklund et al., 2007[683]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Hernia recurrence	three years	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Hernia recurrence	five years	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function)	one week	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Eklund et al., 2007[683] (continued)	Return to work "heavy work" (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Return to work "light work" (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Return to work "medium work" (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Return to work longer than three weeks	NA	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	?	?	Mod.
	Pain	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain severe	three months	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	During the first seven days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain/discomfort mild or moderate	three months	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: Light	one year	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Light	two years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Light	three years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Light	five years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Medium	one year	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Medium	two years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Medium	three years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Medium	five years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	one day	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Eklund et al., 2007[683] (continued)	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	two days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	three days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	five days	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextropropoxyphene 32.5 mg)	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain: Severe	one year	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Severe	two years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Severe	three years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Pain: Severe	five years	Y	Y	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	?	?	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	?	?	Mod.
	Testicular pain/discomfort	one week	Y	Y	Y	Y	Y	Y	?	?	?	Y	?	N	Y	Y	Y	Mod.
	Hernia recurrence	Mean: 5.3 years SD: 3.7	Y	?	Y	Y	Y	Y	?	?	Y	Y	N	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Eklund et al., 2007[683] (continued)	Number of unscheduled visits to local health care centers, the hospital, or its outpatient clinic	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	N	Y	Y	Y	Y	Mod.
	Postoperative days in the hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	N	Y	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	N	N	Y	Y	Y	Mod.
	Pain chronic	NR	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Pain chronic	one year	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Pain chronic	two years	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Pain chronic	three years	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Pain chronic	Mean: 5.3 years SD: 3.7	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Pain: Need for analgesia, number of non-opioid “doses” (did not report which opioid or the size of one dose)	in-hospital	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Pain: Need for analgesia, number of opioid “doses” (did not report which opioid or the size of one dose)	in-hospital	Y	?	Y	Y	Y	Y	?	?	?	Y	N	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	N	Y	Y	Y	Y	Mod.
Neumayer et al., 2004[762-768]	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Sevonius et al., 2009[535,805-813]	Hernia recurrence, first recurrence	NR, but the publication appeared in March 2009, and operation dates ranged from 1992 to 2006	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Sevonius et al., 2009[535,805-813] (continued)	Hernia recurrence, second recurrence	NR, but the publication appeared in March 2009, and operation dates ranged from 1992 to 2006	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
	Hernia recurrence, third recurrence	NR, but the publication appeared in March 2009, and operation dates ranged from 1992 to 2006	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
Wara et al., 2005[829-834]	Hernia recurrence	between 0 and 3 years	N	N	Y	N	N	?	?	?	Y	N	N	?	?	Y	Y	High
	Hernia recurrence	between 0 and 3 years	N	N	Y	N	N	?	?	?	Y	N	N	?	?	Y	Y	High

Table 34. Key Question 2c: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Beets et al., 1999[629]	TAPP vs. Stoppa	RC	Hernia recurrence	one year	15% (6/41)	3% (1/36)	NS based on OR=6 (95% CI: 0.69 to 52.46)[@]	
	TAPP vs. Stoppa	RC	Hernia recurrence	Mean: 34 months, Range: 6-50	14% (6/42)	3% (1/37)	NS based on OR=6 (95% CI: 0.69 to 52.39)[@]	
	TAPP vs. Stoppa	HOSP	hospital stay less than 24 hours	NA	93% (39/42)	76% (28/37)	p<0.05 based on OR=4.18 (95% CI: 1.04 to 16.84)[@]	
	TAPP vs. Stoppa	RTDA	Return to physical activities (days)	NA	21 (SD: 15.5) (N=42)	29 (SD: 13.4) (N=37)	p=0.07 by either t-test or Mann Whitney, did not report which	
	TAPP vs. Stoppa	RTW	Return to work (days)	NA	13 (SD: 8.2) (N=42)	23 (SD: 12.4) (N=37)	p=0.03 by either t-test or Mann Whitney, did not report which	
	TAPP vs. Stoppa	Pain	Pain 1-4 scale where 1=no pain, 2=mild, 3=moderate, 4=severe	During the first seven days	Median: 1 (25th 1, 75th 1) (N=42)	Median: 1 (25th 1, 75th 1) (N=37)	p=0.05 by either t-test or Mann Whitney, did not report which	
	TAPP vs. Stoppa	Pain	Pain VAS	During the first seven days	2.2 (SD: 1.6) (N=42)	2.9 (SD: 1.5) (N=37)	p=0.005 by either t-test or Mann Whitney, did not report which	
	TAPP vs. Stoppa	Pain	Pain: need for analgesia, number of tablets of 1,000 mg paracetamol	During the first seven days	Median: 1 (Range: 0-6) (N=42)	Median: 3.5 (Range: 0-11) (N=37)	p=0.06 by either t-test or Mann Whitney, did not report which	
	TAPP vs. Stoppa	Pain	Painful testicle	postoperative	5% (2/42)	3% (1/37)	NS based on OR=1.8 (95% CI: 0.16 to 20.7)[@]	
	TAPP vs. Stoppa	Pain	Pain chronic minor	Mean: 34 months, Range: 6-50	0% (0/41)	3% (1/36)	n.s. based on OR=0.29 (95% CI: 0.01 to 7.22)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Beets et al., 1999[629] (continued)	TAPP vs. Stoppa	Pain	Pain chronic severe	Mean: 34 months, Range: 6-50	0% (0/41)	0% (0/37)	n.s. based on OR=0.9 (95% CI: 0.02 to 46.69)[@]	
	TAPP vs. Stoppa	ADV	Chest infection	postoperative	2% (1/42)	0% (0/37)	n.s. based on OR=2.71 (95% CI: 0.11 to 68.6)[@]	
	TAPP vs. Stoppa	ADV	Chronic neuralgia	postoperative	0% (0/42)	0% (0/37)	n.s. based on OR=0.88 (95% CI: 0.02 to 45.57)[@]	
	TAPP vs. Stoppa	ADV	Hematoma	postoperative	24% (10/42)	14% (5/37)	NS based on OR=2 (95% CI: 0.61 to 6.51)[@]	
	TAPP vs. Stoppa	ADV	Ileus/laparotomy	postoperative	0% (0/42)	3% (1/37)	n.s. based on OR=0.29 (95% CI: 0.01 to 7.24)[@]	
	TAPP vs. Stoppa	ADV	Inguinal hypesthesia	postoperative	0% (0/42)	0% (0/37)	n.s. based on OR=0.88 (95% CI: 0.02 to 45.57)[@]	
	TAPP vs. Stoppa	ADV	Pulmonary embolism	postoperative	0% (0/42)	3% (1/37)	n.s. based on OR=0.29 (95% CI: 0.01 to 7.24)[@]	
	TAPP vs. Stoppa	ADV	Seroma	postoperative	24% (10/42)	19% (7/37)	NS based on OR=1.34 (95% CI: 0.45 to 3.97)[@]	
	TAPP vs. Stoppa	ADV	Testicular atrophy	postoperative	0% (0/42)	3% (1/37)	NS based on OR=0.29 (95% CI: 0.01 to 7.24)[@]	
	TAPP vs. Stoppa	ADV	Testicular swelling	postoperative	5% (2/42)	5% (2/37)	NS based on OR=0.88 (95% CI: 0.12 to 6.54)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Beets et al., 1999[629] (continued)	TAPP vs. Stoppa	ADV	Urinary infection	postoperative	5% (2/42)	0% (0/37)	n.s. based on OR=4.63 (95% CI: 0.22 to 99.6)[@]	
	TAPP vs. Stoppa	ADV	Urinary retention	postoperative	0% (0/42)	3% (1/37)	n.s. based on OR=0.29 (95% CI: 0.01 to 7.24)[@]	
	TAPP vs. Stoppa	ADV	Vas deferens injury	postoperative	2% (1/42)	0% (0/37)	n.s. based on OR=2.71 (95% CI: 0.11 to 68.6)[@]	
	TAPP vs. Stoppa	ADV	Wound infection	postoperative	0% (0/42)	11% (4/37)	n.s. based on OR=0.09 (95% CI: 0 to 1.68)[@]	
Champault et al., 1997[651-654]	Recurrent hernia: TEP vs. Stoppa	HOSP	Hospital stay (days)	NA	3.7 (Range: 1-4) (N=20)	7.4 (Range: 5-12) (N=23)	p=0.01 either t-test or Mann Whitney, did not report which	Recurrent hernia only
Dedemadi et al., 2006[669]	TAPP vs. Lichtenstein	RC	Hernia recurrence	one year	1 (Ns NR)	2 (Ns NR)	NC	
	TAPP vs. Lichtenstein	RC	Hernia recurrence	two years	2 (Ns NR)	4 (Ns NR)	NC	
	TAPP vs. Lichtenstein	RC	Hernia recurrence	Median: 3 years, SD: 1.6	8% (2/24)	16% (5/32)	NS based on OR=0.49 (95% CI: 0.09 to 2.78)[@]	
	TAPP vs. Lichtenstein	RC	Hernia recurrence	three years	2 (Ns NR)	5 (Ns NR)	NC	
	TAPP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	0.78 (SD: 0.29) (N=24)	0.85 (SD: 0.26) (N=32)	for TAP vs. open, p=0.206; for TEP vs. open, p=0.172. Either the “median test” or the t-test, did not report which	Calculated from reported hours

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TAPP vs. Lichtenstein	HOSP	Hospital stay more than 36 hours	NA	0% (0/24)	0% (0/32)	n.s. based on OR=1.33 (95% CI: 0.03 to 69.23)[@]	
	TAPP vs. Lichtenstein	RTDA	Return to full ordinary and professional activities (days)	NA	14 (SD: 9) (N=24)	20 (SD: 11) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain VAS at rest	six hours	Median: 4 (SD: NR) (N=24)	Median: 5 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain VAS at rest	12 hours	Median: 3 (SD: NR) (N=24)	Median: 4 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain VAS at rest	one day	Median: 1 (SD: NR) (N=24)	Median: 4 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TAPP vs. Lichtenstein	Pain	Pain VAS at rest	two days	Median: 1 (SD: NR) (N=24)	Median: 3 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. Lichtenstein	Pain	Neuralgia	perioperative	4% (1/24)	6% (2/32)	NS based on OR=0.65 (95% CI: 0.06 to 7.64)[@]	
	TAPP vs. Lichtenstein	Pain	Pain VAS at rest	seven days	Median: 1 (SD: NR) (N=24)	Median: 2 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, days needed, oral paracetamol	postoperative	1.9 (SD: NR) (N=24)	3.2 (SD: NR) (N=32)	for TAP vs. open, p=0.004; for TEP vs. open, p=0.0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia, grams paracetamol	postoperative	5.5 (SD: NR) (N=24)	12 (SD: NR) (N=32)	NR	
	TAPP vs. Lichtenstein	Pain	Testicular pain	perioperative	0% (0/24)	3% (1/32)	n.s. based on OR=0.43 (95% CI: 0.02 to 10.99)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TAPP vs. Lichtenstein	Pain	Pain VAS at rest	20 days	Median: 0 (SD: NR) (N=24)	Median: 2 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the "median test" or the t-test, did not report which	
	TAPP vs. Lichtenstein	ADV	Epigastric vessel bleeding	perioperative	4% (1/24)	6% (2/32)	NS based on OR=0.65 (95% CI: 0.06 to 7.64)[@]	
	TAPP vs. Lichtenstein	ADV	Heart rhythm changes	perioperative	4% (1/24)	3% (1/32)	NS based on OR=1.35 (95% CI: 0.08 to 22.7)[@]	
	TAPP vs. Lichtenstein	ADV	Impaired sensibility	perioperative	8% (2/24)	34% (11/32)	p<0.05 based on OR=0.17 (95% CI: 0.03 to 0.88)[@]	
	TAPP vs. Lichtenstein	ADV	Ischaemic orchitis	perioperative	0% (0/24)	3% (1/32)	NS based on OR=0.43 (95% CI: 0.02 to 10.99)[@]	
	TAPP vs. Lichtenstein	ADV	Seroma/ wound hematoma	perioperative	17% (4/24)	38% (12/32)	NS based on OR=0.33 (95% CI: 0.09 to 1.21)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	perioperative	4% (1/24)	3% (1/32)	NS based on OR=1.35 (95% CI: 0.08 to 22.7)[@]	
	TAPP vs. Lichtenstein	ADV	Wound infection	perioperative	0% (0/24)	3% (1/32)	NS based on OR=0.43 (95% CI: 0.02 to 10.99)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	one year	1 (Ns NR)	2 (Ns NR)	NC	
	TEP vs. Lichtenstein	RC	Hernia recurrence	two years	2 (Ns NR)	4 (Ns NR)	NC	
	TEP vs. Lichtenstein	RC	Hernia recurrence	Median: 3 years, SD: 1.6	8% (2/26)	16% (5/32)	NS based on OR=0.45 (95% CI: 0.08 to 2.54)[@]	
	TEP vs. Lichtenstein	RC	Hernia recurrence	three years	2 (Ns NR)	5 (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TEP vs. Lichtenstein	HOSP	Hospital stay (days)	NA	0.77 (SD: 0.26) (N=26)	0.85 (SD: 0.26) (N=32)	for TAP vs. open, p=0.206; for TEP vs. open, p=0.172. Either the “median test” or the t-test, did not report which	Calculated from reported hours
	TEP vs. Lichtenstein	HOSP	Hospital stay more than 36 hours	NA	0% (0/26)	0% (0/32)	n.s. based on OR=1.23 (95% CI: 0.02 to 63.91)[@]	
	TEP vs. Lichtenstein	RTDA	Return to full ordinary and professional activities (days)	NA	13 (SD: 8) (N=26)	20 (SD: 11) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.0.001. Either the “median test” or the t-test, did not report which	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	six hours	Median: 4 (SD: NR) (N=26)	Median: 5 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	12 hours	Median: 3 (SD: NR) (N=26)	Median: 4 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TEP vs. Lichtenstein	Pain	Pain VAS at rest	one day	Median: 1 (SD: NR) (N=26)	Median: 4 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	two days	Median: 1 (SD: NR) (N=26)	Median: 3 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TEP vs. Lichtenstein	Pain	Neuralgia	perioperative	4% (1/26)	6% (2/32)	NS based on OR=0.6 (95% CI: 0.05 to 7.01)[@]	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	seven days	Median: 1 (SD: NR) (N=26)	Median: 2 (SD: NR) (N=32)	for TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia, days needed, oral paracetamol	postoperative	1.8 (SD: NR) (N=26)	3.2 (SD: NR) (N=32)	for TAP vs. open, p=0.004; for TEP vs. open, p=0.0.001. Either the “median test” or the t-test, did not report which	
	TEP vs. Lichtenstein	Pain	Pain: need for analgesia, grams paracetamol	postoperative	5 (SD: NR) (N=26)	12 (SD: NR) (N=32)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TEP vs. Lichtenstein	Pain	Testicular pain	perioperative	12% (3/26)	3% (1/32)	NS based on OR=4.04 (95% CI: 0.39 to 41.42)[@]	
	TEP vs. Lichtenstein	Pain	Pain VAS at rest	20 days	Median: 0 (SD: NR) (N=26)	Median: 2 (SD: NR) (N=32)	for TAP vs open, p=0.001; for TEP vs open, p=0.001. Either the "median test" or the t test, did not report which	
	TEP vs. Lichtenstein	ADV	Epigastric vessel bleeding	perioperative	0% (0/26)	6% (2/32)	NS based on OR=0.23 (95% CI: 0.01 to 5.01)[@]	
	TEP vs. Lichtenstein	ADV	Heart rhythm changes	perioperative	0% (0/26)	3% (1/32)	NS based on OR=0.4 (95% CI: 0.02 to 10.14)[@]	
	TEP vs. Lichtenstein	ADV	Impaired sensibility	perioperative	8% (2/26)	34% (11/32)	p<0.05 based on OR=0.16 (95% CI: 0.03 to 0.8)[@]	
	TEP vs. Lichtenstein	ADV	Ischaemic orchitis	perioperative	0% (0/26)	3% (1/32)	NS based on OR=0.4 (95% CI: 0.02 to 10.14)[@]	
	TEP vs. Lichtenstein	ADV	Seroma/ wound hematoma	perioperative	12% (3/26)	38% (12/32)	p<0.05 based on OR=0.22 (95% CI: 0.05 to 0.88)[@]	
	TEP vs. Lichtenstein	ADV	Urinary retention	perioperative	4% (1/26)	3% (1/32)	NS based on OR=1.24 (95% CI: 0.07 to 20.83)[@]	
	TEP vs. Lichtenstein	ADV	Wound infection	perioperative	0% (0/26)	3% (1/32)	NS based on OR=0.4 (95% CI: 0.02 to 10.14)[@]	
Eklund et al., 2007[683]	TAPP vs. Lichtenstein	RC	Hernia recurrence	one year	5.6% (Ns NR)	8.2% (Ns NR)	NC	Estimated percentages based on Figure 5 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2007[683] (continued)	TAPP vs. Lichtenstein	RC	Hernia recurrence	two years	7.1% (Ns NR)	11.3% (Ns NR)	NC	Estimated percentages based on Figure 5 of the article
	TAPP vs. Lichtenstein	RC	Hernia recurrence	three years	10.2% (Ns NR)	12.9% (Ns NR)	NC	Estimated percentages based on Figure 5 of the article
	TAPP vs. Lichtenstein	RC	Hernia recurrence	five years	19% (12/63)	18% (12/67)	NS based on OR=1.08 (95% CI: 0.44 to 2.62)[@]	
	TAPP vs. Lichtenstein	HOSP	At least one night in hospital	NA	44% (32/73)	26% (19/74)	p<0.05 based on OR=2.26 (95% CI: 1.13 to 4.54)[@]	
	TAPP vs. Lichtenstein	RTDA	Functional: Combined functional index score (ranges from 3-9, lower numbers indicate better function)	one week	Median: 3 (Range: 3-6) (N=73)	Median: 4 (Range: 3-9) (N=73)	p=0.018 Mann Whitney	
	TAPP vs. Lichtenstein	RTW	Return to work "heavy work" (days)	NA	12 (25th 8; 75th 15) (Ns NR)	27 (25th 16; 75th 29) (Ns NR)	p<0.001 Mann Whitney	Estimated medians and IQRs based on Figure 3 of the article
	TAPP vs. Lichtenstein	RTW	Return to work "light work" (days)	NA	7 (25th 3; 75th 13) (Ns NR)	14 (25th 6; 75th 18) (Ns NR)	p=0.011 Mann Whitney	Estimated medians and IQRs based on Figure 3 of the article
	TAPP vs. Lichtenstein	RTW	Return to work "medium work" (days)	NA	7 (25th 7; 75th 15) (Ns NR)	18 (25th 15; 75th 25) (Ns NR)	p=0.007 Mann Whitney	Estimated medians and IQRs based on Figure 3 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2007[683] (continued)	TAPP vs. Lichtenstein	RTW	Return to work (days)	NA	Median: 8 (25th 6; 75th 14) (Ns NR)	Median: 16 (25th 14; 75th 26) (Ns NR)	p<0.001 Mann Whitney	Estimated IQRs based on Figure 3 of the article
	TAPP vs. Lichtenstein	RTW	Return to work longer than three weeks	NA	5% (Ns NR)	35% (Ns NR)	p<0.001, either chi square or Fisher's exact text, did not report which	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextro-propoxyphene 32.5 mg)	one day	1 (25th 0; 75th 4) (N=73)	4 (25th 2; 75th 6) (N=73)	p=0.001 Mann Whitney	Estimated medians and IQRs based on Figure 2 of the article
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextro-propoxyphene 32.5 mg)	two days	2 (25th 0; 75th 2.5) (N=73)	4 (25th 1; 75th 6) (N=73)	p=0.001 Mann Whitney	Estimated medians and IQRs based on Figure 2 of the article
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextro-propoxyphene 32.5 mg)	three days	0 (25th 0; 75th 2) (N=73)	2 (25th 0; 75th 4) (N=73)	p=0.001 Mann Whitney	Estimated medians and IQRs based on Figure 2 of the article
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextro-propoxyphene 32.5 mg)	five days	0 (25th 0; 75th 0) (N=73)	1 (25th 0; 75th 3) (N=73)	p=0.001 Mann Whitney	Estimated medians and IQRs based on Figure 2 of the article
	TAPP vs. Lichtenstein	Pain	Pain	one week	1% (1/73)	1% (1/73)	NS based on OR=1 (95% CI: 0.06 to 16.3)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2007[683] (continued)	TAPP vs. Lichtenstein	Pain	Pain VAS	During the first seven days	1.25 (Range: 0-3.3) (N=73)	1.65 (Range: 0-4) (N=73)	p=0.019 t-test	
	TAPP vs. Lichtenstein	Pain	Pain: need for analgesia (number of tablets of combined parecetamol 325 mg and dextro-propoxyphene 32.5 mg)	one week	0 (25th 0; 75th 0) (N=73)	0 (25th 0; 75th 2) (N=73)	p=0.002 Mann Whitney	Estimated medians and IQRs based on Figure 2 of the article
	TAPP vs. Lichtenstein	Pain	Testicular pain/ discomfort	one week	0% (0/73)	4% (3/73)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.7)[@]	
	TAPP vs. Lichtenstein	Pain	Pain severe	three months	0% (0/68)	0% (0/67)	n.s. based on OR=0.99 (95% CI: 0.02 to 50.38)[@]	
	TAPP vs. Lichtenstein	Pain	Pain/ discomfort mild or moderate	three months	12% (8/68)	18% (12/67)	NS based on OR=0.61 (95% CI: 0.23 to 1.61)[@]	
	TAPP vs. Lichtenstein	Pain	Pain: Light	one year	6.2% (Ns NR)	16.5% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Medium	one year	4.4% (Ns NR)	7.6% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Severe	one year	1.5% (Ns NR)	0% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2007[683] (continued)	TAPP vs. Lichtenstein	Pain	Pain: Light	two years	6.2% (Ns NR)	11.4% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Medium	two years	6% (Ns NR)	8.6% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Severe	two years	1.4% (Ns NR)	0% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Light	three years	11.7% (Ns NR)	15.4% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Medium	three years	4.6% (Ns NR)	12.5% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Severe	three years	0% (Ns NR)	0% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Light	five years	11.9% (Ns NR)	22.1% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	Pain	Pain: Medium	five years	0% (Ns NR)	3.3% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2007[683] (continued)	TAPP vs. Lichtenstein	Pain	Pain: Severe	five years	0% (Ns NR)	0% (Ns NR)	NC	Estimated percentages based on Figure 4 of the article
	TAPP vs. Lichtenstein	ADV	Epigastric vessel bleeding	intraoperative	3% (2/73)	0% (0/74)	n.s. based on OR=5.21 (95% CI: 0.25 to 110.42)[@]	
	TAPP vs. Lichtenstein	ADV	Epileptic seizure during induction of anesthesia	intraoperative	0% (0/73)	1% (1/74)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.32)[@]	
	TAPP vs. Lichtenstein	ADV	Hematoma	during hospital stay	0% (0/73)	11% (8/74)	p<0.05 based on OR=0.05 (95% CI: 0 to 0.94)[@]	
	TAPP vs. Lichtenstein	ADV	Urinary retention	during hospital stay	10% (7/73)	14% (10/74)	NS based on OR=0.68 (95% CI: 0.24 to 1.89)[@]	
	TAPP vs. Lichtenstein	ADV	Cystitis	one week	1% (1/73)	1% (1/73)	NS based on OR=1 (95% CI: 0.06 to 16.3)[@]	
	TAPP vs. Lichtenstein	ADV	Hematoma greater than 50 square centimeters	one week	7% (5/73)	22% (16/73)	p<0.05 based on OR=0.26 (95% CI: 0.09 to 0.76)[@]	
	TAPP vs. Lichtenstein	ADV	Infection	one week	1% (1/73)	3% (2/73)	NS based on OR=0.49 (95% CI: 0.04 to 5.56)[@]	
	TAPP vs. Lichtenstein	ADV	Seroma	one week	0% (0/73)	1% (1/73)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.21)[@]	
	TAPP vs. Lichtenstein	ADV	Orchitis	three months	0% (0/68)	3% (2/67)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.06)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Eklund et al., 2007[683] (continued)	TAPP vs. Lichtenstein	ADV	Seroma	three months	1% (1/68)	0% (0/67)	n.s. based on OR=3 (95% CI: 0.12 to 74.96)[@]	
	TAPP vs. Lichtenstein	ADV	Sex-related complaints	three months	1% (1/68)	0% (0/67)	n.s. based on OR=3 (95% CI: 0.12 to 74.96)[@]	
	TAPP vs. Lichtenstein	ADV	Incisional hernia at port site	three years	1 (Ns NR)	0 (Ns NR)	NC	
	TAPP vs. Lichtenstein	ADV	Impaired erection	Median: 5.1 years (Range: 4.9 to 7.2)	0 (Ns NR)	1 (Ns NR)	NC	
	TAPP vs. Lichtenstein	ADV	Impaired libido	Median: 5.1 years (Range: 4.9 to 7.2)	1 (Ns NR)	0 (Ns NR)	NC	
	TAPP vs. Lichtenstein	ADV	Sexual complaints	Median: 5.1 years (Range: 4.9 to 7.2)	3% (Ns NR)	1% (Ns NR)	NC	
	TAPP vs. Lichtenstein	ADV	Testicular atrophy	Median: 5.1 years (Range: 4.9 to 7.2)	0% (Ns NR)	3% (Ns NR)	NC	
Kouhia et al., 2009[727]	TEP vs. Lichtenstein	RC	Hernia recurrence	Mean: 5.3 years SD: 3.7	0% (0/49)	6% (3/47)	p=0.02 by either t-test or Mann Whitney, did not report which	
	TEP vs. Lichtenstein	HOSP	Number of unscheduled visits to local health care centers, the hospital, or its outpatient clinic	NA	0.2 (SD: 0.6) (N=49)	0.2 (SD: 0.5) (N=47)	p=0.72 by either t-test or Mann Whitney, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kouhia et al., 2009[727] (continued)	TEP vs. Lichtenstein	HOSP	Postoperative days in the hospital	NA	1.2 (SD: 0.6) (N=49)	1.3 (SD: 1.4) (N=47)	p=0.11 by either t-test or Mann Whitney, did not report which	
	TEP vs. Lichtenstein	RTW	Return to work (days)	NA	14.8 (SD: NR) (N=49)	17.9 (SD: NR) (N=47)	p=0.05 by either t-test or Mann Whitney, did not report which	
	TEP vs. Lichtenstein	Pain	Pain: Need for analgesia, number of non-opioid “doses” (did not report which opioid or the size of one dose)	in-hospital	3 (SD: 2.3) (N=49)	4.4 (SD: 3.4) (N=47)	p=0.02 by either t-test or Mann Whitney, did not report which	
	TEP vs. Lichtenstein	Pain	Pain: Need for analgesia, number of opioid “doses” (did not report which opioid or the size of one dose)	in-hospital	2.3 (SD: 2.2) (N=49)	2.2 (SD: 2.5) (N=47)	p=0.49 by either t-test or Mann Whitney, did not report which	
	TEP vs. Lichtenstein	Pain	Pain chronic	one year	6% (3/49)	17% (8/47)	NS based on OR=0.32 (95% CI: 0.08 to 1.28)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	two years	0% (0/49)	15% (7/47)	p<0.05 based on OR=0.05 (95% CI: 0 to 0.98)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	three years	0% (0/49)	13% (6/47)	NS based on OR=0.06 (95% CI: 0 to 1.18)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	Mean: 5.3 years SD: 3.7	8% (4/49)	28% (13/47)	p<0.05 based on OR=0.23 (95% CI: 0.07 to 0.78)[@]	
	TEP vs. Lichtenstein	Pain	Pain chronic	NR	0% (0/49)	11% (5/47)	NS based on OR=0.08 (95% CI: 0 to 1.45)[@]	
	TEP vs. Lichtenstein	ADV	Bleeding considerable	in-hospital	6% (3/49)	6% (3/47)	NS based on OR=0.96 (95% CI: 0.18 to 4.99)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kouhia et al., 2009[727] (continued)	TEP vs. Lichtenstein	ADV	Wound infection	postoperative	2% (1/49)	4% (2/47)	NS based on OR=0.47 (95% CI: 0.04 to 5.35)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma or seroma	Mean: 5.3 years SD: 3.7	27% (13/49)	13% (6/47)	NS based on OR=2.47 (95% CI: 0.85 to 7.16)[@]	
	TEP vs. Lichtenstein	ADV	Hematoma or seroma requiring aspiration	Mean: 5.3 years SD: 3.7	2% (1/49)	2% (1/47)	NS based on OR=0.96 (95% CI: 0.06 to 15.78)[@]	
	TEP vs. Lichtenstein	ADV	Hydrocele painful	Mean: 5.3 years SD: 3.7	0% (0/49)	2% (1/47)	NS based on OR=0.31 (95% CI: 0.01 to 7.88)[@]	
	TEP vs. Lichtenstein	ADV	Infection deep primary complication	Mean: 5.3 years SD: 3.7	0% (0/49)	0% (0/47)	NS based on OR=0.96 (95% CI: 0.02 to 49.35)[@]	
	TEP vs. Lichtenstein	ADV	Infection superficial, primary complication	Mean: 5.3 years SD: 3.7	2% (1/49)	9% (4/47)	NS based on OR=0.22 (95% CI: 0.02 to 2.08)[@]	
	TEP vs. Lichtenstein	ADV	Reoperations owing to primary complications	Mean: 5.3 years SD: 3.7	6% (3/49)	4% (2/47)	NS based on OR=1.47 (95% CI: 0.23 to 9.2)[@]	
	TEP vs. Lichtenstein	ADV	Total number of complications (any)	Mean: 5.3 years SD: 3.7	29% (14/49)	47% (22/47)	NS based on OR=0.45 (95% CI: 0.2 to 1.06)[@]	
Neumayer et al., 2004[762-768]	Recurrent hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	two years	10% (8/81)	14% (11/78)	NS based on OR=0.67 (95% CI: 0.25 to 1.76)[@]	This analysis was based on the original treatment assignment, not necessarily what people received. This includes only those who had received the study operation for recurrent hernia.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813]	Recurrent hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence, second recurrence	NR but likely Range: 0-16 years	Compared to Lichtenstein: hazard ratio 0.79 (95% CI: 0.62 to 0.99)	This was the reference operation	p<0.05 according to the 95% CI	Adjusted for age, gender. Type of hernia, and size of hernia defect. Hazard ratios higher than 1.0 favor the Lichtenstein group. This datapoint reported by the 2011 publication.
	Recurrent hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence, third recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: hazard ratio 0.48 (95% CI: 0.32 to 0.74)	This was the reference operation	p<0.05 according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: TAPP/ TEP vs. Lichtenstein	RC	Hernia recurrence, fourth recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: hazard ratio 0.46 (95% CI: 0.12 to 1.75)	This was the reference operation	n.s. according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Recurrent hernia: TAPP/TEP vs. mesh plug	RC	Hernia recurrence, second recurrence	NR but likely Range: 0-16 years	Compared to Lichtenstein: hazard ratio 0.79 (95% CI: 0.69 to 0.99)	Compared to Lichtenstein: hazard ratio 1.45 (95% CI: 1.15 to 1.82)	Group 1: p<0.05 vs. Lichtenstein, but group 2 n.s. from Lichtenstein, according to 95% CIs	Adjusted for age, gender. Type of hernia, and size of hernia defect. Hazard ratios higher than 1.0 favor the Lichtenstein group. This datapoint reported by the 2011 publication.
	Recurrent hernia: TAPP/TEP vs. mesh plug	RC	Hernia recurrence, third recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: hazard ratio 0.48 (95% CI: 0.32 to 0.74)	Compared to Lichtenstein: hazard ratio 1.24 (95% CI: 0.89 to 1.71)	Group 1: p<0.05 vs. Lichtenstein, but group 2 n.s. from Lichtenstein, according to 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: TAPP/TEP vs. mesh plug	RC	Hernia recurrence, fourth recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: hazard ratio 0.46 (95% CI: 0.12 to 1.75)	Compared to Lichtenstein: hazard ratio 0.85 (95% CI: 0.25 to 2.84)	Neither group differed from Lichtenstein, based on 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Recurrent hernia: TAPP/TEP vs. OPM	RC	Hernia recurrence, second recurrence	NR but likely Range: 0-16 years	Compared to Lichtenstein: hazard ratio: 0.79 (95% CI: 0.69 to 0.99)	Compared to Lichtenstein: hazard ratio: 0.81 (95% CI: 0.58 to 1.13)	Group 1: p<0.05 vs. Lichtenstein, but group 2 n.s. from Lichtenstein, according to 95% CIs	Adjusted for age, gender. Type of hernia, and size of hernia defect. Hazard ratios higher than 1.0 favor the Lichtenstein group. This datapoint reported by the 2011 publication.
	Recurrent hernia: TAPP/TEP vs. OPM	RC	Hernia recurrence, third recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: hazard ratio: 0.48 (95% CI: 0.32 to 0.74)	Compared to Lichtenstein: hazard ratio: 0.68 (95% CI: 0.45 to 1.03)	Group 1: p<0.05 vs. Lichtenstein, but group 2 n.s. from Lichtenstein, according to 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: TAPP/TEP vs. OPM	RC	Hernia recurrence, fourth recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: hazard ratio 0.46 (95% CI: 0.12 to 1.75)	Compared to Lichtenstein: hazard ratio 0.96 (95% CI: 0.31 to 2.95)	Neither group differed from Lichtenstein, based on 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
Wara et al., 2005[829-834]	Recurrent hernia: TAPP/TEP vs. Lichtenstein	RC	Hernia recurrence	Between 0 and 3 years	4.1% (76/1,865)	4.9% (235/4,824)	n.s. based on OR=0.83 (95% CI: 0.64 to 1.08)[@]	Combined data reported in Table 3 of the article

Key Question 3 Tables

Table 35. Key Question 3: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Abu-Own et al., 2000[621]	UK	Royal Free and University College London Medical School, The Middlesex Hospital, London, UK	1	RCT	Lichtenstein vs. PerFix	26	NR	University hospital	NR
Adamonis et al., 2006[622]	Poland	Department of Surgery at the Medical University of Gdansk, Poland	1	RCT	Hertra vs. Plug	100	NR	University hospital	NR
Bringman et al., 2003[641]	Sweden	Karolinska Institutet at Huddinge University Hospital and Sodertalje Hospital	2	RCT	Lichtenstein vs. mesh plug vs. TEP	299	9/1997 to 3/2000	One university hospital and one non-university hospital	NR
Coskun et al., 2005[664]	Turkey	Ankara Numune Teaching and Research Hospital, Ankara, Turkey	1	RCT	Lichtenstein vs. preperitoneal mesh	180	NR	University hospital	NR
Dalenback et al., 2009[665]	Sweden	Frölunda Specialist Hospital, Lundby Hospital and Mölndals Hospital/Sahlgrenska University Hospital all in Sweden	3	RCT	Lichtenstein vs. PHS vs. PerFix	472	02/2000 to 06/2002	University hospital	Study was partially sponsored by Bard Norden AB (Helsinborg, Sweden) and the Ethicon Division of Johnson & Johnson AB (Sollentuna, Sweden)
Dogru et al., 2006[673]	Turkey	Firat University, School of Medicine, Elazig, Turkey	1	RCT	Lichtenstein vs. Kugel	140	09/1999 to 08/2002	University hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Frey et al., 2007[697]	Switzerland	University Hospital Basle, Kantonsspital Olten and Kantonsspital Luzern all in Switzerland	3	RCT	Lichtenstein vs. mesh plug	595	09/1999 to 12/2001	University hospital	Authors declared no financial interests
Gunal et al., 2007[702]	Turkey	NR	NR	RCT	Lichtenstein vs. Nyhus vs. TAPP vs. TEP	160	2/1997 to 2/2001	NR	NR
Hamza et al., 2010[704]	Egypt	Department of Surgery, Faculty of Medicine, University of Alexandria, Egypt	1	RCT	Lichtenstein vs. TAPP vs. TEP vs. open pro-peritoneal mesh	100	NR	University hospital	Study was funded by the University of Alexandria.
Kingsnorth et al., 2000[269,720]	UK	University of Plymouth, Plymouth, UK	1	RCT	Lichtenstein vs. PerFix	141	NR	University hospital	NR
Kingsnorth et al., 2002[721]	UK	University of Plymouth, Plymouth, UK	1	RCT	Lichtenstein vs. PHS	206	NR	University hospital	Study was sponsored by Ethicon Ltd., the manufacturers of PHS.
Koc et al., 2004[722]	Turkey	Ankara Numune Teaching and Research Hospital, Ankara, Turkey	1	RCT	Lichtenstein vs. Stoppa	45	01/1999 to 12/2000	University hospital	NR
Muldoon et al., 2004[761]	USA	Central Arkansas Veterans Healthcare system and University of Arkansas for Medical Sciences	1	RCT	Lichtenstein vs. Read-Rives	247	01/1993 to 10/1997	University hospital	NR
Nienhuijs et al., 2005[769-771]	The Netherlands	Canisius-Wilhelmina Hospital, Nijmegen, The Netherlands	1	RCT	Lichtenstein vs. PHS vs. mesh plug	334	04/2001 to 03/2003	University hospital	NR
Nienhuijs et al., 2007[772]	The Netherlands	Canisius-Wilhelmina Hospital, Nijmegen, The Netherlands	1	RCT	Lichtenstein vs. Kugel	172	12/2004 to 09/2005	University hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Pavlidis et al., 2002[786]	Greece	Medical Faculty of the Aristoles University of Thessaloniki, Second Surgical Department, Thessaloniki, Greece	1	RCT	Patch vs. patch+plug vs. TAPP	299	11/1998 to 10/2000	University hospital	NR
Sanders et al., 2009[798]	USA and UK	Lake Forest Hospital, IL, USA and Plymouth Hernia Service, Plymouth, UK	2 (1 USA and 1 UK)	RCT	Lichtenstein vs. PerFix vs. ProLoop	295	03/2003 to 01/2006	2 University hospitals	NR
Sanjay et al., 2006[799]	UK	Department of Surgery, Royal Glamorgan Hospital, Llantrisant, UK	1	RCT	Lichtenstein vs. PHS	64	06/2000 to 08/2001	University hospital	NR
Sevonius et al., 2009[535,805-813]	Sweden	95% of all hospitals in Sweden	NR	Non-randomized com-parative study	Numerous comparisons	142,578 hernias	1992 to 2006	57% of repairs performed in medium-sized non-teaching hospitals; 32% performed in small-sized non-teaching hospitals; 11% performed in teaching hospitals	Sweden's National Board of Health and Welfare, the Swedish Association of Local Authorities, and by the County Council of Jämtland
Vatansev et al., 2002[826]	Turkey	University of Selcuk	1	RCT	Lichtenstein vs. Nyhus vs. Bassini vs. TEP	84	NR	University hospital	NR
Vironen et al., 2006[827]	Finland	Helsinki University Central Hospital, Finland	1	RCT	Lichtenstein vs. PHS	300	09/2001 to 01/2004	University hospital	Funding was through a university grant.

Table Note:
For Vatansev et al., 2002[826] of the 84 patients enrolled, 65 provided data related to one of the Key Questions (those who received Lichtenstein, Nyhus, or TEP).

Table 36. Key Question 3: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Nienhuijs et al., 2005[769-771]			x	x												
Abu-Own et al., 2000[621]			x	x												
Adamonis et al., 2006[622]			x	x	x	x	x		x							
Bringman et al., 2003[641]				x												
Coskun et al., 2005[664]		x														
Dalenback et al., 2009[665]			x						x							
Dogru et al., 2006[673]			x		x	x	x		x							
Frey et al., 2006[697]									x							x
Gunal et al., 2007[702]			x	x												
Hamza et al., 2010[704]			x		x	x										
Kingsworth et al., 2000[720]			x	x	x	x	x		x					x	x	
Kingsworth et al., 2002[721]			x	x	x	x	x		x					x	x	
Koc et al., 2004[722]		x							x							
Muldoon et al., 2004[761]			x	x	x	x	x									

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Nienhuijs et al., 2007[772]				x	x	x	x		x					x	x	
Pavlidis et al., 2002[786]																
Sanders et al., 2009[798]			x	x	x	x	x								x	
Sanjay et al., 2006[799]			x		x	x	x		x							
Sevonius et al., 2009[535,805-813]																
Vatansev et al., 2002[826]			x	x												
Vironen et al., 2006[827]					x	x	x									

Table 37. Key Question 3: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Nienhuijs et al., 2005[769-771]	18+														
Abu-Own et al., 2000[621]	18+	x													x
Adamonis et al., 2006[622]	16+									x		x			
Bringman et al., 2003[641]	30-75	x			x		x								
Coskun et al., 2005[664]	15+														
Dalenback et al., 2009[665]	30-75	x				3+									
Dogru et al., 2006[673]	18+														x
Frey et al., 2006[697]	40+				x			x		x		x		x	
Gunal et al., 2007[702]	Adults				x	3+									
Hamza et al., 2010[704]	Adults	x					x				x				
Kingsworth et al., 2000[720]	18+														
Kingsworth et al., 2002[721]	18+														

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Koc et al., 2004[722]	Adults														
Muldoon et al., 2004[761]	18+	x					x	x							
Nienhuijs et al., 2007[772]	Adults														
Pavlidis et al., 2002[786]	30+														
Sanders et al., 2009[798]	18+														
Sanjay et al., 2006[799]	18+														
Sevonius et al., 2009[535,805-813]	15+														
Vatansev et al., 2002[826]	Adults														
Vironen et al., 2006[827]	18+														

Table 38. Key Question 3: Patient enrollment criteria, other

Study	Other enrollment criteria
Abu-Own et al., 2000[621]	Excluded those unable to complete the post-operative pain assesment sheet.
Adamonis et al., 2006[622]	No other criteria
Bringman et al., 2003[641]	Appendectomy was not an exclusion. Excluded cancer, immune deficiency.
Coskun et al., 2005[664]	No other criteria
Dalenback et al., 2009[665]	Excluded also were men with prior history of ipsilateral hernia repair and those with a history of drug or alcohol abuse.
Dogru et al., 2006[673]	Excluded those with coagulation disorders.
Frey et al., 2006[697]	Excluded were those type 1 diabetes and severe medical problems contraindicating safe induction.
Gunal et al., 2007[702]	Excluded those with “unsatisfactory data” (not defined by the authors), and those that could not be reached at their last follow-up, Nyhus IIIc or IV
Hamza et al., 2010[704]	Appendectomy was not an exclusion. Excluded obstructive airwary disease, constipation, or obstructive uropathy
Kingsworth et al., 2000[720]	Excluded those with BMI >40 kg/m2
Kingsworth et al., 2002[721]	No other criteria
Koc et al., 2004[722]	No other criteria
Muldoon et al., 2004[761]	Excluded also were those with a history of retropubic surgery and severe comorbidity likely to preclude 2-yr follow-up
Nienhuijs et al., 2005[769-771]	No other criteria
Nienhuijs et al., 2007[772]	No other criteria
Pavlidis et al., 2002[786]	No other criteria
Sanders et al., 2009[798]	Excluded also were those already participating in other medical studies.
Sanjay et al., 2006[799]	Excluded those with known allergy to local anaesthetics, gross obesity.
Sevonius et al., 2009[535,805-813]	Groin repairs in Sweden. One of the publications excluded those without recurrent hernia,[805] and another excluded those with recurrent or bilateral hernia.[808]
Vatansev et al., 2002[826]	Excluded any laparoscopic surgery that required conversion to open surgery
Vironen et al., 2006[827]	Excluded those unsuitable for the day-case unit (BMI >40 kg/m2, those with severe co-morbidities)

Table 39. Key Question 3: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Nienhuijs et al., 2005[769-771] (PHS vs. MPR vs. Lichtenstein)	The Lichtenstein operation was performed as described by Amid. A 6 x 11 cm propylene mesh (Prolene; Ethicon) was trimmed to fit the inguinal floor, as necessary. The mesh was sutured to the ligament of Poupart using a non-absorbable suture and secured cranially using an absorbable suture.	The MPR operation was performed as described by Robbins and Rutkow using a two-part prosthesis. The inserted plug (Perfix; Davol, Cranston, RI) was fixed with interrupted absorbable sutures. A flat mesh (unsutured) was placed for both direct and indirect hernias.	The peritoneal space was opened in the PHS technique. The circular mesh was placed beneath and the flat mesh above the transversalis fascia.	NA	For all techniques, the skin was closed with a subcuticular absorbable suture after closure of the external oblique. Surgical repairs were performed by staff surgeons as well as surgeons in training; all procedures were done or supervised by a surgeon with experience of more than five procedures. general anesthesia in 31% (34/111) of Group A and 34% (38/113) of Group B. spinal anesthesia in 69% (77/111) of Group A and 66% (75/113) of Group B
Abu-Own et al., 2000[621] [Lichtenstein vs. PerFix]	In the Lichtenstein repair group, the hernia sac was dissected free. A piece of prolene mesh was cut to size and placed over the transversalis fascia, around the cord structures and sutured into place with a 2/0 Prolene suture.	The PerFix mesh plug repair was performed as described by Rutkow and Robbins. The Perfix plug was secured to the deep inguinal ring with two or three interrupted, absorbale sutures and the surgeons opted to add an on-lay patch of mesh.	NA	NA	All patients were operated upon by either one consultant or two senior registrars. Patients received a standard general anesthetic, without pre-medication. 100 mg diclofenac was administered immediate postoperatively and all patients received a single intravenous dose of 1.5 g cefuroxime and three-day supply of Co-proxamol for postoperative pain.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Adamonis et al., 2006[622] (Hertra vs. Plug)	Trabucco. Hertra 1 was implanted according to Trabucco's description for small and medium size hernias. Hertra tails were secured with one interrupted suture in a similar fashion as the on-lay mesh in the Perfix plug device.	PerFix Plug repair was performed as described by Rutkow using nonabsorbable 2-0 suture to secure the plug and to reapproximate the external oblique aponeurosis.	NA	NA	Each operation was performed either by an experienced surgeon or by a resident under his/her supervision. Patients were offered local anesthesia with 1:1 mixture of 1% Lidocaine and 0.5% Bupivacaine. Additionally Midazolam 1 mg and Fentanyl 50 ulg were used as needed. Postoperative pain was maintained by ketoprofol 50 mg intramuscular route.
Bringman et al., 2003[641]	TEP, 5 surgeons, all were "experienced" in TEP. Of the 92 operations, 7 were performed by surgeons in training, assisted by one of the experienced surgeons. general anesthesia. CO2 insufflation. 10 x 15 cm polypropylene mesh (Prolene, Ethicon GmbH). Anterior rectus sheath closed with 2-0 polyglactin (Vicryl, Ethicon GmbH).	Lichtenstein, 10 surgeons, all were "experienced" in Lichtenstein. Of the 103 operations, 9 were performed by surgeons in training, assisted by one of the experienced surgeons. 97% had spinal or epidural anesthesia. 7.5 x 15 cm polypropylene mesh (Bard) that was trimmed to match the size of the inguinal floor if necessary. Fixation with 2-0 polypropylene (Prolene)	mesh plug, 10 surgeons, all were "experienced" in mesh plug. Of the 104 operations, 7 were performed by surgeons in training, assisted by one of the experienced surgeons. 94% had spinal or epidural anesthesia. Procedure perfomred as described by Robbins and Rutkow using a large Bard Perfix plug and patch (CR Bard). Interrupted sutures with 2-0 polypropylene to secure the plug, but the patch was not fixed with sutures.	NA	

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Coskun et al., 2005[664] [Lichtenstein vs. preperitoneal)	Hernia repair was by the Lichtenstein technique (anterior) as described by Amid.	Hernia repair was by the preperitoneal technique (posterior)	NA	NA	At surgery, there were some recurrent hernias in the Lichtenstein and preperitoneal repair groups. Most hernias in each group were repaired under general anesthesia. Surgeons in training oeprated on 80% in the Lichtenstein group and 45% in the preperitoneal group. general anesthesia in 80% (48/60) of Group A and 85% (51/60) of Group B.
Dalenback et al., 2009[665] (Lichtenstein vs. PerFix vs. PHS)	Lichtenstein. Descriptions by Amid was strictly adhered to for the Lichtenstein technique. A simple on-lay mesh (Prolene mesh 10 x 15 cm [Ethicon Inc., Somerville, NJ]) was used. Mesh and split part secured and sutured to the margin of the Poupart ligament using a non-absorbable suture (Prolene 2-0).	Mesh plug. Descriptions by Robbins and Rutkow was strictly adhered to for the Perfix technique. A small on-lay mesh with plug (Bard Perfix plug size Large [Davol Inc., Cranston, RI]) was used. The flat mesh routinely was secured unless at the choice of the surgeon. Mesh tails brought together with absorbable sutures.	Descriptions by Gilbert was strictly adhered to for the PHS technique. A bi-layer mesh with connecting plug (Prolene Hernia System Extended [PHS, Ethicon Inc., Somerville, NJ]) was used. The on-lay graft was sutured with a 2-0 Prolene suture over the pubic tubercle.	NA	All surgeons were experienced and interested in hernia surgery. Surgery under local anesthesia was used as routine, while other types of anesthesia were chosen for specific reasons, e.g., large hernia size, patient preference and/or considerable overweight. No antibiotics were used.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Dogru et al., 2006[673] (Lichtenstein vs. Kugel)	Polypropylene meshes (6 x 11 cm) (Prolene; Ethicon, Brussels, Belgium) were introduced anteriorly in the Lichtenstein repair group as described by Amid. The size of the mesh was modified for each patient in accordance with their anatomic variance.	In the Kugel technique as described by Kugel, a mesh (Kugel's Patch; Surgical Sense, Arlington, TX) was introduced into that dissected space between the cord structure and the peritoneum to cover Hesselbach's triangle, the internal inguinal ring, and the femoral ring and also to cover the obturator foramen.	NA	NA	All patients received a single dose of a second-generation cephalosporin intravenously prior to starting the surgery. The anesthesia was determined by the anesthesiologist for each patient. general anesthesia in 49% (34/70) of Group A and 46% (32/69) of Group B. local anesthesia in 3% (2/70) of Group A and 6% (4/69) of Group B. regional anesthesia in 49% (34/70) of Group A and 48% (33/69) of Group B
Frey et al., 2006[697] (Lichtenstein vs. mesh plug)	Lichtenstein's operation was performed as described by Amid using 3/0 polypropylene (Prolene™; Ethicon, Johnson & Johnson Medical AG, Spreitenbach, Switzerland) to secure the mesh. An 8 × 16-cm polypropylene mesh (Bard Medica, Croix-de-Rozon, Switzerland) was trimmed to match the size of the inguinal floor, with a 2-cm overlap medial to the pubic tubercle.	The mesh plug repair was performed as described by Robbins and Rutkow18 using a preformed Marlex mesh hernia plug (PerFix; Bard Medica). The plug is available in four sizes (small, medium, large and extra large), although a large plug was used routinely.	NA	NA	Number and percentage of operations: Lichtenstein [Residents - 252 (71%), Staff Surgeons - 41 (11.5%), Attending Surgeons - 62 (17.5%) / Mesh plug [Residents - 250 (72.5%), Staff Surgeons - 43 (12.5%), Attending Surgeons – 52 (15.1%). epidural anesthesia in 18% (53/297) of Group A and 15% (46/298) of Group B. general anesthesia in 18% (54/297) of Group A and 24% (72/298) of Group B. local anesthesia, with or without sedation in 22% (64/297) of Group A and 22% (66/298) of Group B. spinal anesthesia in 42% (126/297) of Group A and 38% (113/298) of Group B

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Gunal et al., 2007[702]	TAPP, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). Carbon dioxide insufflation. 6 x 12 cm Prolene mesh fixed to the posterior abdominal wall using a hernia stapler.	TEP, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). Balloon trocar expansion of the preperitoneal space and carbon dioxide insufflation. 6x12cm Prolene mesh fixed to the posterior inguinal wall using a hernia stapler.	Lichtenstein, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). 6 x 12 cm Prolene mesh fixed to the anterior aspect of the posterior wall.	Nyhus, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). 6 x 12 cm prolene mesh to the posterior aspect of the inguinal defect	
Hamza et al., 2010[704]	TAPP, no other details reported	TEP, no other details reported	Lichtenstein, no other details reported	Open properitoneal mesh, no other details reported	All operations were performed by one consultant surgeon.
Kingsworth et al., 2000[720] (Lichtenstein vs. Perfix plug-and-patch)	For the Lichtenstein method, the technique used was that described by Shulman and Amid using a 15 x 10 cm patch of Marlex (Davol Inc.) to cover the posterior inguinal wall with a 2- to 4-cm overlap fixed with sutures.	For thePerfix plug-and-patch method, the surgical technique was that used by Robbins and Rutkow. A Bard Marlex Mesh Perfix Plug (Davol Inc.) was used and sutured in position, together with a precut mesh piece to cover the posterior inguinal wall, which was not fixed with sutures.	NA	NA	There were 3 staff surgeons and 6 residents who operated independently and who participated in the study. All patients received rectal administration of NSAID drug prior to operation. Prophylactic antibiotics were not administered. general anesthesia in 9% (6/68) of Group A and 7% (5/73) of Group B. local anesthesia in 91% (62/68) of Group A and 93% (68/73) of Group B

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Kingsworth et al., 2002[721] (Lichtenstein vs. PHS)	For the Lichtenstein method, the technique used was that described by Shulman and Amid.	For the PHS repair technique, the method used was that described by Gilbert.	NA	NA	Operations were performed or supervised by one specialist surgeon and a number of junior surgeons in training. The preperitoneal space was opened by division of the transversalis fascia to allow the placement of the inner, circular mesh. All patients received rectal administration of NSAID drug prior to operation. Prophylactic antibiotics were not administered. general anesthesia in 1% (1/103) of Group A and 2% (2/103) of Group B. local anesthesia in 99% (102/103) of Group A and 98% (101/103) of Group B. sac excised in 2% (2/103) of Group A and 3% (3/103) of Group B. sac transected in 14% (14/103) of Group A and 6% (6/103) of Group B
Koc et al., 2004[722] (Stoppa vs. Lichtenstein)	Stoppa. Authors only reported the original Stoppa hernia technique was used.	Lichtenstein. Authors only reported the bilateral Lichtenstein operation technique was used with two separate incisions.	NA	NA	No additional treatment detail provided.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Muldoon et al., 2004[761] (Lichtenstein vs. Read-Rives)	The Lichtenstein operation was performed as described by Amid. A sheet of polypropylene mesh measuring 7.5 x 15 cm was placed into the groin and secured to the lateral border of the rectus sheath using a running 2-0 Prolene suture. The two tails of the mesh were crossed, sutured together, and attached to the inguinal ligament.	The Read-Rives repair was also performed through a standard groin incision. A 12 x 16 cm polypropylene mesh was placed in the preperitoneal position, dep to the inferior epigastric vessels, and secured with three sutures to the pubic tubercle.	NA	NA	Hernia was performed under either general or spinal anesthesia.
Nienhuijs et al., 2007[772] (Lichtenstein vs. Kugel)	The Lichtenstein technique was performed as described by Amid using a 6 x 11 cm polypropylene mesh (Prolene; Ethicon). The mesh was sutured to the ligament of Poupart with a non-absorbable suture and secured cranially using an absorbable suture.	The Kugel repair using the open, preperitoneal approach described by Kugel. A KugelMesh (Bard, Inc.), medium oval size (11 x 14 cm) was used in each case.	NA	NA	Inguinal hernias repairs were performed by staff surgeons as well as surgeons in training.
Pavlidis et al., 2002[786] (Patch vs. Patch + Plug vs. Laparoscopic TAPP)	The laparoscopic TAPP tension-free mesh technique used a transabdominal preperitoneal approach to place a 6 x 11 cm polypropylene mesh (Prolene) under the transversalis fascia and secured by titanium clips.	The open tension-free patch technique used a polypropylene mesh (Prolene) as a patch placed on the transversalis fascia and secured by sutures or skin staples.	The open tension-free patch and plug technique used a cone shaped polypropylene mesh (Marlex) as a plug inserted through the internal ring and another as patch placed and secured by sutures or skin staples.	NA	All laparoscopic repairs were performed under general anesthesia, while open repairs under general, epidural, regional or even local anesthesia. Antibiotic prophylaxis was attempted by 3 doses of a second generation cephalosporin.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Sanders et al., 2009[798] (PL vs. PF vs. LTFM)	Mesh plug using the Proloop plug. Authors reported standard procedure techniques were used for the PL repair	Mesh plug using the Perfix plug. Authors reported standard procedure techniques were used for the PF repair	Lichtenstein. Authors reported standard procedure techniques were used for the LFTM repair.	NA	Surgery at each center was by a single senior surgeon with good experience of inguinal hernia repair, trained in mesh and plug repairs. Analgesia in the form of 100 diclofenac suppository was given 1 hr. preoperatively. All repairs were performed under local anesthesia and patients under 60 years received additional sedation with Midazolam 3 mg.
Sanjay et al., 2006[799] [PHS mesh vs. Lichtenstein]	PHS bilayer mesh technique was carried out as described by Gilbert.	Lichtenstein mesh procedures was carried out as described by Amid.	NA	NA	All operations were carried out under local anesthesia. A 100 mL solution containing 2% lignocaine with adrenaline (20 mL), 0.5% bupivacaine with adrenaline (30 mL) and 0.9% sodium chloride solution (50 mL) was prepared in each case. Prophylactic intravenous cefuroxime 1.5 g was administered.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Sevonius et al., 2009[535,805-813]	"Laparoscopic"; some TAPP, some TEP, did not report the ratio, or any other procedural details.	Lichtenstein. The publication by Novik et al., 2011[811] detailed fixation methods from 82,015 procedure: nonabsorbable sutures in 95.7% (78,867); long-term absorbable sutures in 2.4% (1938); short-term absorbable sutures in 1.5% (1210); Staples or tacks in 0.1% (75); glue in 0.017% (14); no fixation in 0.2% (151).	"Plug," no other details reported	Open preperitoneal mesh, no other details reported	
Vatansev et al., 2002[826]	TEP, general anesthesia, polypropylene mesh (specifics not reported) for the reinforcement of the preperitoneal areal	Lichtenstein, general anesthesia, polypropylene mesh (specifics not reported) for the reinforcement of the posterior wall	Nyhus, general anesthesia, polypropylene mesh (specifics not reported) for the reinforcement of the preperitoneal areal	NA	

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Vironen et al., 2006[827] (Lichtenstein vs. PHS)	In the Lichtenstein method, a sheet of polypropylene mesh (Suripro; AutoSuture, Norwalk, CT) was secured in position with polypropylene sutures along the inguinal ligament to cover the posterior inguinal wall.	The PHS bilayer device consist of three polypropylene components. Fixing sutures were not used, except for large direct hernias, when the only patch was secured with two or three sutures medially.	NA	NA	Three surgeons competent in both open techniques of repair did all the operations. The repairs were done under local infiltration anesthesia plus intravenous sedation, regional or general anesthesia. Local anesthesia (10 ml bupivacaine 5 mg/ml) was administered into all wounds. No prophylactic antibiotics. Ibuprofen or paracetamol plus codeine were prescribed for postoperative pain. general anesthesia in 27% (40/150) of Group A and 21% (32/150) of Group B. local anesthesia in 29% (43/150) of Group A and 44% (66/150) of Group B. regional anesthesia in 45% (67/150) of Group A and 35% (52/150) of Group B.

Table 40. Key Question 3: Baseline characteristics

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Abu-Own et al., 2000[621]	% recurrent	0% (0/13)	0% (0/13)			
	% bilateral	0% (0/13)	0% (0/13)			
	% direct	Entire study: 42(11/26)				
	% indirect	Entire study: 58(15/26)				
	% left-sided	Entire study: 46(12/26)				
	% right-side	Entire study: 54(14/26)				
	Age	52 (Range: 24-79) (N=13)	44 (Range: 18-64) (N=13)			
Adamonis et al., 2006[622]	% recurrent	0% (0/50)	0% (0/50)			
	% bilateral	0% (0/50)	0% (0/50)			
	% large hernia (defect >4 cm) Gilbert-Rutkow hernia type 4	20% (10/50)	16% (8/50)			
	% large hernia (defect >4 cm) Gilbert-Rutkow hernia type 3	34% (17/50)	32% (16/50)			
	% large hernia (defect >4 cm) Gilbert-Rutkow hernia type 6	2% (1/50)	2% (1/50)			
	% medium hernia (defect <4 cm) Gilbert-Rutkow hernia type 2	26% (13/50)	28% (14/50)			
	% small hernia (defect <1 cm) Gilbert-Rutkow hernia type 1	2% (1/50)	10% (5/50)			
	% small hernia (defect <1 cm) Gilbert-Rutkow hernia type 5	16% (8/50)	12% (6/50)			
	% male	96% (48/50)	96% (48/50)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Adamonis et al., 2006[622] (continued)	Age	55.4 (SD: 17.9, Range: 17-89) (N=50)	54.2 (SD: 17.2, Range: 17.2) (N=50)			
	% ASA score 1	56% (28/50)	50% (25/50)			
	% ASA score 2	16% (8/50)	24% (12/50)			
	% ASA score 3	28% (14/50)	26% (13/50)			
Bringman et al., 2003[641]	% bilateral	0% (0/92)	0% (0/103)	0% (0/104)		
	% combined direct/indirect	9% (8/92)	3% (3/103)	4% (4/104)		
	% direct	37% (34/92)	43% (44/103)	43% (45/104)		
	% femoral	1% (1/92)	0% (0/103)	1% (1/104)		
	% indirect	53% (49/92)	54% (56/103)	52% (54/104)		
	% recurrent	14% (13/92)	11% (11/103)	16% (17/104)		
	% recurrent, one prior operations	12% (11/92)	11% (11/103)	13% (13/104)		
	% recurrent, three prior operations	1% (1/92)	0% (0/103)	1% (1/104)		
	% recurrent, two prior operations	1% (1/92)	0% (0/103)	3% (3/104)		
	% male	100% (92/92)	100% (103/103)	100% (104/104)		
	% work any	70% (64/92)	66% (68/103)	68% (71/104)		
	% work long-term sick leave	0% (0/92)	0% (0/103)	1% (1/104)		
	% work retired	26% (24/92)	29% (30/103)	31% (32/104)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Bringman et al., 2003[641] (continued)	% work unemployed but not retired and not long-term sick leave	4% (4/92)	4% (4/103)	0% (0/104)		
	Age	55 (SD: 12) (N=92)	54 (SD: 11) (N=103)	55 (SD: 12) (N=104)		
	BMI (kg/m^2)	25 (SD: 3) (N=92)	25 (SD: 3) (N=103)	25 (SD: 4) (N=104)		
Coskun et al., 2005[664]	Age	Median: 48 (Range: 15-87) (N=60)	Median: 50 (Range: 25-83) (N=60)			
	% Nyhus type 1	0% (0/60)	0% (0/60)			
	% Nyhus type 2	22% (13/60)	17% (10/60)			
	% Nyhus type 3	53% (32/60)	53% (32/60)			
	% Nyhus type 4	25% (15/60)	30% (18/60)			
	% recurrent	25% (15/60)	30% (18/60)			
	% male	90% (54/60)	95% (57/60)			
Dalenback et al., 2009[665]	% recurrent	0% (0/158)	0% (0/159)	0% (0/155)		
	% physical activity score “work load” 0	28% (45/158)	31% (49/159)	34% (53/155)		
	% physical activity score “work load” 1	47% (75/158)	52% (82/159)	46% (72/155)		
	% physical activity score “work load” 2	24% (38/158)	18% (28/159)	19% (30/155)		
	Age	56 (SEM: 1) (N=158)	55 (SEM: 1) (N=159)	56 (SEM: 1) (N=155)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Dalenback et al., 2009[665] (continued)	BMI (kg/m^2)	Median: 25 (NR) (N=158)	Median: 25 (NR) (N=159)	Median: 25 (NR) (N=155)		
	Weight (kg)	80 (SEM: 1) (N=158)	80 (SEM: 1) (N=159)	79 (SEM: 1) (N=155)		
	% ASA score 2	16% (25/158)	15% (24/159)	12% (19/155)		
	% ASA score 3	1% (1/158)	1% (1/159)	1% (1/155)		
	% ASA score 4	84% (132/158)	84% (134/159)	87% (135/155)		
Dogru et al., 2006[673]	% recurrent	0% (0/70)	0% (0/69)			
	% direct	39% (27/70)	30% (21/69)			
	% indirect	61% (43/70)	70% (48/69)			
	% male	96% (67/70)	97% (67/69)			
	Age	51.1 (SD: 16.2) (N=70)	50.1 (SD: 16.4) (N=69)			
Frey et al., 2006[697]	Age	Median: 59 (Range: 40-92) (N=297)	Median: 58 (Range: 40-91) (N=298)			
	% combined hernia	20% (59/297)	12% (36/298)			
	% direct	38% (112/297)	35% (105/298)			N is number of operations
	% indirect	42% (126/297)	53% (157/298)			
	% primary	93% (277/297)	93% (278/298)			
	% recurrent	7% (20/297)	7% (20/298)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Frey et al., 2006[697] (continued)	% male	97% (288/297)	96% (285/298)			
	% work any	46% (137/297)	52% (154/298)			
	% work retired	44% (130/297)	40% (118/298)			
	% work self-employed	10% (30/297)	9% (26/298)			
	BMI (kg/m^2)	Median: 25.3 (Range: 16.6 to 37.2) (N=297)	Median: 24.9 (Range: 16.4 to 36.8) (N=298)			
	% ASA score 1	52% (153/297)	55% (164/298)			
	% ASA score 2	39% (117/297)	37% (111/298)			
	% ASA score 3	9% (27/297)	8% (23/298)			
Gunal et al., 2007[702]	% bilateral	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% Nyhus type 3c	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% Nyhus type 4	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% recurrent	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	Age	25.72 (SD: 6.8) (N=39)	22.38 (SD: 4.1) (N=40)	22.76 (SD: 1.9) (N=42)	23.85 (SD: 3.1) (N=40)	SDs calculated by ECRI Institute based on reported SEMs and Ns
Hamza et al., 2010[704]	% direct	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% indirect	100% (25/25)	100% (25/25)	100% (25/25)	100% (25/25)	
	% irreducible	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Hamza et al., 2010[704] (continued)	% obstructed	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% recurrent	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% male	100% (25/25)	100% (25/25)	100% (25/25)	100% (25/25)	
	% smoking	44% (11/25)	36% (9/25)	40% (10/25)	44% (11/25)	
	% work heavy weight lifting	36% (9/25)	40% (10/25)	32% (8/25)	32% (8/25)	
	Age	36.73 (SD: 12.06) (N=25)	34.91 (SD: 13) (N=25)	35.12 (SD: 10.11) (N=25)	35.67 (SD: 12.965) (N=25)	
	BMI (kg/m^2)	22.4 (SD: 1.242) (N=25)	23.2 (SD: 5.3) (N=25)	24.34 (SD: 14.22) (N=25)	22.2 (SD: 1.568) (N=25)	
Kingsnorth et al., 2000[269,720]	% recurrent	0% (0/68)	0% (0/73)			
Kingsnorth et al., 2002[721]	% recurrent	0% (0/103)	0% (0/103)			
Kingsworth et al., 2000[720]	Age	50 (Range: 21-84) (N=68)	56 (Range: 23-83) (N=73)			
	% bilateral	0% (0/68)	0% (0/73)			
	% combined hernia	10% (7/68)	5% (4/73)			
	% direct	32% (22/68)	22% (16/73)			
	% indirect	57% (39/68)	73% (53/73)			
	% left-sided	50% (34/68)	62% (45/73)			
	% right-side	50% (34/68)	38% (28/73)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Kingsworth et al., 2000[720] (continued)	% male	96% (65/68)	97% (71/73)			
	% work full time	68% (46/68)	62% (45/73)			
	% work retired	29% (20/68)	27% (20/73)			
	% work unemployed	3% (2/68)	1% (1/73)			
	BMI (kg/m^2)	Median: 25 (Range: 18-34) (N=68)	Median: 24 (Range: 17-31) (N=73)			
	% Aachen classification I	18% (12/68)	21% (15/73)			
	% Aachen classification II	49% (33/68)	51% (37/73)			
	% Aachen classification III	34% (23/68)	29% (21/73)			
Kingsworth et al., 2002[721]	% bilateral	0% (0/103)	0% (0/103)			
	% combined hernia	3% (3/103)	4% (4/103)			
	% direct	38% (39/103)	38% (39/103)			
	% endocrine disease	15% (15/103)	6% (6/103)			
	% hernia <1.5 cm	12% (12/103)	13% (13/103)			
	% hernia >3 cm	37% (38/103)	43% (44/103)			
	% hernia 1.5 to 3 cm	51% (53/103)	44% (45/103)			
	% indirect	59% (61/103)	58% (60/103)			
	% skin disease	1% (1/103)	2% (2/103)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Kingsworth et al., 2002[721] (continued)	% male	100% (103/103)	96% (99/103)			
	% work active	25% (13/51)	7% (3/46)			
	% work always on feet	31% (16/51)	26% (12/46)			
	% work always on feet home activity	15% (15/103)	15% (15/103)			
	% work fairly sedentary home activity	11% (11/103)	12% (12/103)			
	% work full time	46% (47/103)	41% (42/103)			
	% work largely sedentary among employed only (N=51 vs. 46)	4% (2/51)	22% (10/46)			
	% work largely sedentary home activity	6% (6/103)	5% (5/103)			
	% work moderately sedentary home activity	36% (37/103)	39% (40/103)			
	% work not employed	5% (5/103)	6% (6/103)			
	% work part time	4% (4/103)	4% (4/103)			
	% work predominantly sedentary	22% (11/51)	15% (7/46)			
	% work retired	46% (47/103)	49% (50/103)			
	% work self employed	6% (6/103)	6% (6/103)			
	% work very active home activity	33% (34/103)	30% (31/103)			
	% work very labor intensive	18% (9/51)	30% (14/46)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Kingsworth et al., 2002[721] (continued)	Age	59 (SD: 25.7, Range: 21-29) (N=103)	59 (SD: 15.4, Range: 24-86) (N=103)			The reported upper limit of the range of 29 conflicts with the mean of 59
	BMI (kg/m^2)	25 (SD: 3.9, Range: 16-43) (N=103)	24 (SD: 2.4, Range: 19-31) (N=103)			
	% “other” disease	8% (8/103)	11% (11/103)			
	% cardiovascular disease	26% (27/103)	26% (27/103)			
	% genito-urinary disease	14% (14/103)	11% (11/103)			
	% musculoskeletal	19% (20/103)	11% (11/103)			
	% respiratory disease	7% (7/103)	11% (11/103)			
	% CNS disease	14% (14/103)	8% (8/103)			
Koc et al., 2004[722]	No baseilne characteristics reported					
Muldoon et al., 2004[761]	% recurrent	0% (0/126)	0% (0/121)			
	% bilateral	0% (0/126)	0% (0/121)			
	% direct	44% (55/126)	40% (48/121)			Total number of hernia was not given and the sum did not add up to number of patients (possibly due to bilateral hernias). Only the number of hernia was reported.

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Muldoon et al., 2004[761] (continued)	% indirect	33% (41/126)	36% (44/121)			
	% pantaloon	13% (17/126)	11% (13/121)			
	% unclassified hernia	2% (2/126)	3% (4/121)			
	% alcohol abuse	6% (7/126)	9% (11/121)			
	% smoking	56% (71/126)	71% (86/121)			
	Age	63.3 (Range: 18 to 85) (N=126)	60.7 (Range: 26 to 86) (N=121)			
	Height (cm)	177.3 (Range: 154.9 to 198.1) (N=126)	177.8 (Range: 154.9 to 200.7) (N=121)			
	Relative ideal body weight (%)	106.2 (Range: 58.9 to 175.4) (N=126)	105.9 (Range: 67.5 to 178.6) (N=121)			
	% chronic obstructive pulmonary disease	13% (17/126)	19% (23/121)			
	% constipation	4% (5/126)	5% (6/121)			
	% diabetes	10% (12/126)	10% (12/121)			
	% peripheral vascular disease (PVD)	13% (16/126)	7% (9/121)			
	% steroids	1% (1/126)	2% (2/121)			
	% urinary obstruction	10% (13/126)	17% (21/121)			
	SF-36 general health	Median: 79 (68-90) (N=295)	Median: 78 (62-89.5) (N=296)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Muldoon et al., 2004[761] (continued)	SF-36 mental health	Median: 82 (69-91) (N=295)	Median: 82 (69-91) (N=296)			
	SF-36 physical functioning	Median: 80 (60-90) (N=295)	Median: 80 (60-90) (N=296)			
	SF-36 social functioning	Median: 89 (75-100) (N=295)	Median: 89 (75-100) (N=296)			
	SF-SF-36 vitality	Median: 70 (50-87) (N=295)	Median: 70 (55-87) (N=296)			
	VAS resting in bed	Median: 2 (0-5) (N=295)	Median: 1 (0-5) (N=296)			
Nienhuijs et al., 2005[769-771]	% recurrent	0% (0/111)	0% (0/113)	0% (0/110)		
	% bilateral	0% (0/111)	0% (0/111)	0% (0/110)		
	% combined hernia	10% (11/111)	10% (11/113)	10% (11/110)		
	% direct	34% (38/111)	35% (40/113)	33% (36/110)		
	% hernia <1.5 cm	13% (14/111)	13% (15/113)	7% (8/110)		
	% hernia >3.0 cm	32% (36/111)	32% (36/113)	26% (29/110)		
	% hernia 1.5 to 3.0 cm	55% (61/111)	55% (62/113)	67% (74/110)		
	% indirect	56% (62/111)	55% (62/113)	57% (63/110)		
	% male	96% (107/111)	98% (111/113)	4% (4/110)		
	% work any	67% (74/111)	56% (63/113)	52% (57/110)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Nienhuijs et al., 2005[769-771] (continued)	% work not employed	1% (1/111)	3% (3/113)	4% (4/110)		
	% work retired	26% (29/111)	33% (37/113)	29% (32/110)		
	% work status not known	6% (7/111)	9% (10/113)	15% (17/110)		
	Age	Median: 55 (Range: 28-81) (N=111)	Median: 56 (Range: 20-83) (N=113)	Median: 53 (Range: 22-81) (N=110)		
	BMI (kg/m^2)	24.4 (NR) (N=111)	24.6 (NR) (N=113)	24.5 (NR) (N=110)		
Nienhuijs et al., 2007[772]	Age	54.4 (SD: 13.6) (N=86)	55.6 (SD: 15.8) (N=86)			
	% bilateral	0% (0/86)	0% (0/86)			
	% with hernia presence “missing”	6% (5/86)	9% (8/86)			
	% with hernia presence for months	50% (43/86)	52% (45/86)			
	% with hernia presence for weeks	27% (23/86)	23% (20/86)			
	% with hernia presence for years	17% (15/86)	15% (13/86)			
	% male	99% (85/86)	99% (85/86)			
	% work heavy employment	28% (24/86)	29% (25/86)			
	% work light employment	43% (37/86)	31% (27/86)			
	% work none or retired	23% (20/86)	30% (26/86)			
	BMI (kg/m^2)	25.4 (SD: 2.7) (N=86)	25.1 (SD: 2.9) (N=86)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Nienhuijs et al., 2007[772] (continued)	% ASA score 2	30% (26/86)	35% (30/86)			
	% ASA score 3	1% (1/86)	2% (2/86)			
	% ASA score 5	69% (59/86)	63% (54/86)			
Pavlidis et al., 2002[786]	% bilateral	28% (10/36)	28% (14/50)	20% (11/54)		
	% primary hernia based on the number of repairs (i.e., 64 vs. 65 vs. 46)	89% (32/36)	106% (53/50)	104% (56/54)		
	% recurrent	39% (14/36)	22% (11/50)	17% (9/54)		N is hernias
	% unilateral	72% (26/36)	72% (36/50)	80% (43/54)		
	% male	8% (3/36)	92% (46/50)	91% (49/54)		
	Age	Median: 59 (Range: 33 to 82) (N=36)	Median: 60 (Range: 35 to 75) (N=50)	Median: 62 (Range: 30 to 78) (N=54)		
Sanders et al., 2009[798]	% recurrent	0% (0/93)	0% (0/101)	0% (0/101)		
	% bilateral	0% (0/93)	0% (0/101)	0% (0/101)		
	% male	Entire study: 92% (271/295)				
	Age	Entire study 56 (Range: 19 to 91) (N=194)				
	BMI (kg/m^2)	Entire study 25.8 (Range: 14.4 to 35) (N=194)				
Sanjay et al., 2006[799]	% recurrent	0% (0/31)	0% (0/33)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Sanjay et al., 2006[799] (continued)	% indirect	77% (24/31)	82% (27/33)			
	% reducible	94% (29/31)	100% (33/33)			
	% right-side	48% (15/31)	58% (19/33)			
	% scrotal hernia	3% (1/31)	9% (3/33)			
	Symptom duration (months)	15.3 (SD: 10.7) (N=31)	30.6 (SD: 54) (N=33)			
	% male	97% (30/31)	100% (33/33)			
	% work manual occupation	58% (18/31)	58% (19/33)			
	Age	63 (SD: 15) (N=31)	59 (SD: 15.6) (N=33)			
	Weight (kg)	76 (SD: 12) (N=31)	79 (SD: 13) (N=33)			
	% ASA 1 or 2	58% (18/31)	70% (23/33)			
	% ASA score 3	42% (13/31)	30% (10/33)			
Sevonius et al., 2009[535,805-813]	% recurrent	Entire study 12% (16,648/142,578)				Reported by Magnusson.[806]
	% male	Entire study 92% (131,607/142,578)				Reported by Magnusson.[806]
	Age	Entire study 59 (NR) (N=142578)				Reported by Magnusson.[806]
Vatansev et al., 2002[826]	% bilateral	0% (0/20)	0% (0/24)	0% (0/21)		
	% direct	25% (5/20)	21% (5/24)	19% (4/21)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Vatansev et al., 2002[826] (continued)	% femoral	5% (1/20)	8% (2/24)	5% (1/21)		
	% indirect	65% (13/20)	71% (17/24)	76% (16/21)		
	% recurrent	0% (0/20)	0% (0/24)	0% (0/21)		
	% male	90% (18/20)	92% (22/24)	86% (18/21)		
	Age	54.6 (SD: 12.8) (N=20)	53.2 (12.6) (N=24)	50.7 (15.3) (N=21)		
Vironen et al., 2006[827]	% bilateral	9% (14/150)	13% (20/150)			
	% Nyhus type 1 lateral hernia	35% (53/150)	35% (52/150)			
	% Nyhus type 2 lateral and posterior wall hernia	16% (24/150)	20% (30/150)			
	% Nyhus type 3a medial hernia	39% (58/150)	35% (52/150)			
	% Nyhus type 3b combined hernia	6% (9/150)	7% (10/150)			
	% Nyhus type 3c	1% (1/150)	1% (1/150)			
	% Nyhus type 4	3% (5/150)	3% (5/150)			
	% recurrent	3% (5/150)	3% (5/150)			
	% unilateral	91% (136/150)	87% (130/150)			
	% male	95% (142/150)	93% (140/150)			
	% work heavy	19% (28/150)	22% (33/150)			
	% work light	24% (36/150)	19% (29/150)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Vironen et al., 2006[827] (continued)	% work office	37% (56/150)	38% (57/150)			
	% work retired or unemployed	20% (30/150)	21% (31/150)			
	Age	Median: 47 (Range: 20 to 70) (N=150)	Median: 46 (Range: 19 to 72) (N=150)			
	BMI (kg/m^2)	Median: 25 (Range: 19 to 36) (N=150)	Median: 25 (Range: 17 to 36) (N=150)			

Table 41. Key Question 3: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Abu-Own et al., 2000[621]	Recurrences	At 6 weeks	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normality & work [days]	6 weeks	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Analgesia (number of tablets)	First 7 post-operative days	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain score (0-10)	First 7 post-operative days	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Complications	At 6 weeks	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Adamonis et al., 2006[622]	Recurrence	21 months (12-33)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Resumption of normal home activity, days	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Need for NSAID, days	1 wk	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	No pain	21 months (12-33)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Pain- does not limit physical activity, limits some activity, & limits normal life activity	21 months (12-33)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	VAS Pain (0-100)	Postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Complications	Early post-operative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Mod.
Bringman et al., 2003[641]	Hernia recurrence	Mean: 19.8 months (SD: 8.6)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Full recovery (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain	Mean: 19.8 months (SD: 8.6)	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	?	Y	Y	Mod.
	Pain, prolonged	one month	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: required extra analgesia	four hours	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	four hours	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	two hours	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain: VAS	first postoperative morning	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bringman et al., 2003[641] (continued)	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Coskun et al., 2005[664]	Recurrences	Months median (range) 36 (14-47), 36 (13-45), 37 (16-48)	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	LOS, days	Postoperative	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Complications	Months median (range) 36 (14-47), 36 (13-45), 37 (16-48)	Y	N	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Dalenback et al., 2009[665]	Recurrence	3 months, 1 year, & 3 years	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Percentage of patients reaching full functional ability test scores	2 weeks, 3 months, 1 year, & 3 years	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Average number of drugs taken	1 to 14 days	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Severe pain (VAS >7)	Immediate postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS discomfort score (0-10)	Perioperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score (0-10)	Perioperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score (0-10)	1 to 14 days (morning & evening)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Complications	Immediate postoperative, 30 days, 3 months, 1 year, & 3 years	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
Dogru et al., 2006[673]	Recurrence	53.06 (5.6), 53.41 (7.1)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Complications	Months, mean (SD) 53.06 (5.6), 53.41 (7.1)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Frey et al., 2007[697]	Recurrence	Within 12 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Frey et al., 2007[697] (continued)	LOS <24 hrs., 1 day, 2 days, 3 days, & 4 days	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Complications	Intraoperative, postoperative, 4 weeks, & within 12 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Mod.
Gunal et al., 2007[702]	Hernia recurrence	TAPP: 87.59 months (±2.77, but authors didn't define "±"); TEP: 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	Y	?	Y	Y	Y	Y	Y	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	six hours	Y	?	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	Y	?	Y	Y	?	Y	Y	Y	Y	Mod.
Hamza et al., 2010[704]	Recurrence	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	At least two nights in hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	LOS 1 day, 2 days, >2 days	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Return to domestic activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to normal domestic activities & normal work activities	Up to 24 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	six hours	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: Groin	postoperative	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (0-10)	Days 1 & 2	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	Complications	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y Mod.	Low

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Kingsnorth et al., 2000[269,720]	Cumulative percentage of patients who returned to normal home activity	1-7, 9, 10, 12, 14, 23, & 24 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	days to return to normal activity	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Cumulative percentage of patients who returned to work	1, 6, 8, 10, 16, 21, 23, 25, 27, 30, 34, 36, & 56 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	days to return to work	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Total days of missed work	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	days of analgesic medication	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Percentage of patients requiring analgesic medication	Day of operation, 1-14 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	VAS pain scores (0-100)	Day of operation, 1-14 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Complications	Resolving at <14 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Prophylactic medication/antibiotics (significant)	Postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Kingsnorth et al., 2002[721]	Recurrence	Up to 1 year	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Number of days between surgery and return to normal	Postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Proportion of patients taking >3 days to return to normal activity	Up to 66 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	time to return to normal activity, days	0-12 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	days of employment missed among patients in employment	Postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	days to return to work after surgery	Postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Kingsnorth et al., 2002[721] (continued)	Sf- 36 - general health, physical functioning, role physical, role emotional, social function, mental health, vitality, & bodily pain	6 months and 12 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain score (0-100)	Day of the surgery, 1-14 days, and 6 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
Koc et al., 2004[722]	SF-36 physical functioning, social function, role limitation, mental health, vitality, pain, & general health perception	6 months	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
Muldoon et al., 2004[761]	Recurrence	Lichtenstein (1 at 18 months, 2 sometime after 2-yr 1 at 53 months, 1 was unknown) / Read-Rives (1 at 2 months after the primary operation)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain on exertion	Minimum of 2 years, Median: 82 months (24-110)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Complications	Minimum of 2 years, Median: 82 months (24-110)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Nienhuijs et al., 2005[769-771]	Recurrence	Late follow-up Median: 15.4 (Range: 7-33) months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Amount of paracetamol consumed, g/per day	Postoperative	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	VAS pain scores (0-100)	1-14 days	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Complications	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Mod.
Nienhuijs et al., 2007[772]	Recurrence	Less than 6 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Nienhuijs et al., 2007[772] (continued)	Proportion of patients reporting pain	3 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Proportion of patients with NO/MILD/MODERATE/SEVERE chronic pain (chronic pain was defined as 3 months)	3 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Total number of paracetamol & meloxicam consumed	First 2 weeks	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain score [0-100]	1 - 14 days, 3 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Complications	3 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Pavlidis et al., 2002[786]	Recurrence, %	Mean: 12.7 months (Range: 1-24)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	LOS, days	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to work, days	Mean: 12.7 months (Range: 1-24)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	No analgesic use, %	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Non-opioid analgesic, %	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Opioids	Postoperative	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Complications, %	Mean: 12.7 months (Range: 1-24)	Y	N	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Sanders et al., 2009[798]	Recurrence	2 weeks, 6 months, & 12 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	LOS, hrs.	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Return to normal daily activity	2 weeks, 6 months, & 12 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain scores (0-10)	2 weeks, 6 months, & 12 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Complications	2 weeks, 6 months, & 12 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Sanjay et al., 2006[799]	Recurrent herniation	Within 6 months after original operation	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Sanjay et al., 2006[799] (continued)	time to return to normal work, driving [days]	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Very satisfied, satisfied with surgery	Minimum of 4 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Mild chronic groin pain	Minimum of 4 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain scores (0-10 scale)	Day 1 & 6 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Total number of codydramol tablets consumed	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Complications	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Sevonius et al., 2009[535,805-813]	Hernia recurrence	five years	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
	Hernia recurrence, first recurrence	NR, but the publication appeared in March 2009, and operation dates ranged from 1992 to 2006	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
	Hernia recurrence, second recurrence	NR, but the publication appeared in March 2009, and operation dates ranged from 1992 to 2006	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
	Hernia recurrence, third recurrence	NR, but the publication appeared in March 2009, and operation dates ranged from 1992 to 2006	N	N	Y	N	N	?	?	?	Y	?	N	?	?	Y	Y	High
	Pain: felt pain within the past week	between 2 and 3 years	N	N	Y	N	N	?	?	?	?	?	N	N	?	Y	Y	High
	Pain: in pain now	between 2 and 3 years	N	N	Y	N	N	?	?	?	?	?	N	N	?	Y	Y	High
Vatansev et al., 2002[826]	Pain: need for analgesia meperidin mg in 24 hours	one day	Y	Y	Y	Y	Y	Y	?	Y	?	N	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Vironen et al., 2006[827]	Recurrence	Within 30 days	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Recurrence	One year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Recurrence	Five years	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Mod
	LOS, hrs.	Postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Return to work, driving, sports [days]	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Moderate pain when walking, %	2 weeks	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Number of patients who stayed overnight for pain control	Postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Number of patients with pain	1 day, 7 days, 14 days	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Occasional use of analgesics	2 weeks	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Patients reporting small painful area in the medial corner of the groin area	After 1 year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain outcomes	Five years	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Mod
	Complications	Within 30 days	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Complications	Five years	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Mod

Table 42. Key Question 3: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Abu-Own et al., 2000[621]	Lichtenstein vs. mesh plug	RTDA	Return to normality, days	6 weeks	35 (SD: 12) (N=13)	25 (SD: 11) (N=13)	p=0.04, t-test	
	Lichtenstein vs. mesh plug	RTW	Return to work, days	6 weeks	29 (SD: 18) (N=13)	22 (SD: 13) (N=13)	p=0.4, t-test	
	Lichtenstein vs. mesh plug	Pain	Analgesia (number of tablets)	First 7 postoperative days	19 (SD: 10) (N=13)	13 (SD: 9) (N=13)	p=0.15, t-test	
	Lichtenstein vs. mesh plug	Pain	Pain score (0-10)	First 7 postoperative days	3.9 (SD: 1.8) (N=13)	2.1 (SD: 1.5) (N=13)	p=0.01, t-test	
	Lichtenstein vs. mesh plug	ADV	Hematoma	6 weeks	8% (1/13)	0% (0/13)	n.s. based on OR=3.24 (95% CI: 0.12 to 87.13)[@]	
	Lichtenstein vs. mesh plug	ADV	Seroma	6 weeks	15% (2/13)	15% (2/13)	n.s. based on OR=1 (95% CI: 0.12 to 8.42)[@]	
Adamonis et al., 2006[622]	Trabucco vs. mesh plug	RC	Hernia recurrence	21 months (12-33)	4% (2/50)	4% (2/50)	n.s. based on OR=1 (95% CI: 0.14 to 7.39)[@]	
	Trabucco vs. mesh plug	RTDA	Resumption of normal home activity, days	NA	Median: 4 days (Range: 3-11) (N=50)	Median: 5 days (Range: 3-12) (N=50)	p>0.05, t-test	
	Trabucco vs. mesh plug	Pain	VAS Pain (0-100)	Postoperative	Median: 4 (Range: 1-9) (N=50)	Median: 5 (Range: 2-9) (N=50)	NR	
	Trabucco vs. mesh plug	Pain	Need for NSAID, days	1 wk	Median: 3 days (Range: 2-10) (N=50)	Median: 4 days (Range: 2-11) (N=50)	p>0.05, t-test	
	Trabucco vs. mesh plug	Pain	No pain (higher % is better)	21 months (12-33)	66% (33/50)	58% (29/50)	n.s. based on OR=1.41 (95% CI: 0.62 to 3.16)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Adamonis et al., 2006[622] (continued)	Trabucco vs. mesh plug	Pain	Pain - limits normal life activity	21 months (12-33)	0% (0/50)	0% (0/50)	Overall p>0.05, Chi-Sq test	
	Trabucco vs. mesh plug	Pain	Pain - limits some activity	21 months (12-33)	6% (3/50)	6% (3/50)	n.s. based on OR=1 (95% CI: 0.19 to 5.21)[@]	
	Trabucco vs. mesh plug	Pain	Pain- does not limit physical activity	21 months (12-33)	24% (12/50)	32% (16/50)	n.s. based on OR=0.67 (95% CI: 0.28 to 1.62)[@]	
	Trabucco vs. mesh plug	ADV	Deep vein thrombosis (side of surgery)	Early postoperative	2% (1/50)	0% (0/50)	n.s. based on OR=3.06 (95% CI: 0.12 to 76.95)[@]	
	Trabucco vs. mesh plug	ADV	Scrotal edema	Early postoperative	6% (3/50)	2% (1/50)	n.s. based on OR=2.89 (95% CI: 0.29 to 28.67)[@]	
	Trabucco vs. mesh plug	ADV	Total number of complications	Early postoperative	16% (8/50)	4% (2/50)	p=0.048, t-test	
	Trabucco vs. mesh plug	ADV	Urinary retention	Early postoperative	2% (1/50)	0% (0/50)	n.s. based on OR=3.06 (95% CI: 0.12 to 76.95)[@]	
	Trabucco vs. mesh plug	ADV	Wound infection	Early postoperative	2% (1/50)	0% (0/50)	n.s. based on OR=3.06 (95% CI: 0.12 to 76.95)[@]	
	Trabucco vs. mesh plug	ADV	Wound or scrotal hematoma	Early postoperative	4% (2/50)	2% (1/50)	n.s. based on OR=2.04 (95% CI: 0.18 to 23.27)[@]	
Bringman et al., 2003[641]	Lichtenstein vs. mesh plug	RC	Hernia recurrence	Mean: 19.8 months (SD: 8.6)	0% (0/102)	2% (2/102)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.14)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	Lichtenstein vs. mesh plug	RTDA	Full recovery (days)	NA	Median: 28.5 (Range: 1-365) (N=86)	Median: 24.5 (Range: 0-122) (N=94)	Recovery time shorter after TEP than the open groups: p<0.0001, Kruskal Wallis then Siegel-Castellan	
	Lichtenstein vs. mesh plug	RTW	Return to work (days)	NA	Median: 7 (SD: NR, Range: 0-70) (Ns NR)	Median: 7 (SD: NR, Range: 0-150) (Ns NR)	Recovery time shorter after TEP than Lichtenstein: p=0.02, Kruskal Wallis then Siegel-Castellan	
	Lichtenstein vs. mesh plug	Pain	Pain: VAS	two hours	Median: 3 (25th: 1, 75th: 4) (N=103)	Median: 4 (25th: 1, 75th: 4) (N=104)	Pain scores lower in the TEP group than Lichtenstein group: p=0.009, chi square test	
	Lichtenstein vs. mesh plug	Pain	Pain: required extra analgesia	four hours	19% (20/103)	25% (26/104)	n.s. based on OR=0.72 (95% CI: 0.37 to 1.4)[@]	
	Lichtenstein vs. mesh plug	Pain	Pain: VAS	four hours	Median: 2 (25th: 2, 75th: 4) (N=103)	Median: 2 (25th: 1, 75th: 3) (N=104)	Pain scores lower in the TEP group than Lichtenstein group: p=0.015, chi square test	
	Lichtenstein vs. mesh plug	Pain	Pain: VAS	first postoperative morning	Median: 2 (25th: 1, 75th: 3) (N=103)	Median: 2 (25th: 1, 75th: 4) (N=104)	Pain scores lower in the TEP group than both of the open groups: p<0.0001, chi square test	
	Lichtenstein vs. mesh plug	Pain	Pain, prolonged	one month	2% (2/102)	1% (1/102)	n.s. based on OR=2.02 (95% CI 0.18 to 22.63) [@]	
	Lichtenstein vs. mesh plug	Pain	Pain	Mean: 19.8 months (SD: 8.6)	10% (10/102)	4% (4/102)	n.s. based on OR=2.66 (95% CI 0.81 to 8.79) [@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	Lichtenstein vs. mesh plug	ADV	Any complications	perioperative	0% (0/103)	0% (0/104)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.37)[@]	
	Lichtenstein vs. mesh plug	ADV	Dyspnea	one month	0% (0/102)	0% (0/102)	n.s. based on OR=1 (95% CI: 0.02 to 50.88)[@]	
	Lichtenstein vs. mesh plug	ADV	Hematoma	one month	8% (8/102)	7% (7/102)	n.s. based on OR=1.16 (95% CI 0.4 to 3.31)[@]	
	Lichtenstein vs. mesh plug	ADV	Sensory loss	one month	2% (2/102)	1% (1/102)	n.s. based on OR=2.02 (95% CI 0.18 to 22.63)[@]	
	Lichtenstein vs. mesh plug	ADV	Seroma	one month	0% (0/102)	1% (1/102)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.2)[@]	
	Lichtenstein vs. mesh plug	ADV	Superficial infection	one month	4% (4/102)	3% (3/102)	n.s. based on OR=1.35 (95% CI 0.29 to 6.18)[@]	
	Lichtenstein vs. mesh plug	ADV	Testicular swelling	one month	2% (2/102)	0% (0/102)	n.s. based on OR=5.1 (95% CI: 0.24 to 107.56)[@]	
	Lichtenstein vs. mesh plug	ADV	Urinary retention	one month	0% (0/102)	0% (0/102)	n.s. based on OR=1 (95% CI: 0.02 to 50.88)[@]	
	Lichtenstein vs. mesh plug	ADV	Wound healing delayed	one month	0% (0/102)	1% (1/102)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.2)[@]	
	Lichtenstein vs. mesh plug	ADV	Wound secretion	one month	3% (3/102)	2% (2/102)	n.s. based on OR=1.52 (95% CI 0.25 to 9.26)[@]	
	Lichtenstein vs. mesh plug	ADV	Hyperesthesia	Mean: 19.8 months (SD: 8.6)	0% (0/102)	1% (1/102)	n.s. based on OR=0.33 (95% CI 0.01 to 8.2)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2003[641] (continued)	Lichtenstein vs. mesh plug	ADV	Mesh-related problems	Mean: 19.8 months (SD: 8.6)	2% (2/102)	2% (2/102)	n.s. based on OR=1 (95% CI 0.14 to 7.24)[@]	
	Lichtenstein vs. mesh plug	ADV	Sensory loss	Mean: 19.8 months (SD: 8.6)	3% (3/102)	1% (1/102)	n.s. based on OR=3.06 (95% CI 0.31 to 29.93)[@]	
Coskun et al., 2005[664]	Lichtenstein vs. OPM	RC	Hernia recurrence	Months Median: (Range) 36 (14-47), 36 (13-45), 37 (16-48)	3% (2/60)	0% (0/60)	n.s. based on OR=5.17 (95% CI: 0.24 to 110.02)[@]	
	Lichtenstein vs. OPM	HOSP	LOS, days	Postoperative	Median: 2 (Range: 0-8) (N=60)	Median: 3 (Range: 1-7) (N=60)	p=ns, one-way ANOVA and Tukey's post-hoc test	Non Mesh [Coskun's hernia repair (FTR)] group was not abstracted.
	Lichtenstein vs. OPM	ADV	Early complications	Months Median: (range) 36 (14-47), 36 (13-45), 37 (16-48)	18% (11/60)	48% (29/60)	p<0.05, Fisher's test	
	Lichtenstein vs. OPM	ADV	Late complications	Months Median: (range) 36 (14-47), 36 (13-45), 37 (16-48)	12% (7/60)	8% (5/60)	p<0.01, Fisher's test	
	Lichtenstein vs. OPM	HOSP	Hospital stay (days)	NA	Median: 2 (Range: 0-8) (N=60)	Median: 3 (Range: 1-7) (N=60)	p=ns, one-way ANOVA and Tukey's post-hoc test	
Dalenback et al., 2009[665]	Lichtenstein vs. mesh plug	RC	Hernia recurrence	3 months	0% (0/158)	1% (1/158)	n.s. based on OR=0.33 (95% CI: 0.01 to 8.19)[@]	
	Lichtenstein vs. mesh plug	RC	Hernia recurrence	1 year	1% (1/154)	1% (1/157)	n.s. based on OR=1.02 (95% CI 0.06 to 16.45)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	RC	Hernia recurrence	3 years	1% (1/149)	1% (1/154)	n.s. based on OR=1.03 (95% CI 0.06 to 16.68)[@]	
	Lichtenstein vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	2 weeks	71% (Ns NR)	77% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	3 months	98% (Ns NR)	97% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	1 year	97% (Ns NR)	99% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	3 years	100% (Ns NR)	100% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	Severe pain (VAS >7)	Immediate postoperative	1% (2/158)	1% (1/159)	n.s. based on OR=2.03 (95% CI 0.18 to 22.57)[@]	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	1 day	2.6 (SD: NR) (N=158)	3 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	1 day evening	3.5 (SD: NR) (N=158)	3.25 (SD: NR) (N=159)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	1 day morning	4.25 (SD: NR) (N=158)	3.75 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	Perioperative	Median: 1 (SD: NR) (N=158)	Median: 1 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	2 days	4.5 (SD: NR) (N=158)	4.4 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	2 days evening	2.75 (SD: NR) (N=158)	2.6 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	2 days morning	3 (SD: NR) (N=158)	2.75 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	3 days	3.6 (SD: NR) (N=158)	3.4 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	3 days morning	2.5 (SD: NR) (N=158)	2.25 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	3 days evening	2.45 (SD: NR) (N=158)	2.4 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	4 days	2.4 (SD: NR) (N=158)	2.2 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	4 days morning	2.25 (SD: NR) (N=158)	2.15 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	4 days evening	2.3 (SD: NR) (N=158)	2.25 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	5 days	1.6 (SD: NR) (N=158)	1.5 (SD: NR) (N=159)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	5 days morning	2.15 (SD: NR) (N=158)	1.9 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	5 days evening	2.15 (SD: NR) (N=158)	2.1 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	6 days	1.3 (SD: NR) (N=158)	1.3 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	6 days morning	1.9 (SD: NR) (N=158)	1.75 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	6 days evening	1.9 (SD: NR) (N=158)	1.85 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	7 days	0.8 (SD: NR) (N=158)	0.9 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	7 days morning	1.8 (SD: NR) (N=158)	1.5 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	7 days evening	1.8 (SD: NR) (N=158)	1.75 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	8 days	0.8 (SD: NR) (N=158)	0.9 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	8 days morning	1.4 (SD: NR) (N=158)	1.4 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	8 days evening	1.45 (SD: NR) (N=158)	1.5 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	9 days	0.7 (SD: NR) (N=158)	0.8 (SD: NR) (N=159)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	9 days morning	1.25 (SD: NR) (N=158)	1.25 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	9 days evening	1.3 (SD: NR) (N=158)	1.4 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	10 days	0.6 (SD: NR) (N=158)	0.7 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	10 days morning	1.15 (SD: NR) (N=158)	1.25 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	10 days evening	1.25 (SD: NR) (N=158)	1.25 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	11 days	0.5 (SD: NR) (N=158)	0.65 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	11 days morning	1 (SD: NR) (N=158)	1.05 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	11 days evening	1.15 (SD: NR) (N=158)	1.2 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	12 days	0.5 (SD: NR) (N=158)	0.6 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	12 days morning	0.9 (SD: NR) (N=158)	0.9 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	12 days evening	1 (SD: NR) (N=158)	1 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	13 days	0.5 (SD: NR) (N=158)	0.5 (SD: NR) (N=159)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	13 days evening	0.75 (SD: NR) (N=158)	0.65 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	13 days morning	0.75 (SD: NR) (N=158)	0.78 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Average number of drugs taken	14 days	0.4 (SD: NR) (N=158)	0.4 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	14 days morning	0.7 (SD: NR) (N=158)	0.65 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain score (0-10)	14 days evening	0.7 (SD: NR) (N=158)	0.6 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	Pain	Transient neuralgia	30 days	0% (0/158)	1% (2/159)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.17)[@]	
	Lichtenstein vs. mesh plug	Pain	Neuralgia	3 months	1% (1/158)	4% (6/158)	n.s. based on OR=0.16 (95% CI 0.02 to 1.36)[@]	
	Lichtenstein vs. mesh plug	Pain	Pain	3 months	3% (4/158)	4% (7/158)	n.s. based on OR=0.56 (95% CI 0.16 to 1.95)[@]	
	Lichtenstein vs. mesh plug	Pain	Neuralgia	1 year	0% (0/154)	1% (2/157)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.23)[@]	
	Lichtenstein vs. mesh plug	Pain	Pain	1 year	3% (5/154)	4% (6/157)	n.s. based on OR=0.84 (95% CI 0.25 to 2.83)[@]	
	Lichtenstein vs. mesh plug	Pain	Neuralgia	3 years	1% (1/149)	2% (3/154)	n.s. based on OR=0.34 (95% CI 0.03 to 3.31)[@]	
	Lichtenstein vs. mesh plug	Pain	Pain	3 years	2% (3/149)	3% (4/154)	n.s. based on OR=0.77 (95% CI 0.17 to 3.5)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	ADV	Complications of anesthesia (minor)	Immediate postoperative	1% (1/158)	2% (3/159)	n.s. based on OR=0.33 (95% CI 0.03 to 3.22)[@]	
	Lichtenstein vs. mesh plug	ADV	Minor hematoma	Immediate postoperative	1% (1/158)	1% (2/159)	n.s. based on OR=0.5 (95% CI 0.04 to 5.57)[@]	
	Lichtenstein vs. mesh plug	ADV	Miscellaneous	Immediate postoperative	1% (1/158)	0% (0/159)	n.s. based on OR=3.04 (95% CI: 0.12 to 75.15)[@]	
	Lichtenstein vs. mesh plug	ADV	Severe complications	Immediate postoperative	0% (0/158)	0% (0/159)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.03)[@]	
	Lichtenstein vs. mesh plug	ADV	Surgical interventions	Immediate postoperative	0% (0/158)	0% (0/159)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.03)[@]	
	Lichtenstein vs. mesh plug	ADV	Urinary retention	Immediate postoperative	3% (4/158)	0% (0/159)	n.s. based on OR=9.29 (95% CI: 0.5 to 174.03)[@]	
	Lichtenstein vs. mesh plug	ADV	VAS discomfort score (0-10)	Perioperative	Median: 0 (SD: NR) (N=158)	Median: 0 (SD: NR) (N=159)	NR	
	Lichtenstein vs. mesh plug	ADV	"Miscellaneous complications"	30 days	4% (6/158)	3% (4/159)	n.s. based on OR=1.53 (95% CI 0.42 to 5.53)[@]	
	Lichtenstein vs. mesh plug	ADV	Hematoma	30 days	4% (7/158)	11% (17/159)	p<0.05 based on OR=0.39 (95% CI 0.16 to 0.96)[@]	
	Lichtenstein vs. mesh plug	ADV	Infection	30 days	1% (2/158)	1% (1/159)	n.s. based on OR=2.03 (95% CI 0.18 to 22.57)[@]	
	Lichtenstein vs. mesh plug	ADV	Ischemic orchitis	30 days	0% (0/158)	0% (0/159)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.03)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	ADV	Serious infection	30 days	1% (1/158)	0% (0/159)	n.s. based on OR=3.04 (95% CI: 0.12 to 75.15)[@]	
	Lichtenstein vs. mesh plug	ADV	Discomfort	3 months	8% (13/158)	6% (9/158)	n.s. based on OR=1.48 (95% CI 0.62 to 3.58)[@]	
	Lichtenstein vs. mesh plug	ADV	Other complaint	3 months	1% (2/158)	3% (5/158)	n.s. based on OR=0.39 (95% CI 0.07 to 2.05)[@]	
	Lichtenstein vs. mesh plug	ADV	Prickling sensation	3 months	10% (16/158)	15% (23/158)	n.s. based on OR=0.66 (95% CI 0.33 to 1.31)[@]	
	Lichtenstein vs. mesh plug	ADV	Testicular atrophy	3 months	0% (0/158)	0% (0/158)	n.s. based on OR=1 (95% CI: 0.02 to 50.71)[@]	
	Lichtenstein vs. mesh plug	ADV	Tightness	3 months	3% (5/158)	3% (5/158)	n.s. based on OR=1 (95% CI: 0.28 to 3.52)[@]	
	Lichtenstein vs. mesh plug	ADV	Discomfort	1 year	7% (11/154)	5% (8/157)	n.s. based on OR=1.43 (95% CI 0.56 to 3.66)[@]	
	Lichtenstein vs. mesh plug	ADV	Other complaint	1 year	1% (2/154)	1% (1/157)	n.s. based on OR=2.05 (95% CI 0.18 to 22.87)[@]	
	Lichtenstein vs. mesh plug	ADV	Prickling sensation	1 year	9% (14/154)	11% (17/157)	n.s. based on OR=0.82 (95% CI 0.39 to 1.73)[@]	
	Lichtenstein vs. mesh plug	ADV	Testicular atrophy	1 year	0% (0/154)	0% (0/157)	n.s. based on OR=1.02 (95% CI: 0.02 to 51.7)[@]	
	Lichtenstein vs. mesh plug	ADV	Tightness	1 year	5% (7/154)	4% (7/157)	n.s. based on OR=1.02 (95% CI 0.35 to 2.98)[@]	
	Lichtenstein vs. mesh plug	ADV	Discomfort	3 years	5% (7/149)	6% (9/154)	n.s. based on OR=0.79 (95% CI 0.29 to 2.19)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. mesh plug	ADV	Other complaint	3 years	1% (1/149)	1% (2/154)	n.s. based on OR=0.51 (95% CI 0.05 to 5.72)[@]	
	Lichtenstein vs. mesh plug	ADV	Prickling sensation	3 years	4% (6/149)	8% (12/154)	n.s. based on OR=0.5 (95% CI 0.18 to 1.36)[@]	
	Lichtenstein vs. mesh plug	ADV	Testicular atrophy	3 years	0% (0/149)	0% (0/154)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.42)[@]	
	Lichtenstein vs. mesh plug	ADV	Tightness	3 years	3% (4/149)	1% (1/154)	n.s. based on OR=4.22 (95% CI 0.47 to 38.21)[@]	
	Lichtenstein vs. PHS	RC	Hernia recurrence	3 months	0% (0/158)	0% (0/155)	n.s. based on OR=0.98 (95% CI: 0.02 to 49.76)[@]	
	Lichtenstein vs. PHS	RC	Hernia recurrence	1 year	1% (1/154)	1% (2/157)	n.s. based on OR=0.51 (95% CI 0.05 to 5.64)[@]	
	Lichtenstein vs. PHS	RC	Hernia recurrence	3 years	1% (1/149)	0% (0/147)	n.s. based on OR=2.98 (95% CI: 0.12 to 73.75)[@]	
	Lichtenstein vs. PHS	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	2 weeks	71% (Ns NR)	79% (Ns NR)	NC	
	Lichtenstein vs. PHS	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	3 months	98% (Ns NR)	96% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	1 year	97% (Ns NR)	99% (Ns NR)	NC	
	Lichtenstein vs. PHS	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	3 years	100% (Ns NR)	97% (Ns NR)	NC	
	Lichtenstein vs. PHS	Pain	Severe pain (VAS >7)	Immediate postoperative	1% (2/158)	1% (2/155)	n.s. based on OR=0.98 (95% CI: 0.14 to 7.05)[@]	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	1 day	2.6 (SD: NR) (N=158)	2.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	1 day evening	3.5 (SD: NR) (N=158)	3.4 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	1 day morning	4.25 (SD: NR) (N=158)	3.9 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	Perioperative	Median: 1 (SD: NR) (N=158)	Median: 1 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	2 days	4.5 (SD: NR) (N=158)	4.3 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	2 days evening	2.75 (SD: NR) (N=158)	2.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	2 days morning	3 (SD: NR) (N=158)	2.9 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	Pain	Average number of drugs taken	3 days	3.6 (SD: NR) (N=158)	3.5 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	3 days evening	2.45 (SD: NR) (N=158)	2.45 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	3 days morning	2.5 (SD: NR) (N=158)	2.45 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	4 days	2.4 (SD: NR) (N=158)	2.3 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	4 days evening	2.3 (SD: NR) (N=158)	2.35 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	4 days morning	2.25 (SD: NR) (N=158)	2.3 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	5 days	1.6 (SD: NR) (N=158)	1.5 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	5 days morning	2.15 (SD: NR) (N=158)	2.15 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	5 days evening	2.15 (SD: NR) (N=158)	2.15 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	6 days	1.3 (SD: NR) (N=158)	1.3 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	6 days morning	1.9 (SD: NR) (N=158)	1.9 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	6 days evening	1.9 (SD: NR) (N=158)	2 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	Pain	Average number of drugs taken	7 days	0.8 (SD: NR) (N=158)	0.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	7 days morning	1.8 (SD: NR) (N=158)	1.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	7 days evening	1.8 (SD: NR) (N=158)	1.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	8 days	0.8 (SD: NR) (N=158)	0.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	8 days morning	1.4 (SD: NR) (N=158)	1.5 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	8 days evening	1.45 (SD: NR) (N=158)	1.6 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	9 days	0.7 (SD: NR) (N=158)	0.7 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	9 days morning	1.25 (SD: NR) (N=158)	1.3 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	9 days evening	1.3 (SD: NR) (N=158)	1.4 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	10 days	0.6 (SD: NR) (N=158)	0.6 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	10 days evening	1.25 (SD: NR) (N=158)	1.25 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	10 days morning	1.15 (SD: NR) (N=158)	1.2 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	Pain	Average number of drugs taken	11 days	0.5 (SD: NR) (N=158)	0.5 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	11 days morning	1 (SD: NR) (N=158)	1.05 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	11 days evening	1.15 (SD: NR) (N=158)	1.15 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	12 days	0.5 (SD: NR) (N=158)	0.5 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	12 days morning	0.9 (SD: NR) (N=158)	0.8 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	12 days evening	1 (SD: NR) (N=158)	0.9 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	13 days	0.5 (SD: NR) (N=158)	0.5 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	13 days morning	0.75 (SD: NR) (N=158)	0.75 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	13 days evening	0.75 (SD: NR) (N=158)	0.7 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	Average number of drugs taken	14 days	0.4 (SD: NR) (N=158)	0.4 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	14 days evening	0.7 (SD: NR) (N=158)	0.65 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-10)	14 days morning	0.7 (SD: NR) (N=158)	0.68 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	Pain	Transient neuralgia	30 days	0% (0/158)	2% (3/155)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.68)[@]	
	Lichtenstein vs. PHS	Pain	Neuralgia	3 months	1% (1/158)	2% (3/155)	n.s. based on OR=0.32 (95% CI 0.03 to 3.14)[@]	
	Lichtenstein vs. PHS	Pain	Pain	3 months	3% (4/158)	3% (4/155)	n.s. based on OR=0.98 (95% CI: 0.24 to 3.99)[@]	
	Lichtenstein vs. PHS	Pain	Neuralgia	1 year	0% (0/154)	1% (1/157)	n.s. based on OR=0.34 (95% CI: 0.01 to 8.35)[@]	
	Lichtenstein vs. PHS	Pain	Pain	1 year	3% (5/154)	5% (8/157)	n.s. based on OR=0.63 (95% CI 0.2 to 1.95)[@]	
	Lichtenstein vs. PHS	Pain	Neuralgia	3 years	1% (1/149)	0% (0/147)	n.s. based on OR=2.98 (95% CI: 0.12 to 73.75)[@]	
	Lichtenstein vs. PHS	Pain	Pain	3 years	2% (3/149)	3% (4/147)	n.s. based on OR=0.73 (95% CI 0.16 to 3.34)[@]	
	Lichtenstein vs. PHS	ADV	Complications of anesthesia (minor)	Immediate postoperative	1% (1/158)	1% (1/155)	n.s. based on OR=0.98 (95% CI 0.06 to 15.82)[@]	
	Lichtenstein vs. PHS	ADV	Minor hematoma	Immediate postoperative	1% (1/158)	1% (1/155)	n.s. based on OR=0.98 (95% CI 0.06 to 15.82)[@]	
	Lichtenstein vs. PHS	ADV	Miscellaneous	Immediate postoperative	1% (1/158)	1% (2/155)	n.s. based on OR=0.49 (95% CI 0.04 to 5.43)[@]	
	Lichtenstein vs. PHS	ADV	Severe complications	Immediate postoperative	0% (0/158)	0% (0/155)	n.s. based on OR=0.98 (95% CI: 0.02 to 49.76)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	ADV	Surgical interventions	Immediate postoperative	0% (0/158)	0% (0/155)	n.s. based on OR=0.98 (95% CI: 0.02 to 49.76)[@]	
	Lichtenstein vs. PHS	ADV	Urinary retention	Immediate postoperative	3% (4/158)	1% (1/155)	n.s. based on OR=4 (95% CI 0.44 to 36.2)[@]	
	Lichtenstein vs. PHS	ADV	VAS discomfort score (0-10)	Perioperative	Median: 0 (SD: NR) (N=158)	Median: 0 (SD: NR) (N=155)	NR	
	Lichtenstein vs. PHS	ADV	"Miscellaneous complications"	30 days	4% (6/158)	5% (7/155)	n.s. based on OR=0.83 (95% CI 0.27 to 2.54)[@]	
	Lichtenstein vs. PHS	ADV	Hematoma	30 days	4% (7/158)	9% (14/155)	n.s. based on OR=0.47 (95% CI 0.18 to 1.19)[@]	
	Lichtenstein vs. PHS	ADV	Infection	30 days	1% (2/158)	4% (6/155)	n.s. based on OR=0.32 (95% CI 0.06 to 1.6)[@]	
	Lichtenstein vs. PHS	ADV	Ischemic orchitis	30 days	0% (0/158)	0% (0/155)	n.s. based on OR=0.98 (95% CI: 0.02 to 49.76)[@]	
	Lichtenstein vs. PHS	ADV	Serious infection	30 days	1% (1/158)	0% (0/155)	n.s. based on OR=2.96 (95% CI: 0.12 to 73.27)[@]	
	Lichtenstein vs. PHS	ADV	Discomfort	3 months	8% (13/158)	6% (10/155)	n.s. based on OR=1.3 (95% CI 0.55 to 3.06)[@]	
	Lichtenstein vs. PHS	ADV	Other complaint	3 months	1% (2/158)	4% (6/155)	n.s. based on OR=0.32 (95% CI 0.06 to 1.6)[@]	
	Lichtenstein vs. PHS	ADV	Prickling sensation	3 months	10% (16/158)	12% (19/155)	n.s. based on OR=0.81 (95% CI 0.4 to 1.63)[@]	
	Lichtenstein vs. PHS	ADV	Testicular atrophy	3 months	0% (0/158)	0% (0/155)	n.s. based on OR=0.98 (95% CI: 0.02 to 49.76)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	Lichtenstein vs. PHS	ADV	Tightness	3 months	3% (5/158)	6% (9/155)	n.s. based on OR=0.53 (95% CI 0.17 to 1.62)[@]	
	Lichtenstein vs. PHS	ADV	Discomfort	1 year	7% (11/154)	11% (17/157)	n.s. based on OR=0.63 (95% CI 0.29 to 1.4)[@]	
	Lichtenstein vs. PHS	ADV	Other complaint	1 year	1% (2/154)	1% (2/157)	n.s. based on OR=1.02 (95% CI 0.14 to 7.33)[@]	
	Lichtenstein vs. PHS	ADV	Prickling sensation	1 year	9% (14/154)	8% (13/157)	n.s. based on OR=1.11 (95% CI 0.5 to 2.44)[@]	
	Lichtenstein vs. PHS	ADV	Testicular atrophy	1 year	0% (0/154)	1% (1/157)	n.s. based on OR=0.34 (95% CI: 0.01 to 8.35)[@]	
	Lichtenstein vs. PHS	ADV	Tightness	1 year	5% (7/154)	4% (6/157)	n.s. based on OR=1.2 (95% CI 0.39 to 3.65)[@]	
	Lichtenstein vs. PHS	ADV	Discomfort	3 years	5% (7/149)	10% (14/147)	n.s. based on OR=0.47 (95% CI 0.18 to 1.2)[@]	
	Lichtenstein vs. PHS	ADV	Other complaint	3 years	1% (1/149)	0% (0/147)	n.s. based on OR=2.98 (95% CI 0.12 to 73.75)[@]	
	Lichtenstein vs. PHS	ADV	Prickling sensation	3 years	4% (6/149)	6% (9/147)	n.s. based on OR=0.64 (95% CI 0.22 to 1.86)[@]	
	Lichtenstein vs. PHS	ADV	Testicular atrophy	3 years	0% (0/149)	0% (0/147)	n.s. based on OR=0.99 (95% CI: 0.02 to 50.06)[@]	
	Lichtenstein vs. PHS	ADV	Tightness	3 years	3% (4/149)	3% (4/147)	n.s. based on OR=0.99 (95% CI: 0.24 to 4.02)[@]	
	PHS vs. mesh plug	RC	Hernia recurrence	3 months	1% (1/158)	0% (0/155)	n.s. based on OR=2.96 (95% CI: 0.12 to 73.27)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	RC	Hernia recurrence	1 year	1% (1/157)	1% (2/157)	n.s. based on OR=0.5 (95% CI 0.04 to 5.54)[@]	
	PHS vs. mesh plug	RC	Hernia recurrence	3 years	1% (1/154)	0% (0/147)	n.s. based on OR=2.88 (95% CI: 0.12 to 71.33)[@]	
	PHS vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	2 weeks	77% (Ns NR)	79% (Ns NR)	NC	
	PHS vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	3 months	97% (Ns NR)	96% (Ns NR)	NC	
	PHS vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	1 year	99% (Ns NR)	99% (Ns NR)	NC	
	PHS vs. mesh plug	RTDA	Percentage of patients reaching full functional ability test scores (higher % is better)	3 years	100% (Ns NR)	97% (Ns NR)	NC	
	PHS vs. mesh plug	Pain	Severe pain (VAS >7)	Immediate postoperative	1% (1/159)	1% (2/155)	n.s. based on OR=0.48 (95% CI 0.04 to 5.39)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	Pain	Average number of drugs taken	1 day	3 (SD: NR) (N=159)	2.8 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	1 day evening	3.25 (SD: NR) (N=159)	3.4 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	1 day morning	3.75 (SD: NR) (N=159)	3.9 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	Perioperative	Median: 1 (SD: NR) (N=159)	Median: 1 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	2 days	4.4 (SD: NR) (N=159)	4.3 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	2 days evening	2.6 (SD: NR) (N=159)	2.8 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	2 days morning	2.75 (SD: NR) (N=159)	2.9 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	3 days	3.4 (SD: NR) (N=159)	3.5 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	3 days morning	2.25 (SD: NR) (N=159)	2.45 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	3 days evening	2.4 (SD: NR) (N=159)	2.45 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	4 days	2.2 (SD: NR) (N=159)	2.3 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	4 days evening	2.25 (SD: NR) (N=159)	2.35 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	Pain	VAS pain score (0-10)	4 days morning	2.15 (SD: NR) (N=159)	2.3 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	5 days	1.5 (SD: NR) (N=159)	1.5 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	5 days morning	1.9 (SD: NR) (N=159)	2.15 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	5 days evening	2.1 (SD: NR) (N=159)	2.15 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	6 days	1.3 (SD: NR) (N=159)	1.3 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	6 days morning	1.75 (SD: NR) (N=159)	1.9 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	6 days evening	1.85 (SD: NR) (N=159)	2 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	7 days	0.9 (SD: NR) (N=159)	0.8 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	7 days morning	1.5 (SD: NR) (N=159)	1.8 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	7 days evening	1.75 (SD: NR) (N=159)	1.8 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	8 days	0.9 (SD: NR) (N=159)	0.8 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	8 days morning	1.4 (SD: NR) (N=159)	1.5 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	Pain	VAS pain score (0-10)	8 days evening	1.5 (SD: NR) (N=159)	1.6 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	9 days	0.8 (SD: NR) (N=159)	0.7 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	9 days morning	1.25 (SD: NR) (N=159)	1.3 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	9 days evening	1.4 (SD: NR) (N=159)	1.4 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	10 days	0.7 (SD: NR) (N=159)	0.6 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	10 days evening	1.25 (SD: NR) (N=159)	1.25 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	10 days morning	1.25 (SD: NR) (N=159)	1.2 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	11 days	0.65 (SD: NR) (N=159)	0.5 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	11 days morning	1.05 (SD: NR) (N=159)	1.05 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	11 days evening	1.2 (SD: NR) (N=159)	1.15 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	12 days	0.6 (SD: NR) (N=159)	0.5 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	12 days morning	0.9 (SD: NR) (N=159)	0.8 (SD: NR) (N=155)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	Pain	VAS pain score (0-10)	12 days evening	1 (SD: NR) (N=159)	0.9 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	13 days	0.5 (SD: NR) (N=159)	0.5 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	13 days morning	0.78 (SD: NR) (N=159)	0.75 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	13 days evening	0.65 (SD: NR) (N=159)	0.7 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Average number of drugs taken	14 days	0.4 (SD: NR) (N=159)	0.4 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	14 days evening	0.6 (SD: NR) (N=159)	0.65 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	VAS pain score (0-10)	14 days morning	0.65 (SD: NR) (N=159)	0.68 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	Pain	Transient neuralgia	30 days	1% (2/159)	2% (3/155)	n.s. based on OR=0.65 (95% CI 0.11 to 3.92)[@]	
	PHS vs. mesh plug	Pain	Neuralgia	3 months	4% (6/158)	2% (3/155)	n.s. based on OR=2 (95% CI 0.49 to 8.14)[@]	
	PHS vs. mesh plug	Pain	Pain	3 months	4% (7/158)	3% (4/155)	n.s. based on OR=1.75 (95% CI 0.5 to 6.1)[@]	
	PHS vs. mesh plug	Pain	Neuralgia	1 year	1% (2/157)	1% (1/157)	n.s. based on OR=2.01 (95% CI 0.18 to 22.43)[@]	
	PHS vs. mesh plug	Pain	Pain	1 year	4% (6/157)	5% (8/157)	n.s. based on OR=0.74 (95% CI 0.25 to 2.18)[@]	
	PHS vs. mesh plug	Pain	Neuralgia	3 years	2% (3/154)	0% (0/147)	n.s. based on OR=6.82 (95% CI 0.35 to 133.09)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	Pain	Pain	3 years	3% (4/154)	3% (4/147)	n.s. based on OR=0.95 (95% CI 0.23 to 3.88)[@]	
	PHS vs. mesh plug	ADV	Complications of anesthesia (minor)	Immediate postoperative	2% (3/159)	1% (1/155)	n.s. based on OR=2.96 (95% CI 0.3 to 28.78)[@]	
	PHS vs. mesh plug	ADV	Minor hematoma	Immediate postoperative	1% (2/159)	1% (1/155)	n.s. based on OR=1.96 (95% CI 0.18 to 21.86)[@]	
	PHS vs. mesh plug	ADV	Miscellaneous	Immediate postoperative	0% (0/159)	1% (2/155)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.04)[@]	
	PHS vs. mesh plug	ADV	Severe complications	Immediate postoperative	0% (0/159)	0% (0/155)	n.s. based on OR=0.97 (95% CI: 0.02 to 49.44)[@]	
	PHS vs. mesh plug	ADV	Surgical interventions	Immediate postoperative	0% (0/159)	0% (0/155)	n.s. based on OR=0.97 (95% CI: 0.02 to 49.44)[@]	
	PHS vs. mesh plug	ADV	Urinary retention	Immediate postoperative	0% (0/159)	1% (1/155)	n.s. based on OR=0.32 (95% CI: 0.01 to 7.99)[@]	
	PHS vs. mesh plug	ADV	VAS discomfort score (0-10)	Perioperative	Median: 0 (SD: NR) (N=159)	Median: 0 (SD: NR) (N=155)	NR	
	PHS vs. mesh plug	ADV	"Miscellaneous complications"	30 days	3% (4/159)	5% (7/155)	n.s. based on OR=0.55 (95% CI 0.16 to 1.9)[@]	
	PHS vs. mesh plug	ADV	Hematoma	30 days	11% (17/159)	9% (14/155)	n.s. based on OR=1.21 (95% CI 0.57 to 2.54)[@]	
	PHS vs. mesh plug	ADV	Infection	30 days	1% (1/159)	4% (6/155)	n.s. based on OR=0.16 (95% CI 0.02 to 1.32)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	ADV	Ischemic orchitis	30 days	0% (0/159)	0% (0/155)	n.s. based on OR=0.97 (95% CI: 0.02 to 49.44)[@]	
	PHS vs. mesh plug	ADV	Serious infection	30 days	0% (0/159)	0% (0/155)	n.s. based on OR=0.97 (95% CI: 0.02 to 49.44)[@]	
	PHS vs. mesh plug	ADV	Discomfort	3 months	6% (9/158)	6% (10/155)	n.s. based on OR=0.88 (95% CI 0.35 to 2.22)[@]	
	PHS vs. mesh plug	ADV	Other complaint	3 months	3% (5/158)	4% (6/155)	n.s. based on OR=0.81 (95% CI 0.24 to 2.72)[@]	
	PHS vs. mesh plug	ADV	Prickling sensation	3 months	15% (23/158)	12% (19/155)	n.s. based on OR=1.22 (95% CI 0.63 to 2.34)[@]	
	PHS vs. mesh plug	ADV	Testicular atrophy	3 months	0% (0/158)	0% (0/155)	n.s. based on OR=0.98 (95% CI 0.02 to 49.76)[@]	
	PHS vs. mesh plug	ADV	Tightness	3 months	3% (5/158)	6% (9/155)	n.s. based on OR=0.53 (95% CI 0.17 to 1.62)[@]	
	PHS vs. mesh plug	ADV	Discomfort	1 year	5% (8/157)	11% (17/157)	n.s. based on OR=0.44 (95% CI 0.18 to 1.06)[@]	
	PHS vs. mesh plug	ADV	Other complaint	1 year	1% (1/157)	1% (2/157)	n.s. based on OR=0.5 (95% CI 0.04 to 5.54)[@]	
	PHS vs. mesh plug	ADV	Prickling sensation	1 year	11% (17/157)	8% (13/157)	n.s. based on OR=1.35 (95% CI 0.63 to 2.87)[@]	
	PHS vs. mesh plug	ADV	Testicular atrophy	1 year	0% (0/157)	1% (1/157)	n.s. based on OR=0.33 (95% CI 0.01 to 8.19)[@]	
	PHS vs. mesh plug	ADV	Tightness	1 year	4% (7/157)	4% (6/157)	n.s. based on OR=1.17 (95% CI 0.39 to 3.58)[@]	
	PHS vs. mesh plug	ADV	Discomfort	3 years	6% (9/154)	10% (14/147)	n.s. based on OR=0.59 (95% CI 0.25 to 1.41)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dalenback et al., 2009[665] (continued)	PHS vs. mesh plug	ADV	Other complaint	3 years	1% (2/154)	0% (0/147)	n.s. based on OR=4.84 (95% CI 0.23 to 101.59)[@]	
	PHS vs. mesh plug	ADV	Prickling sensation	3 years	8% (12/154)	6% (9/147)	n.s. based on OR=1.3 (95% CI 0.53 to 3.17)[@]	
	PHS vs. mesh plug	ADV	Testicular atrophy	3 years	0% (0/154)	0% (0/147)	n.s. based on OR=0.95 (95% CI 0.02 to 48.43)[@]	
	PHS vs. mesh plug	ADV	Tightness	3 years	1% (1/154)	3% (4/147)	n.s. based on OR=0.23 (95% CI 0.03 to 2.12)[@]	
Dogru et al., 2006[673]	Lichtenstein vs. Kugel	RC	Hernia recurrence	53.06 months (5.6), 53.41 months (7.1)	1% (1/70)	0% (0/70)	p=0.34, chi sq	
	Lichtenstein vs. Kugel	ADV	Chordema	Months, mean (SD) 53.06 (5.6), 53.41 (7.1)	1% (1/70)	1% (1/70)	p=0.74, chi sq	
	Lichtenstein vs. Kugel	ADV	Hematoma	53.06 months (5.6), 53.41 months (7.1)	0% (0/70)	1% (1/70)	p=0.49, chi sq	
	Lichtenstein vs. Kugel	ADV	Infection	53.06 months (5.6), 53.41 months (7.1)	0% (0/70)	1% (1/70)	p=0.49, chi sq	
	Lichtenstein vs. Kugel	ADV	Mesh reaction	53.06 months (5.6), 53.41 months (7.1)	0% (0/70)	1% (1/70)	p=0.49, chi sq	
	Lichtenstein vs. Kugel	ADV	Seroma	53.06 months (5.6), 53.41 months (7.1)	0% (0/70)	1% (1/70)	p=0.49, chi sq	
	Lichtenstein vs. Kugel	ADV	Total complications	53.06 months (5.6), 53.41 months (7.1)	1% (1/70)	7% (5/70)	p=0.21, chi sq	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Frey et al., 2007[697]	Lichtenstein vs. mesh plug	RC	Hernia recurrence	4 weeks	0% (0/355)	0% (1/345)	p=0.488, t-test	N is hernias
	Lichtenstein vs. mesh plug	RC	Hernia recurrence	12 months	2% (5/309)	1% (3/288)	p=0.425, t-test	
	Lichtenstein vs. mesh plug	RC	Hernia recurrence	Within 12 months	80% (4/5)	33% (1/3)	n.s. based on OR=8 (95% CI 0.31 to 206.38)[@]	Denominator is those who had recurrence
	Lichtenstein vs. mesh plug	HOSP	LOS <24 hrs (higher % is better)	NA	4% (15/355)	4% (15/345)	p=0.145, X^2 test (for hospital stay)	N is hernias
	Lichtenstein vs. mesh plug	HOSP	LOS 1 day (higher % is better)	NA	17% (61/355)	23% (81/345)	p<0.05 based on OR=0.68 (95% CI 0.47 to 0.98)[@]	N is hernias
	Lichtenstein vs. mesh plug	HOSP	LOS 2 days	NA	42% (148/355)	35% (122/345)	n.s. based on OR=1.31 (95% CI 0.96 to 1.77)[@]	N is hernias
	Lichtenstein vs. mesh plug	HOSP	LOS 3 days	NA	37% (131/355)	36% (125/345)	n.s. based on OR=1.03 (95% CI 0.76 to 1.4)[@]	N is hernias
	Lichtenstein vs. mesh plug	HOSP	LOS 4 days	NA	0% (0/355)	1% (2/345)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.04)[@]	N is hernias
	Lichtenstein vs. mesh plug	Pain	Pain	4 weeks	4% (14/355)	2% (7/345)	p=0.189, t-test	N is hernias
	Lichtenstein vs. mesh plug	Pain	Chronic pain	Within 12 months	60% (3/5)	0% (0/3)	n.s. based on OR=9.8 (95% CI: 0.33 to 287.44)[@]	Denominator is those who had recurrence
	Lichtenstein vs. mesh plug	ADV	Injury to spermatic cord structure	Intraoperative	0% (0/355)	1% (2/345)	p=0.212, Fisher's test	N is hernias
	Lichtenstein vs. mesh plug	ADV	Injury to vessel	Intraoperative	1% (3/355)	1% (2/345)	p=1, Fisher's test	N is hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Frey et al., 2007[697] (continued)	Lichtenstein vs. mesh plug	ADV	Intraoperative complications - none (This study reported in Table 2 data for inguinal hernia repairs)	Intraoperative	99% (352/355)	99% (341/345)	p=0.721, Fisher's test	N is hernias
	Lichtenstein vs. mesh plug	ADV	Hematoma	Postoperative	5% (17/355)	5% (18/345)	n.s. based on OR=0.91 (95% CI 0.46 to 1.8)[@]	N is hernias
	Lichtenstein vs. mesh plug	ADV	Postoperative complications - none	Postoperative	93% (330/355)	93% (320/345)	p=0.985, Fisher's test (for postoperative complications	N is hernias
	Lichtenstein vs. mesh plug	ADV	Reoperation for hematoma	Postoperative	1% (3/355)	1% (3/345)	n.s. based on OR=0.97 (95% CI: 0.19 to 4.85)[@]	N is hernias
	Lichtenstein vs. mesh plug	ADV	Urinary retention	Postoperative	1% (5/355)	1% (4/345)	n.s. based on OR=1.22 (95% CI 0.32 to 4.57)[@]	N is hernias
	Lichtenstein vs. mesh plug	ADV	Infection	4 weeks	0% (1/355)	0% (0/345)	p=1, t-test	N is hernias
	Lichtenstein vs. mesh plug	ADV	Reoperation	4 weeks	1% (5/355)	1% (4/345)	p=1, t-test	N is hernias
	Lichtenstein vs. mesh plug	ADV	Sensory loss	4 weeks	27% (97/355)	27% (94/345)	p=0.931, t-test	N is hernias
	Lichtenstein vs. mesh plug	ADV	Seroma	4 weeks	1% (5/355)	4% (15/345)	p=0.022, t-test	N is hernias
	Lichtenstein vs. mesh plug	ADV	Femoral hernia	Within 12 months	40% (2/5)	0% (0/3)	n.s. based on OR=5 (95% CI: 0.17 to 146.65)[@]	Denominator is those who had recurrence
	Lichtenstein vs. mesh plug	ADV	Infection	Within 12 months	20% (1/5)	0% (0/3)	n.s. based on OR=2.33 (95% CI: 0.07 to 76.67)[@]	Denominator is those who had recurrence

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Frey et al., 2007[697] (continued)	Lichtenstein vs. mesh plug	ADV	Reasons for reoperation - Hematoma or seroma	Within 12 months	60% (3/5)	100% (3/3)	p=0.427, t-test (for reasons for reoperation within 12 months)	Denominator is those who had recurrence
Gunal et al., 2007[702]	Lichtenstein vs. Nyhus	RC	Hernia recurrence	TAPP: 87.59 months (±2.77, but authors didn't define "±"); TEP: 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	7% (3/42)	3% (1/39)	n.s. based on OR=2.92 (95% CI: 0.29 to 29.36)[@]	
	Lichtenstein vs. Nyhus	Pain	Pain VAS	six hours	7.3 (SD: 1.6) (N=42)	6 (SD: 1.4) (N=39)	F=12.754, p<0.001, ANOVA	
	Lichtenstein vs. Nyhus	Pain	Pain VAS	two days	4.8 (SD: 1.4) (N=42)	3.7 (SD: 1) (N=39)	F=14.460, p<0.001, ANOVA	
	Lichtenstein vs. Nyhus	ADV	Any complications	perioperative	24% (10/42)	18% (7/39)	n.s. based on OR=1.43 (95% CI: 0.48 to 4.22)[@]	
	Lichtenstein vs. Nyhus	ADV	Any complications	postoperative	21% (9/42)	5% (2/39)	p<0.05 based on OR=5.05 (95% CI: 1.02 to 25.05)[@]	
	Lichtenstein vs. Nyhus	ADV	Hematoma in penis	postoperative	2% (1/42)	0% (0/39)	n.s. based on OR=2.86 (95% CI: 0.11 to 72.2)[@]	
	Lichtenstein vs. Nyhus	ADV	Hematoma incisional	postoperative	0% (0/42)	3% (1/39)	n.s. based on OR=0.3 (95% CI: 0.01 to 7.64)[@]	
	Lichtenstein vs. Nyhus	ADV	Inferior epigastric vessel bleeding	perioperative	10% (4/42)	18% (7/39)	n.s. based on OR=0.48 (95% CI 0.13 to 1.79)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	Lichtenstein vs. Nyhus	ADV	Nerve injury ilioinguinal	perioperative	7% (3/42)	0% (0/39)	n.s. based on OR=7 (95% CI: 0.35 to 140.02)[@]	
	Lichtenstein vs. Nyhus	ADV	Other complications (specifics not reported)	postoperative	0% (0/42)	0% (0/39)	n.s. based on OR=0.93 (95% CI: 0.02 to 47.97)[@]	
	Lichtenstein vs. Nyhus	ADV	pampinioform plexus bleeding	perioperative	5% (2/42)	0% (0/39)	n.s. based on OR=4.88 (95% CI: 0.23 to 104.83)[@]	
	Lichtenstein vs. Nyhus	ADV	scrotal edema	postoperative	17% (7/42)	0% (0/39)	n.s. based on OR=16.69 (95% CI: 0.92 to 302.85)[@]	
	Lichtenstein vs. Nyhus	ADV	Subcutenous emphysema	postoperative	0% (0/42)	0% (0/39)	n.s. based on OR=0.93 (95% CI: 0.02 to 47.97)[@]	
	Lichtenstein vs. Nyhus	ADV	Urinary retention	postoperative	2% (1/42)	3% (1/39)	n.s. based on OR=0.93 (95% CI 0.06 to 15.35)[@]	
	Lichtenstein vs. Nyhus	ADV	Vas deferens injury	perioperative	2% (1/42)	0% (0/39)	n.s. based on OR=2.86 (95% CI 0.11 to 72.2)[@]	
Hamza et al., 2010[704]	Lichtenstein vs. OPM	HOSP	At least one night in hospital	NA	16% (4/25)	12% (3/25)	n.s. based on OR=1.4 (95% CI 0.28 to 7)[@]	
	Lichtenstein vs. OPM	HOSP	At least two nights in hospital	NA	4% (1/25)	0% (0/25)	n.s. based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	Lichtenstein vs. OPM	RTDA	Return to domestic activities (days)	NA	12.11 (SD: 4.23) (N=25)	12.27 (SD: 3.535) (N=25)	t=5.746 p<0.001 comparing the two lap groups with the two open groups	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704] (continued)	Lichtenstein vs. OPM	RTW	Return to work (days)	NA	15.25 (SD: 2.53) (N=25)	16.13 (SD: 3.758) (N=25)	t=5.774 p≤0.001 comparing the two lap groups with the two open groups	
	Lichtenstein vs. OPM	Pain	Pain VAS	six hours	6.5 (SD: 3.5) (N=25)	7.067 (SD: 1.831) (N=25)	t=3.424 p=0.002 comparing the two lap groups with the two open groups	
	Lichtenstein vs. OPM	Pain	Pain VAS	two days	4.63 (SD: 2.22) (N=25)	4.933 (SD: 1.624) (N=25)	t=2.438 p=0.020 comparing the two lap groups with the two open groups	
	Lichtenstein vs. OPM	Pain	Pain: Groin	postoperative	0% (0/25)	0% (0/25)	n.s. based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Lichtenstein vs. OPM	ADV	Scrotal hematoma	postoperative	0% (0/25)	4% (1/25)	n.s. based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
	Lichtenstein vs. OPM	ADV	Wound infection	postoperative	4% (1/25)	4% (1/25)	n.s. based on OR=1 (95% CI 0.06 to 16.93)[@]	
Kingsnorth et al., 2000[269,720]	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	1 day	20% (Ns NR)	10% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	2 days	35% (Ns NR)	68% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	3 days	77% (Ns NR)	81% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	4 days	80% (Ns NR)	88% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	5 days	84% (Ns NR)	90% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	6 days	90% (Ns NR)	90% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	7 days	92% (Ns NR)	98% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	9 days	94% (Ns NR)	99% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	10 days	96% (Ns NR)	99% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	12 days	97% (Ns NR)	100% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	14 days	98% (Ns NR)	100% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	23 days	99% (Ns NR)	100% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Cumulative percentage of patients who returned to normal home activity	24 days	100% (Ns NR)	100% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTDA	Days to return to normal activity	NA	2.8 (SD: NR) (N=68)	3.6 (SD: NR) (N=73)	P=NS, t-test	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	1 day	6% (Ns NR)	0% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	6 days	6% (Ns NR)	8% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	8 days	14% (Ns NR)	16% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	10 days	22% (Ns NR)	20% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	13 days	35% (Ns NR)	32% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	16 days	48% (Ns NR)	46% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	21 days	50% (Ns NR)	50% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	23 days	70% (Ns NR)	70% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	25 days	72% (Ns NR)	72% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	27 days	77% (Ns NR)	76% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	30 days	78% (Ns NR)	79% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	34 days	80% (Ns NR)	95% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	36 days	86% (Ns NR)	100% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	RTW	Cumulative percentage of patients who returned to work (higher % is better)	56 days	98% (Ns NR)	100% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	RTW	Days to return to work	NA	17 (SD: NR) (N=68)	20.8 (SD: NR) (N=73)	P=NS, t-test	
	Lichtenstein vs. mesh plug	RTW	Total days of missed work	NA	14.3 (SD: NR) (N=68)	16.1 (SD: NR) (N=73)	P=NS, t-test	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	Day of operation	20% (Ns NR)	17% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	Day of operation	39 (SD: NR) (N=68)	27 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	1 day	0% (Ns NR)	4% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	1 day	30 (SD: NR) (N=68)	18 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	2 days	7% (Ns NR)	15% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	2 days	25 (SD: NR) (N=68)	16 (SD: NR) (N=73)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	3 days	15% (Ns NR)	13% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	3 days	23 (SD: NR) (N=68)	14 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	4 days	12% (Ns NR)	14% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	4 days	22 (SD: NR) (N=68)	13 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	5 days	13% (Ns NR)	6% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	5 days	18 (SD: NR) (N=68)	12 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	6 days	6% (Ns NR)	7% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	6 days	15 (SD: NR) (N=68)	9 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	7 days	8% (Ns NR)	4% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	7 days	12 (SD: NR) (N=68)	8 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	8 days	3% (Ns NR)	3% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	8 days	12 (SD: NR) (N=68)	8 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	9 days	2% (Ns NR)	4% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	9 days	11 (SD: NR) (N=68)	8 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	10 days	2% (Ns NR)	3% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	10 days	10 (SD: NR) (N=68)	6 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	11 days	3% (Ns NR)	2% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	11 days	9 (SD: NR) (N=68)	6 (SD: NR) (N=73)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	12 days	3% (Ns NR)	2% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	12 days	8 (SD: NR) (N=68)	5 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	13 days	2% (Ns NR)	2% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	13 days	8 (SD: NR) (N=68)	4 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Percentage of patients requiring analgesic medication	14 days	2% (Ns NR)	4% (Ns NR)	NC	
	Lichtenstein vs. mesh plug	Pain	Testicular pain (not significant)	Resolving at <14 days	0% (0/68)	1% (1/73)	n.s. based on OR=0.35 (95% CI 0.01 to 8.81)@	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	14 days	7 (SD: NR) (N=68)	3 (SD: NR) (N=73)	NR	
	Lichtenstein vs. mesh plug	Pain	Days of analgesic medication	NA	4 (SD: NR) (N=68)	4.6 (SD: NR) (N=73)	P=NS, t-test	
	Lichtenstein vs. mesh plug	ADV	Hematoma (significant)	Postoperative	1% (1/68)	0% (0/73)	n.s. based on OR=3.27 (95% CI: 0.13 to 81.57)[@]	
	Lichtenstein vs. mesh plug	ADV	Major infection requiring surgical drainage (significant)	Postoperative	1% (1/68)	0% (0/73)	n.s. based on OR=3.27 (95% CI: 0.13 to 81.57)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2000[269,720] (continued)	Lichtenstein vs. mesh plug	ADV	Minor infection requiring antibiotics (significant)	Postoperative	3% (2/68)	0% (0/73)	n.s. based on OR=5.53 (95% CI: 0.26 to 117.21)[@]	
	Lichtenstein vs. mesh plug	ADV	Prophylactic medication/ antibiotics (significant)	Postoperative	3% (2/68)	0% (0/73)	n.s. based on OR=5.53 (95% CI: 0.26 to 117.21)[@]	
	Lichtenstein vs. mesh plug	ADV	Allergy to dressing (mepore) (not significant)	Resolving at <14 days	0% (0/68)	3% (2/73)	n.s. based on OR=0.21 (95% CI: 0.01 to 4.43)[@]	
	Lichtenstein vs. mesh plug	ADV	Chest infection (not significant)	Resolving at <14 days	1% (1/68)	0% (0/73)	n.s. based on OR=3.27 (95% CI: 0.13 to 81.57)[@]	
	Lichtenstein vs. mesh plug	ADV	Constipation (not significant)	Resolving at <14 days	12% (8/68)	11% (8/73)	n.s. based on OR=1.08 (95% CI 0.38 to 3.07)[@]	
	Lichtenstein vs. mesh plug	ADV	Sound swelling (not significant)	Resolving at <14 days	57% (39/68)	59% (43/73)	n.s. based on OR=0.94 (95% CI 0.48 to 1.83)[@]	
	Lichtenstein vs. mesh plug	ADV	Testicular bruising (not significant)	Resolving at <14 days	65% (44/68)	70% (51/73)	n.s. based on OR=0.79 (95% CI 0.39 to 1.6)[@]	
	Lichtenstein vs. mesh plug	ADV	Testicular swelling (not significant)	Resolving at <14 days	31% (21/68)	21% (15/73)	n.s. based on OR=1.73 (95% CI 0.8 to 3.72)[@]	
	Lichtenstein vs. mesh plug	ADV	Vomiting (not significant)	Resolving at <14 days	0% (0/68)	1% (1/73)	n.s. based on OR=0.35 (95% CI: 0.01 to 8.81)[@]	
	Lichtenstein vs. mesh plug	ADV	Wound bruising (not significant)	Resolving at <14 days	91% (62/68)	73% (53/73)	p<0.05 based on OR=3.9 (95% CI 1.46 to 10.42)[@]	
	Lichtenstein vs. mesh plug	ADV	Wound discomfort (not significant)	Resolving at <14 days	100% (68/68)	100% (73/73)	n.s. based on OR=0.93 (95% CI: 0.02 to 47.62)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2002[721]	Lichtenstein vs. PHS	RC	Hernia recurrence	Up to 1 year	2% (2/103)	0% (0/103)	n.s. based on OR=5.1 (95% CI: 0.24 to 107.52)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	0 day	2% (2/103)	0% (0/103)	n.s. based on OR=5.1 (95% CI: 0.24 to 107.52)[@]	
	Lichtenstein vs. PHS	RTDA	Number of days between surgery and return to normal	Postoperative	Median: 2 (SD: NR) (N=103)	Median: 2 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	2 days	16% (16/103)	10% (10/103)	n.s. based on OR=1.71 (95% CI 0.74 to 3.97)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	3 days	37% (38/103)	49% (50/103)	n.s. based on OR=0.62 (95% CI 0.36 to 1.08)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	4 days	21% (22/103)	31% (32/103)	n.s. based on OR=0.6 (95% CI 0.32 to 1.13)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	5 days	17% (18/103)	12% (12/103)	n.s. based on OR=1.61 (95% CI 0.73 to 3.53)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	6 days	6% (6/103)	6% (6/103)	n.s. based on OR=1 (95% CI 0.31 to 3.21)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	7 days	2% (2/103)	0% (0/103)	n.s. based on OR=5.1 (95% CI: 0.24 to 107.52)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	8 days	4% (4/103)	0% (0/103)	n.s. based on OR=9.36 (95% CI: 0.5 to 176.15)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	9 days	2% (2/103)	2% (2/103)	n.s. based on OR=1 (95% CI 0.14 to 7.24)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2002[721] (continued)	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	10 days	4% (4/103)	0% (0/103)	n.s. based on OR=9.36 (95% CI: 0.5 to 176.15)[@]	
	Lichtenstein vs. PHS	RTDA	Time to return to normal activity, days	12 days	2% (2/103)	0% (0/103)	n.s. based on OR=5.1 (95% CI: 0.24 to 107.52)[@]	
	Lichtenstein vs. PHS	RTDA	Proportion of patients taking >3 days to return to normal activity	Up to 66 days	28% (29/103)	16% (16/103)	p<0.05, Mann-Whitney test	
	Lichtenstein vs. PHS	RTW	Days of employment missed among patients in employment	Postoperative	Median: 13 (SD: NR) (N=51)	Median: 10 (SD: NR) (N=47)	p=0.309, Mann-Whitney test	
	Lichtenstein vs. PHS	RTW	Days to return to work after surgery	Postoperative	Median: 19 (SD: NR) (N=103)	Median: 14 (SD: NR) (N=103)	p=0.354, Mann-Whitney test	
	Lichtenstein vs. PHS	QOL	Sf- 36 – bodily pain (higher number is better)	6 months	72.7 (SD: 22.4) (N=94)	76.5 (SD: 19.5) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - general health (higher number is better)	6 months	72.7 (SD: 22.4) (N=94)	76.5 (SD: 19.5) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - mental health (higher number is better)	6 months	69.2 (SD: 19.9) (N=94)	70.2 (SD: 21.6) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - physical functioning (higher number is better)	6 months	82.8 (SD: 33.6) (N=94)	77.4 (SD: 36.7) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - role emotional (higher number is better)	6 months	86.7 (SD: 23.4) (N=94)	87.3 (SD: 22.9) (N=100)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2002[721] (continued)	Lichtenstein vs. PHS	QOL	Sf- 36 - role physical (higher number is better)	6 months	85.7 (SD: 32.4) (N=94)	85.5 (SD: 31.3) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - social functioning (higher number is better)	6 months	81.5 (SD: 16.4) (N=94)	82.6 (SD: 16.2) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - vitality (higher number is better)	6 months	85 (SD: 22.6) (N=94)	83.9 (SD: 23.7) (N=100)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - bodily pain (higher number is better)	12 months	74.6 (SD: 20.8) (N=87)	75.5 (SD: 19) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - general health (higher number is better)	12 months	84.1 (SD: 23.6) (N=87)	83 (SD: 24.1) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - mental health (higher number is better)	12 months	70.6 (SD: 17.7) (N=87)	69.6 (SD: 22.1) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - physical functioning (higher number is better)	12 months	83.8 (SD: 35.3) (N=87)	78.2 (SD: 37.9) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - role emotional (higher number is better)	12 months	88.2 (SD: 22.9) (N=87)	88.7 (SD: 18.6) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - role physical (higher number is better)	12 months	86.2 (SD: 31) (N=87)	88 (SD: 29.5) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - social functioning (higher number is better)	12 months	81.2 (SD: 17.9) (N=87)	82 (SD: 15.8) (N=96)	NR	
	Lichtenstein vs. PHS	QOL	Sf- 36 - vitality (higher number is better)	12 months	82.3 (SD: 25.4) (N=87)	85.8 (SD: 21.3) (N=96)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2002[721] (continued)	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	Day of the surgery	28.1 (SD: NR) (N=103)	19.2 (SD: NR) (N=103)	p<0.05, t-test	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	1 day	27 (SD: NR) (N=103)	19 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	2 days	35 (SD: NR) (N=103)	35 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	3 days	26 (SD: NR) (N=103)	28 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	4 days	26 (SD: NR) (N=103)	25 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	5 days	25 (SD: NR) (N=103)	23 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	6 days	21 (SD: NR) (N=103)	21 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	7 days	19 (SD: NR) (N=103)	19 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	8 days	17 (SD: NR) (N=103)	18 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	9 days	16 (SD: NR) (N=103)	17 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	10 days	14 (SD: NR) (N=103)	15 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	11days	13 (SD: NR) (N=103)	14 (SD: NR) (N=103)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kingsnorth et al., 2002[721] (continued)	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	12 days	12 (SD: NR) (N=103)	13 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	13 days	12 (SD: NR) (N=103)	12 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	14 days	10 (SD: NR) (N=103)	10 (SD: NR) (N=103)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain score (0-100)	6 months	83 (SD: 23.5) (N=94)	81.2 (SD: 26.3) (N=100)	NR	
Koc et al., 2004[722]	Stoppa vs. Lichtenstein	QOL	SF- 36 vitality (higher number is better)	6 months	73.6 (SD: 1.4) (N=22)	67.8 (SD: 1.8) (N=23)	NR	
	Stoppa vs. Lichtenstein	QOL	SF-36 general health perception (higher number is better)	6 months	85.2 (SD: 2.5) (N=22)	74.4 (SD: 2.7) (N=23)	p<0.05, Mann-Whitney U test	
	Stoppa vs. Lichtenstein	QOL	SF-36 mental health (higher number is better)	6 months	71.4 (SD: 1.7) (N=22)	72.6 (SD: 2.4) (N=23)	NR	
	Stoppa vs. Lichtenstein	QOL	SF-36 pain (higher number is better)	6 months	66.7 (SD: 2.4) (N=22)	59.8 (SD: 5.2) (N=23)	NR	
	Stoppa vs. Lichtenstein	QOL	SF-36 physical functioning (higher number is better)	6 months	85.1 (SD: 2.1) (N=22)	74.8 (SD: 4.1) (N=23)	p<0.05, Mann-Whitney U test	
	Stoppa vs. Lichtenstein	QOL	SF-36 role limitation (emotional) (higher number is better)	6 months	80.9 (SD: 8.2) (N=22)	77.5 (SD: 4.5) (N=23)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koc et al., 2004[722] (continued)	Stoppa vs. Lichtenstein	QOL	SF-36 role limitation (physical) (higher number is better)	6 months	86.2 (SD: 4.4) (N=22)	64.8 (SD: 4.6) (N=23)	p<0.05, Mann-Whitney U test	
	Stoppa vs. Lichtenstein	QOL	SF-36 social functioning (higher number is better)	6 months	84.4 (SD: 2.4) (N=22)	76.5 (SD: 2.7) (N=23)	NR	
Muldoon et al., 2004[761]	Lichtenstein vs. Read-Rives	RC	Hernia recurrence	six months	0% (0/115)	1% (1/109)	P=0.21, Fisher's test	
	Lichtenstein vs. Read-Rives	RC	Hernia recurrence	one year	1% (1/115)	1% (1/109)	n.s. based on OR=0.95 (95% CI 0.06 to 15.34)[@]	
	Lichtenstein vs. Read-Rives	RC	Hernia recurrence	two years	3% (3/115)	1% (1/109)	n.s. based on OR=2.89 (95% CI 0.3 to 28.24)[@]	
	Lichtenstein vs. Read-Rives	Pain	Pain on exertion	82 months (24-110)	6% (7/115)	9% (10/109)	n.s. based on OR=0.64 (95% CI 0.24 to 1.75)[@]	
	Lichtenstein vs. Read-Rives	Pain	Testicular pain	82 months (24-110)	2% (2/115)	1% (1/109)	n.s. based on OR=1.91 (95% CI 0.17 to 21.39)[@]	
	Lichtenstein vs. Read-Rives	ADV	Early reoperation	82 months (24-110)	0% (0/115)	1% (1/109)	n.s. based on OR=0.31 (95% CI 0.01 to 7.77)[@]	The one was a femoral nerve injury
	Lichtenstein vs. Read-Rives	ADV	Groin discomfort	82 months (24-110)	8% (9/115)	9% (10/109)	n.s. based on OR=0.84 (95% CI 0.33 to 2.15)[@]	
	Lichtenstein vs. Read-Rives	ADV	Numbness	82 months (24-110)	10% (11/115)	12% (13/109)	n.s. based on OR=0.78 (95% CI 0.33 to 1.83)[@]	
	Lichtenstein vs. Read-Rives	ADV	Scrotal hematoma	82 months (24-110)	3% (4/115)	4% (4/109)	n.s. based on OR=0.95 (95% CI 0.23 to 3.88)[@]	
	Lichtenstein vs. Read-Rives	ADV	Testicular atrophy	82 months (24-110)	3% (3/115)	1% (1/109)	n.s. based on OR=2.89 (95% CI 0.3 to 28.24)[@]	
	Lichtenstein vs. Read-Rives	ADV	Urinary retention	82 months (24-110)	8% (9/115)	6% (7/109)	n.s. based on OR=1.24 (95% CI 0.44 to 3.45)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Muldoon et al., 2004[761] (continued)	Lichtenstein vs. Read-Rives	ADV	Urinary tract infection	82 months (24-110)	2% (2/115)	1% (1/109)	n.s. based on OR=1.91 (95% CI 0.17 to 21.39)[@]	
	Lichtenstein vs. Read-Rives	ADV	Wound hematoma	82 months (24-110)	3% (3/115)	5% (5/109)	n.s. based on OR=0.56 (95% CI 0.13 to 2.39)[@]	
	Lichtenstein vs. Read-Rives	ADV	Wound infection	82 months (24-110)	0% (0/115)	0% (0/109)	n.s. based on OR=0.95 (95% CI: 0.02 to 48.2)[@]	
Nienhuijs et al., 2005[769-771]	Lichtenstein vs. mesh plug	RC	Hernia recurrence	Median: 15.4 (Range: 7-33) months	1 (Ns NR)	4 (Ns NR)	NC	Authors reported 319 (95.8%) of 333 patients completed the postal questionnaire. The total recurrent rate was 8 (2.5%) of 319: PHS 1, MPR 4, Lichtenstein 3.
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - bodily pain (higher number is better)	15 months	88 (SD: NR) (Ns NR)	86 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - general health (higher number is better)	15 months	75 (SD: NR) (Ns NR)	75 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - mental health (higher number is better)	15 months	82 (SD: NR) (Ns NR)	83 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - physical functioning (higher number is better)	15 months	88 (SD: NR) (Ns NR)	90 (SD: NR) (Ns NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - role emotional (higher number is better)	15 months	92 (SD: NR) (Ns NR)	92 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - role physical (higher number is better)	15 months	88 (SD: NR) (Ns NR)	88 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - social functioning (higher number is better)	15 months	90 (SD: NR) (Ns NR)	91 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	QOL	SF-36 (0-100) - vitality (higher number is better)	15 months	72 (SD: NR) (Ns NR)	75 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	1 day	6.3 (SD: NR) (N=111)	5.5 (SD: NR) (N=113)	NR	At long-term follow up, 138 (43.4%) of 319 patients reported pain; in 14 patients (10.1%) discomfort was moderate (VAS score 30-50) and in 20 patients (14.5%) pain was severe (VAS score >50).
	Lichtenstein vs. mesh plug	Pain	Amount of paracetamol consumed, g/ per day	Postoperative	1.9 (SD: NR) (N=111)	1.6 (SD: NR) (N=113)	p=0.804, Pearson X squared test.	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	2 days	5.7 (SD: NR) (N=111)	5.3 (SD: NR) (N=113)	NR	The study did not give patient information for number of patients per group during long-term follow-up.
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	3 days	5 (SD: NR) (N=111)	5 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	4 days	4.6 (SD: NR) (N=111)	4.4 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	5 days	4.2 (SD: NR) (N=111)	3.7 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	6 days	3.7 (SD: NR) (N=111)	3.3 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	7 days	3.3 (SD: NR) (N=111)	2.8 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	8 days	3.1 (SD: NR) (N=111)	2.4 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	9 days	2.6 (SD: NR) (N=111)	2.2 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	10 days	2.2 (SD: NR) (N=111)	1.8 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	11 days	1.8 (SD: NR) (N=111)	1.7 (SD: NR) (N=113)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	12 days	1.6 (SD: NR) (N=111)	1.6 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	13 days	1.4 (SD: NR) (N=111)	1.4 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	Pain	VAS pain scores (0-100)	14 days	1.2 (SD: NR) (N=111)	1.1 (SD: NR) (N=113)	NR	
	Lichtenstein vs. mesh plug	ADV	Iatrogenic damage to the vas deferens	Perioperative	1% (1/111)	0% (0/113)	n.s. based on OR=3.08 (95% CI 0.12 to 76.46)@	
	Lichtenstein vs. mesh plug	ADV	Re-explorations for a hematoma	Perioperative	1% (1/111)	0% (0/113)	n.s. based on OR=3.08 (95% CI 0.12 to 76.46)@	
	Lichtenstein vs. mesh plug	ADV	Wound infections (reported or diagnosed by observer)	Postoperative	11% (12/111)	9% (10/113)	n.s. based on OR=1.25 (95% CI 0.52 to 3.02)[@]	
	Lichtenstein vs. mesh plug	ADV	Endocarditis	4th postoperative day	1% (1/111)	0% (0/113)	n.s. based on OR=3.08 (95% CI: 0.12 to 76.46)[@]	
	Lichtenstein vs. PHS	RC	Hernia recurrence	Median: 15.4 (Range: 7 - 33) months	1 (Ns NR)	3 (Ns NR)	NC	Authors reported 319 (95.8%) of 333 patients completed the postal questionnaire. The total recurrent rate was 8 (2.5%) of 319: PHS 1, MPR 4, Lichtenstein 3.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - bodily pain (higher number is better)	15 months	88 (SD: NR) (Ns NR)	88 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - general health (higher number is better)	15 months	75 (SD: NR) (Ns NR)	70 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - mental health (higher number is better)	15 months	82 (SD: NR) (Ns NR)	80 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - physical functioning (higher number is better)	15 months	88 (SD: NR) (Ns NR)	87 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - role emotional (higher number is better)	15 months	92 (SD: NR) (Ns NR)	85 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - role physical (higher number is better)	15 months	88 (SD: NR) (Ns NR)	85 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - social functioning (higher number is better)	15 months	90 (SD: NR) (Ns NR)	86 (SD: NR) (Ns NR)	NR	
	Lichtenstein vs. PHS	QOL	SF-36 (0-100) - vitality (higher number is better)	15 months	72 (SD: NR) (Ns NR)	66 (SD: NR) (Ns NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	1 day	6.3 (SD: NR) (N=111)	6.3 (SD: NR) (N=110)	NR	At long-term follow up, 138 (43.4%) of 319 patients reported pain; in 14 patients (10.1%) discomfort was moderate (VAS score 30-50) and in 20 patients (14.5%) pain was severe (VAS score >50).
	Lichtenstein vs. PHS	Pain	Amount of paracetamol consumed, g/ per day	Postoperative	1.9 (SD: NR) (N=111)	1.8 (SD: NR) (N=110)	p=0.804, Pearson X squared test.	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	2 days	5.7 (SD: NR) (N=111)	5.7 (SD: NR) (N=110)	NR	The study did not give patient information for number of patients per group during long-term follow-up.
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	3 days	5 (SD: NR) (N=111)	4.9 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	4 days	4.6 (SD: NR) (N=111)	4.2 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	5 days	4.2 (SD: NR) (N=111)	3.5 (SD: NR) (N=110)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	6 days	3.7 (SD: NR) (N=111)	3.3 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	7 days	3.3 (SD: NR) (N=111)	3 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	8 days	3.1 (SD: NR) (N=111)	2.8 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	9 days	2.6 (SD: NR) (N=111)	2.5 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	10 days	2.2 (SD: NR) (N=111)	2.2 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	11 days	1.8 (SD: NR) (N=111)	2 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	12 days	1.6 (SD: NR) (N=111)	1.7 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	13 days	1.4 (SD: NR) (N=111)	1.5 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	Pain	VAS pain scores (0-100)	14 days	1.2 (SD: NR) (N=111)	1.2 (SD: NR) (N=110)	NR	
	Lichtenstein vs. PHS	ADV	Iatrogenic damage to the vas deferens	Perioperative	1% (1/111)	0% (0/110)	n.s. based on OR=3 (95% CI: 0.12 to 74.45)[@]	
	Lichtenstein vs. PHS	ADV	Re-explorations for a hematoma	Perioperative	1% (1/111)	3% (3/110)	n.s. based on OR=0.32 (95% CI 0.03 to 3.17)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Lichtenstein vs. PHS	ADV	Wound infections (reported or diagnosed by observer)	Postoperative	11% (12/111)	7% (8/110)	n.s. based on OR=1.55 (95% CI 0.61 to 3.94)[@]	
	Lichtenstein vs. PHS	ADV	Endocarditis	4th postoperative day	1% (1/111)	0% (0/110)	n.s. based on OR=3 (95% CI: 0.12 to 74.45)[@]	
	Mesh plug vs. PHS	RC	Hernia recurrence	Median: of 15.4 (Range: 7-33) months	4 recurrences (Ns NR)	3 recurrences (Ns NR)	NC	Authors reported 319 (95.8%) of 333 patients completed the postal questionnaire.
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - bodily pain (higher number is better)	15 months	86 (SD: NR) (Ns NR)	88 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - general health (higher number is better)	15 months	75 (SD: NR) (Ns NR)	70 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - mental health (higher number is better)	15 months	83 (SD: NR) (Ns NR)	80 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - physical functioning (higher number is better)	15 months	90 (SD: NR) (Ns NR)	87 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - role emotional (higher number is better)	15 months	92 (SD: NR) (Ns NR)	85 (SD: NR) (Ns NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Mesh plug vs. PHS	QOL	SF-36 (0-100) - role physical (higher number is better)	15 months	88 (SD: NR) (Ns NR)	85 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - social functioning (higher number is better)	15 months	91 (SD: NR) (Ns NR)	86 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	QOL	SF-36 (0-100) - vitality (higher number is better)	15 months	75 (SD: NR) (Ns NR)	66 (SD: NR) (Ns NR)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	1 day	5.5 (SD: NR) (N=113)	6.3 (SD: NR) (N=110)	NR	At long-term follow up, 138 (43.4%) of 319 patients reported pain; in 14 patients (10.1%) discomfort was moderate (VAS score 30-50) and in 20 patients (14.5%) pain was severe (VAS score >50).
	Mesh plug vs. PHS	Pain	Amount of paracetamol consumed, g/ per day	Postoperative	1.6 (SD: NR) (N=113)	1.8 (SD: NR) (N=110)	p=0.804, Pearson X squared test.	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	2 days	5.3 (SD: NR) (N=113)	5.7 (SD: NR) (N=110)	NR	The study did not give patient information for number of patients per group during long-term follow-up.
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	3 days	5 (SD: NR) (N=113)	4.9 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	4 days	4.4 (SD: NR) (N=113)	4.2 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	5 days	3.7 (SD: NR) (N=113)	3.5 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	6 days	3.3 (SD: NR) (N=113)	3.3 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	7 days	2.8 (SD: NR) (N=113)	3 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	8 days	2.4 (SD: NR) (N=113)	2.8 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	9 days	2.2 (SD: NR) (N=113)	2.5 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	10 days	1.8 (SD: NR) (N=113)	2.2 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	11 days	1.7 (SD: NR) (N=113)	2 (SD: NR) (N=110)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2005[769-771] (continued)	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	12 days	1.6 (SD: NR) (N=113)	1.7 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	13 days	1.4 (SD: NR) (N=113)	1.5 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	Pain	VAS pain scores (0-100)	14 days	1.1 (SD: NR) (N=113)	1.2 (SD: NR) (N=110)	NR	
	Mesh plug vs. PHS	ADV	Iatrogenic damage to the vas deferens	Perioperative	0% (0/113)	0% (0/110)	n.s. based on OR=0.97 (95% CI: 0.02 to 49.5)[@]	
	Mesh plug vs. PHS	ADV	Re-explorations for a hematoma	Perioperative	0% (0/113)	3% (3/110)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.65)[@]	
	Mesh plug vs. PHS	ADV	Wound infections (reported or diagnosed by observer)	Postoperative	9% (10/113)	7% (8/110)	n.s. based on OR=1.24 (95% CI 0.47 to 3.26)[@]	
	Mesh plug vs. PHS	ADV	Endocarditis	4th postoperative day	0% (0/113)	0% (0/110)	n.s. based on OR=0.97 (95% CI: 0.02 to 49.5)[@]	
Nienhuijs et al., 2007[772]	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	1 day	4.4 (SD: NR) (N=84)	4.8 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	2 days	4.1 (SD: NR) (N=84)	4.5 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	3 days	3.5 (SD: NR) (N=84)	3.7 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	4 days	2.8 (SD: NR) (N=84)	3.5 (SD: NR) (N=82)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2007[772] (continued)	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	5 days	2.5 (SD: NR) (N=84)	2.9 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	6 days	2.2 (SD: NR) (N=84)	2.7 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	7 days	2.1 (SD: NR) (N=84)	2.5 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	8 days	1.7 (SD: NR) (N=84)	2.2 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	9 days	1.5 (SD: NR) (N=84)	2 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	10 days	1.5 (SD: NR) (N=84)	2 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	11 days	1.3 (SD: NR) (N=84)	1.5 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	12 days	1.2 (SD: NR) (N=84)	1.5 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	13 days	1.1 (SD: NR) (N=84)	1.4 (SD: NR) (N=82)	NR	
	Lichtenstein vs. Kugel	Pain	Total number of meloxicam tablets consumed	First 2 weeks	8.6 (SD: NR) (N=84)	7 (SD: NR) (N=82)	p=0.295, Pearson test	
	Lichtenstein vs. Kugel	Pain	Total number of paracetamol consumed	First 2 weeks	19.9 (SD: NR) (N=84)	18.5 (SD: NR) (N=82)	p=0.4, Pearson test	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	14 days	0.9 (SD: NR) (N=84)	1.2 (SD: NR) (N=82)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nienhuijs et al., 2007[772] (continued)	Lichtenstein vs. Kugel	Pain	Proportion of patients reporting pain	3 months	21% (18/84)	40% (33/82)	p=0.007, Pearson test	
	Lichtenstein vs. Kugel	Pain	Proportion of patients with MILD chronic pain	3 months	30% (25/84)	17% (14/82)	n.s. based on OR=2.06 (95% CI 0.98 to 4.32)[@]	
	Lichtenstein vs. Kugel	Pain	Proportion of patients with MODERATE chronic pain	3 months	5% (4/84)	2% (2/82)	n.s. based on OR=2 (95% CI 0.36 to 11.23)[@]	
	Lichtenstein vs. Kugel	Pain	Proportion of patients with NO chronic pain (chronic pain was defined as 3 months) (higher % is better)	3 months	60% (50/84)	80% (66/82)	p<0.05 based on OR=0.36 (95% CI 0.18 to 0.72)[@]	
	Lichtenstein vs. Kugel	Pain	Proportion of patients with SEVERE chronic pain	3 months	7% (6/84)	0% (0/82)	n.s. based on OR=13.66 (95% CI: 0.76 to 246.58)[@]	
	Lichtenstein vs. Kugel	Pain	VAS pain score [0-100]	3 months	0.3 (SD: NR) (N=84)	0.9 (SD: NR) (N=82)	p=0.002, Wilcoxon test	
	Lichtenstein vs. Kugel	ADV	Cutaneous sensory changes	3 months	29% (24/84)	7% (6/82)	p<0.05 based on OR=5.07 (95% CI 1.95 to 13.19)[@]	
	Lichtenstein vs. Kugel	ADV	Numbness	3 months	26% (22/84)	4% (3/82)	p=0.001, Pearson test	
Pavlidis et al., 2002[786]	Patch vs. plug-and-patch	RC	Hernia recurrence	Mean: 12.7 months (Range: 1-24)	2% (1/64)	2% (1/65)	n.s. based on OR=1.02 (95% CI 0.06 to 16.6)[@]	
	Patch vs. plug-and-patch	HOSP	LOS, days	Postoperative	1.8 (Range: 1-6) (N=64)	2 (Range: 1-7) (N=65)	p=ns, t test	
	Patch vs. plug-and-patch	RTW	Return to work, days	Mean: 12.7 months (Range: 1-24)	7.3 (Range: 6-18) (N=64)	7.9 (Range: 5-17) (N=65)	p=ns, t test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pavlidis et al., 2002[786] (continued)	Patch vs. plug-and-patch	Pain	No analgesic use, % (higher % is better)	Postoperative	84% (54/64)	80% (52/65)	n.s. based on OR=1.35 (95% CI 0.54 to 3.35)[@]	
	Patch vs. plug-and-patch	Pain	Non-opioid analgesic, %	Postoperative	31% (20/64)	40% (26/65)	n.s. based on OR=0.68 (95% CI 0.33 to 1.41)[@]	
	Patch vs. plug-and-patch	Pain	Opioids	Postoperative	41% (26/64)	34% (22/65)	n.s. based on OR=1.34 (95% CI 0.65 to 2.74)[@]	
	Patch vs. plug-and-patch	ADV	Complications, %	Mean: 12.7 months (Range: 1-24)	3% (2/64)	5% (3/65)	n.s. based on OR=0.67 (95% CI 0.11 to 4.13)[@]	
Sanders et al., 2009[798]	Mesh plug with PerFix vs. Lichtenstein	RC	Hernia recurrence	Up to 12 months	1% (1/101)	2% (2/101)	n.s. based on OR=0.5 (95% CI 0.04 to 5.55)[@]	
	Mesh plug with PerFix vs. Lichtenstein	RC	Hernia recurrence	Up to 12 months	2% (2/93)	2% (2/101)	n.s. based on OR=1.09 (95% CI 0.15 to 7.88)[@]	
	Mesh plug with PerFix vs. Lichtenstein	HOSP	LOS, hrs	NA	8.1 (Range: 4.1-30) (N=101)	8.9 (Range: 4.6-32) (N=101)	p=0.74 (PL vs. PF), p=0.44 (PL vs. LTFM), Mann-Whitney U test	
	Mesh plug with PerFix vs. Lichtenstein	HOSP	LOS, hrs	NA	8.7 (Range: 3.6-52) (N=93)	8.9 (Range: 4.6-32) (N=101)	p=0.74 (PL vs. PF), p=0.44 (PL vs. LTFM), Mann-Whitney U test	
	Mesh plug with PerFix vs. Lichtenstein	RTDA	Return to normal daily activity	2 weeks	70% (61/87)	76% (69/91)	n.s. based on OR=0.75 (95% CI 0.39 to 1.45)[@]	
	Mesh plug with PerFix vs. Lichtenstein	RTDA	Return to normal daily activity	2 weeks	78% (73/94)	76% (69/91)	n.s. based on OR=1.11 (95% CI 0.56 to 2.19)[@]	
	Mesh plug with PerFix vs. Lichtenstein	RTDA	Return to normal daily activity	6 months	19% (18/94)	19% (17/91)	n.s. based on OR=1.03 (95% CI 0.49 to 2.15)[@]	
	Mesh plug with PerFix vs. Lichtenstein	RTDA	Return to normal daily activity	6 months	28% (24/87)	19% (17/91)	n.s. based on OR=1.66 (95% CI 0.82 to 3.36)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sanders et al., 2009[798] (continued)	Mesh plug with PerFix vs. Lichtenstein	RTDA	Return to normal daily activity	12 months	2% (2/87)	5% (5/91)	n.s. based on OR=0.4 (95% CI 0.08 to 2.14)[@]	
	Mesh plug with PerFix vs. Lichtenstein	RTDA	Return to normal daily activity	12 months	3% (3/94)	5% (5/91)	n.s. based on OR=0.57 (95% CI 0.13 to 2.45)[@]	
	Mesh plug with PerFix vs. Lichtenstein	Pain	VAS pain scores (0-10)	2 weeks	2.37 (Range: 0-10) (N=93)	2.35 (Range: 0-9) (N=101)	NR	
	Mesh plug with PerFix vs. Lichtenstein	Pain	VAS pain scores (0-10)	2 weeks	2.44 (Range: 0-10) (N=101)	2.35 (Range: 0-9) (N=101)	NR	
	Mesh plug with PerFix vs. Lichtenstein	Pain	VAS pain scores	6 months	1.3 (Range: 0-8) (N=93)	1.14 (Range: 0-6) (N=101)	NR	
	Mesh plug with PerFix vs. Lichtenstein	Pain	VAS pain scores	6 months	1.67 (Range0-8) (N=101)	1.14 (Range: 0-6) (N=101)	NR	
	Mesh plug with PerFix vs. Lichtenstein	Pain	Improvement in VAS pain scores from baseline (higher number is better)	12 months	1.23 (SD: NR) (N=93)	1.38 (SD: NR) (N=101)	NR	
	Mesh plug with PerFix vs. Lichtenstein	Pain	Improvement in VAS pain scores from baseline (higher number is better)	12 months	1.43 (SD: NR) (N=101)	1.38 (SD: NR) (N=101)	NR	
	Mesh plug with PerFix vs. Lichtenstein	Pain	VAS pain scores	12 months	1.14 (Range: 0-8) (N=93)	0.96 (Range: 0-8) (N=101)	p=0.84 (PL vs. PF), p=0.85 (PL vs. LTFM), p=0.16 (PF vs. LTFM), Mann-Whitney U test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sanders et al., 2009[798] (continued)	Mesh plug with PerFix vs. Lichtenstein	Pain	VAS pain scores	12 months	1 (Range: 0-5) (N=101)	0.96 (Range: 0-8) (N=101)	p=0.84 (PL vs. PF), p=0.85 (PL vs. LTFM), p=0.16 (PF vs. LTFM), Mann-Whitney U test	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Hematoma	Up to 12 months	1% (1/101)	2% (2/101)	n.s. based on OR=0.5 (95% CI 0.04 to 5.55)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Hematoma	Up to 12 months	1% (1/93)	2% (2/101)	n.s. based on OR=0.54 (95% CI 0.05 to 6.03)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Numbness	Up to 12 months	43% (40/93)	59% (60/101)	n.s. based on OR=1.47 (95% CI 0.83 to 2.62)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Numbness	Up to 12 months	68% (69/101)	59% (60/101)	p<0.05 based on OR=0.52 (95% CI 0.29 to 0.91)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Signs of infection	Up to 12 months	2% (2/101)	1% (1/101)	n.s. based on OR=2.02 (95% CI 0.18 to 22.64)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Signs of infection	Up to 12 months	2% (2/93)	1% (1/101)	n.s. based on OR=2.2 (95% CI 0.2 to 24.65)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Testicular atrophy	Up to 12 months	0% (0/101)	0% (0/101)	n.s. based on OR=1 (95% CI: 0.02 to 50.89)[@]	
	Mesh plug with PerFix vs. Lichtenstein	ADV	Testicular atrophy	Up to 12 months	0% (0/93)	0% (0/101)	n.s. based on OR=1.09 (95% CI: 0.02 to 55.27)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sanders et al., 2009[798] (continued)	Mesh plug with PerFix vs. Lichtenstein	ADV	Wound healing problems	Up to 12 months	3% (3/101)	1% (1/101)	n.s. based on OR=3.06 (95% CI 0.31 to 29.94)[@]	Posoperative complications including recurrence were assessed at 2-wk, 6-month and 12-month follow-up and reported as "postoperative outcomes."
	Mesh plug with PerFix vs. Lichtenstein	ADV	Wound healing problems	Up to 12 months	4% (4/93)	1% (1/101)	n.s. based on OR=4.49 (95% CI 0.49 to 40.96)[@]	Posoperative complications including recurrence were assessed at 2-wk, 6-month and 12-month follow-up and reported as "postoperative outcomes."
	Mesh plug with Proloop vs. Mesh plug with PerFix	RC	Hernia recurrence	Up to 12 months	2% (2/93)	1% (1/101)	n.s. based on OR=2.2 (95% CI 0.2 to 24.65)[@]	
	Mesh plug with Proloop vs. Mesh plug with PerFix	HOSP	LOS, hrs	NA	8.7 (Range: 3.6-52) (N=93)	8.1 (Range: 4.1-30) (N=101)	p=0.74 (PL vs. PF), p=0.44 (PL vs. LTFM), Mann-Whitney U test	
	Mesh plug with Proloop vs. Mesh plug with PerFix	RTDA	Return to normal daily activity	2 weeks	70% (61/87)	78% (73/94)	n.s. based on OR=0.67 (95% CI 0.35 to 1.32)[@]	
	Mesh plug with Proloop vs. Mesh plug with PerFix	RTDA	Return to normal daily activity	6 months	28% (24/87)	19% (18/94)	n.s. based on OR=1.61 (95% CI 0.8 to 3.23)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sanders et al., 2009[798] (continued)	Mesh plug with Proloop vs. Mesh plug with PerFix	RTDA	Return to normal daily activity	12 months	2% (2/87)	3% (3/94)	n.s. based on OR=0.71 (95% CI 0.12 to 4.38)[@]	
	Mesh plug with Proloop vs. Mesh plug with PerFix	Pain	VAS pain scores (0-10)	2 weeks	2.37 (Range: 0-10) (N=93)	2.44 (Range: 0-10) (N=101)	NR	
	Mesh plug with Proloop vs. Mesh plug with PerFix	Pain	VAS pain scores	6 months	1.3 (Range: 0-8) (N=93)	1.67 (Range0-8) (N=101)	NR	
	Mesh plug with Proloop vs. Mesh plug with PerFix	Pain	Improvement in VAS pain scores from baseline (higher number is better)	12 months	1.23 (SD: NR) (N=93)	1.43 (SD: NR) (N=101)	NR	
	Mesh plug with Proloop vs. Mesh plug with PerFix	Pain	VAS pain scores	12 months	1.14 (Range: 0-8) (N=93)	1 (Range: 0-5) (N=101)	p=0.84 (PL vs. PF), p=0.85 (PL vs. LTFM), p=0.16 (PF vs. LTFM), Mann-Whitney U test	
	Mesh plug with Proloop vs. Mesh plug with PerFix	ADV	Hematoma	Up to 12 months	1% (1/93)	1% (1/101)	n.s. based on OR=1.09 (95% CI 0.07 to 17.63)[@]	
	Mesh plug with Proloop vs. Mesh plug with PerFix	ADV	Numbness	Up to 12 months	43% (40/93)	68% (69/101)	p<0.05 based on OR=0.35 (95% CI 0.19 to 0.63)[@]	
	Mesh plug with Proloop vs. Mesh plug with PerFix	ADV	Signs of infection	Up to 12 months	2% (2/93)	2% (2/101)	n.s. based on OR=1.09 (95% CI 0.15 to 7.88)[@]	
	Mesh plug with Proloop vs. Mesh plug with PerFix	ADV	Testicular atrophy	Up to 12 months	0% (0/93)	0% (0/101)	n.s. based on OR=1.09 (95% CI 0.02 to 55.27)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sanders et al., 2009[798] (continued)	Mesh plug with Proloop vs. Mesh plug with PerFix	ADV	Wound healing problems	Up to 12 months	4% (4/93)	3% (3/101)	n.s. based on OR=1.47 (95% CI 0.32 to 6.74)[@]	Posoperative complications including recurrence were assessed at 2-wk, 6-month and 12-month follow-up and reported as "postoperative outcomes."
Sanjay et al., 2006[799]	PHS vs. Lichtenstein	RC	Hernia recurrence	Within 6 months after original operation	3% (1/31)	0% (0/33)	P>0.05, Fisher's test	
	PHS vs. Lichtenstein	RTDA	Time to return to driving, days	NA	20 (SD: 20) (N=31)	14 (SD: 9) (N=33)	p=0.2, t-test	
	PHS vs. Lichtenstein	RTDA	Time to return to normal activity, days	NA	21 (SD: 21) (N=31)	22 (SD: 14) (N=33)	p=0.8, t-test	
	PHS vs. Lichtenstein	RTW	Time to return to manual work, days	NA	42 (SD: 30) (N=31)	30 (SD: 17) (N=33)	p=0.3, t-test	
	PHS vs. Lichtenstein	SFN	Satisfied with surgery (higher % is better)	Minimum of 4 years	13% (4/31)	18% (6/33)	n.s. based on OR=0.67 (95% CI 0.17 to 2.63)[@]	
	PHS vs. Lichtenstein	SFN	Very satisfied with surgery (higher % is better)	Minimum of 4 years	74% (23/31)	73% (24/33)	p=0.6, Fisher's test	
	PHS vs. Lichtenstein	Pain	Pain scores (0-10 scale)	Day 1	3.5 (SD: 3.5) (N=31)	4.2 (SD: 2.9) (N=33)	p=0.2, t-test	
	PHS vs. Lichtenstein	Pain	Total number of codydramol tablets consumed	Postoperative	29% (9/31)	24% (8/33)	p=0.65, t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sanjay et al., 2006[799] (continued)	PHS vs. Lichtenstein	Pain	Pain scores (0-10)	6 weeks	3.5 (SD: 3.5) (N=31)	2.5 (SD: 2) (N=33)	p=0.1, t-test	
	PHS vs. Lichtenstein	Pain	Mild chronic groin pain	Minimum of 4 years	13% (4/31)	15% (5/33)	P>0.05, t-test	
	PHS vs. Lichtenstein	ADV	Hematoma	Postoperative	3% (1/31)	0% (0/33)	n.s. based on OR=3.3 (95% CI: 0.13 to 83.97)[@]	
	PHS vs. Lichtenstein	ADV	Wound infection rates	Postoperative	6% (2/31)	3% (1/33)	p=0.53, t-test	
Sevonius et al., 2009[535,805-813]	Recurrent hernia: Lichtenstein vs. mesh plug	RC	Hernia recurrence, first recurrence	NR but likely Range: 0-7 years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 1.45 (95% CI: 1.15 to 1.82)	p<0.05 according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: Lichtenstein vs. mesh plug	RC	Hernia recurrence, second recurrence	NR but likely Range: 0-7 years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 1.24 (95% CI: 0.89 to 1.71)	n.s. according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: Lichtenstein vs. mesh plug	RC	Hernia recurrence, third recurrence	NR but likely Range: 0-7 years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 0.85 (95% CI: 0.25 to 2.84)	n.s. according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Recurrent hernia: Lichtenstein vs. OPM	RC	Hernia recurrence, first recurrence	NR but likely Range: 0-7 years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 0.81 (95% CI: 0.58 to 1.13)	n.s. according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: Lichtenstein vs. OPM	RC	Hernia recurrence, second recurrence	NR but likely Range: 0-7 years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 0.68 (95% CI: 0.45 to 1.03)	n.s. according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: Lichtenstein vs. OPM	RC	Hernia recurrence, third recurrence	NR but likely Range: 0-7 years	This was the reference operation	Compared to Lichtenstein: Hazard ratio: 0.96 (95% CI: 0.31 to 2.95)	n.s. according to the 95% CI	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: Mesh plug vs. OPM	RC	Hernia recurrence, first recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: Hazard ratio: 1.45 (95% CI: 1.15 to 1.82)	Compared to Lichtenstein: Hazard ratio: 0.81 (95% CI: 0.58 to 1.13)	group 1 p<0.05 vs. Lichtenstein, but group 2 n.s. from Lichtenstein, according to 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
	Recurrent hernia: Mesh plug vs. OPM	RC	Hernia recurrence, second recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: Hazard ratio: 1.24 (95% CI: 0.89 to 1.71)	Compared to Lichtenstein: Hazard ratio: 0.68 (95% CI: 0.45 to 1.03)	Neither group differed from Lichtenstein, based on 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Recurrent hernia: Mesh plug vs. OPM	RC	Hernia recurrence, third recurrence	NR but likely Range: 0-7 years	Compared to Lichtenstein: Hazard ratio: 0.85 (95% CI: 0.25 to 2.84)	Compared to Lichtenstein: Hazard ratio: 0.96 (95% CI: 0.31 to 2.95)	Neither group differed from Lichtenstein, based on 95% CIs	Adjusted for age and gender. Hazard ratios higher than 1.0 favor the Lichtenstein group
Vatansev et al., 2002[826]	Lichtenstein vs. Nyhus	Pain	Pain: need for analgesia meperidin mg in 24 hours	one day	253.9 (SD: 129.3) (N=24)	382.9 (SD: 189.1) (N=21)	No p-value reported specifically for any pairwise comparison	
Vironen et al., 2006[439,827]	Lichtenstein vs. PHS	RC	Hernia recurrence	After 1 year	0% (0/141)	0% (0/142)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.11)[@]	
	Lichtenstein vs. PHS	RC	Hernia recurrence	1 year	0.8% (N=121)	0% (N=110)		
	Lichtenstein vs. PHS	RC	Hernia recurrence	5 years	0.9% (N=114)	0.8% (N=122)		
	Lichtenstein vs. PHS	HOSP	LOS, hrs	Postoperative	7.9, Median: 4.9 (SD: NR) (N=149)	6.6, Median: 4.6 (SD: NR) (N=150)	p=0.242, Kruskal-Wallis test	
	Lichtenstein vs. PHS	HOSP	Number of patients who stayed overnight for pain control	Postoperative	3% (5/149)	2% (3/150)	n.s. based on OR=1.7 (95% CI 0.4 to 7.25)[@]	
	Lichtenstein vs. PHS	RTDA	Driving a car, days	NA	4.6, Median: 4 (SD: NR) (N=149)	4.4, Median: 3 (SD: NR) (N=150)	p=0.566, Kruskal-Wallis test	
	Lichtenstein vs. PHS	RTDA	Return to driving car, days	NA	4 (SD: NR) (N=149)	3 (SD: NR) (N=150)	NR	
	Lichtenstein vs. PHS	RTDA	Return to sporting activities, days	NA	13 (SD: NR) (N=149)	11 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Vironen et al., 2006[439,827] (continued)	Lichtenstein vs. PHS	RTDA	Return to sporting hobbies, days	NA	14.8, Median: 13 (SD: NR) (N=149)	12.1, Median: 11 (SD: NR) (N=150)	p=060, Kruskal-Wallis test	
	Lichtenstein vs. PHS	RTW	Return to work, days	NA	10.4, Median: 7 (SD: NR) (N=149)	10.2, Median: 7 (SD: NR) (N=150)	p=0.980, Kruskal-Wallis test	
	Lichtenstein vs. PHS	RTW	Return to work, days	NA	10.4 (SEM: 0.5 / 95% CI 9.3 -11.5) (N=149)	10.2 (SEM: 0.5 / 95% CI 9.1 - 11.3) (N=150)	p=0.980, Kruskall-Wallis test	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain at rest (higher % is better)	1 day	46% (69/149)	43% (64/150)	n.s. based on OR=1.16 (95% CI 0.73 to 1.83)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain when walking (higher % is better)	1 day	14% (21/149)	17% (25/150)	n.s. based on OR=0.82 (95% CI 0.44 to 1.54)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with moderate pain at rest	1 day	25% (37/149)	28% (42/150)	n.s. based on OR=0.85 (95% CI 0.51 to 1.42)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with moderate pain when walking	1 day	42% (62/149)	47% (70/150)	n.s. based on OR=0.81 (95% CI 0.52 to 1.29)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with no pain at rest (higher % is better)	1 day	11% (17/149)	17% (26/150)	n.s. based on OR=0.61 (95% CI 0.32 to 1.19)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with no pain when walking (higher % is better)	1 day	1% (1/149)	1% (2/150)	n.s. based on OR=0.5 (95% CI 0.04 to 5.57)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Vironen et al., 2006[439,827] (continued)	Lichtenstein vs. PHS	Pain	Number of patients with severe pain at rest	1 day	7% (10/149)	6% (9/150)	n.s. based on OR=1.13 (95% CI 0.44 to 2.86)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with severe pain when walking	1 day	34% (50/149)	32% (48/150)	n.s. based on OR=1.07 (95% CI 0.66 to 1.74)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain at rest (higher % is better)	7 days	30% (45/149)	30% (45/150)	n.s. based on OR=1.01 (95% CI 0.62 to 1.65)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain when walking (higher % is better)	7 days	19% (29/149)	18% (27/150)	n.s. based on OR=1.1 (95% CI 0.62 to 1.97)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with moderate pain at rest	7 days	5% (8/149)	5% (7/150)	n.s. based on OR=1.16 (95% CI 0.41 to 3.28)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with moderate pain when walking	7 days	2% (3/149)	1% (2/150)	n.s. based on OR=1.52 (95% CI 0.25 to 9.23)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with no pain at rest (higher % is better)	7 days	52% (77/149)	59% (89/150)	n.s. based on OR=0.73 (95% CI 0.46 to 1.16)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with no pain when walking (higher % is better)	7 days	15% (22/149)	21% (32/150)	n.s. based on OR=0.64 (95% CI 0.35 to 1.16)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Vironen et al., 2006[439,827] (continued)	Lichtenstein vs. PHS	Pain	Number of patients with no pain when walking (higher % is better)	7 days	54% (80/149)	57% (85/150)	n.s. based on OR=0.97 (95% CI: 0.68 to 1.38)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with severe pain at rest	7 days	0% (0/149)	0% (0/150)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.07)[@]	
	Lichtenstein vs. PHS	Pain	Moderate pain when walking, %	2 weeks	4% (6/149)	4% (6/150)	n.s. based on OR=1.01 (95% CI: 0.32 to 3.19)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain at rest (higher % is better)	14 days	12% (18/149)	11% (16/150)	n.s. based on OR=1.01 (95% CI 0.32 to 3.2)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain when walking (higher % is better)	14 days	0% (0/149)	0% (0/150)	n.s. based on OR=1.15 (95% CI 0.56 to 2.35)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with mild pain when walking (higher % is better)	14 days	5% (8/149)	5% (8/150)	n.s. based on OR=1.01 (95% CI 0.37 to 2.76)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with moderate pain at rest	14 days	0% (0/149)	1% (2/150)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.17)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with no pain at rest (higher % is better)	14 days	78% (116/149)	15% (23/150)	p<0.05 based on OR=19.41 (95% CI 10.77 to 34.98)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Vironen et al., 2006[439,827] (continued)	Lichtenstein vs. PHS	Pain	Number of patients with no pain when walking (higher % is better)	14 days	27% (40/149)	28% (42/150)	n.s. based on OR=0.82 (95% CI 0.52 to 1.29)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with no pain when walking (higher % is better)	14 days	55% (82/149)	60% (90/150)	n.s. based on OR=0.94 (95% CI 0.57 to 1.57)[@]	
	Lichtenstein vs. PHS	Pain	Number of patients with severe pain at rest	14 days	0% (0/149)	0% (0/150)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.07)[@]	
	Lichtenstein vs. PHS	Pain	Occasional use of analgesics	2 weeks	10% (15/149)	9% (14/150)	n.s. based on OR=1.09 (95% CI 0.51 to 2.34)[@]	
	Lichtenstein vs. PHS	Pain	Prolonged pain	Within 30 days	8% (12/149)	12% (18/150)	n.s. based on OR=0.64 (95% CI 0.3 to 1.39)[@]	
	Lichtenstein vs. PHS	Pain	Testicular pain	Within 30 days	1% (1/149)	1% (1/150)	n.s. based on OR=1.01 (95% CI 0.06 to 16.25)[@]	
	Lichtenstein vs. PHS	Pain	Patients reporting small painful area in the medial corner of the groin area	After 1 year	5% (7/149)	5% (7/150)	n.s. based on OR=1.01 (95% CI: 0.34 to 2.94)[@]	
	Lichtenstein vs. PHS	Pain	% Pain altogether	5 years	12.3% (N=114)	9.8% (N=122)		
	Lichtenstein vs. PHS	Pain	% Pain at rest	5 years	1.8% (N=114)	0.8% (N=122)		
	Lichtenstein vs. PHS	Pain	% Pain while coughing	5 years	0.9% (N=114)	1.6% (N=122)		
	Lichtenstein vs. PHS	Pain	% Pain when standing up	5 years	4.4% (N=114)	3.3% (N=122)		
	Lichtenstein vs. PHS	Pain	% Pain while moving	5 years	11.4% (N=114)	7.4% (N=122)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Vironen et al., 2006[439,827] (continued)	Lichtenstein vs. PHS	Pain	% Pain interferes with everyday life	5 years	1.8% (N=114)	1.6% (N=122)		
	Lichtenstein vs. PHS	Pain	% Pain interfere with sports	5 years	5.3% (N=114)	5.7% (N=122)		
	Lichtenstein vs. PHS	Pain	% Use of medication	5 years	1.8% (N=114)	0.8% (N=122)		
	Lichtenstein vs. PHS	ADV	Atrophy	Within 30 days	0% (0/149)	0% (0/150)	n.s. based on OR=1.01 (95% CI: 0.02 to 51.07)[@]	
	Lichtenstein vs. PHS	ADV	Hematoma or swelling	Within 30 days	7% (11/149)	1% (2/150)	p<0.05 based on OR=5.9 (95% CI 1.28 to 27.09)[@]	
	Lichtenstein vs. PHS	ADV	Hydrocele or scrotal swelling	Within 30 days	1% (1/149)	3% (4/150)	n.s. based on OR=0.25 (95% CI 0.03 to 2.23)[@]	
	Lichtenstein vs. PHS	ADV	Infection	Within 30 days	1% (2/149)	2% (3/150)	n.s. based on OR=0.67 (95% CI 0.11 to 4.05)[@]	
	Lichtenstein vs. PHS	ADV	Numbness	Within 30 days	9% (13/149)	7% (11/150)	n.s. based on OR=1.21 (95% CI 0.52 to 2.79)[@]	
	Lichtenstein vs. PHS	ADV	Residual hernia (femoral)	Within 30 days	1% (1/149)	0% (0/150)	n.s. based on OR=3.04 (95% CI: 0.12 to 75.24)[@]	
	Lichtenstein vs. PHS	ADV	% Mesh perceptible	5 years	15.8% (N=114)	13.1% (N=122)		
	Lichtenstein vs. PHS	ADV	% Sensory dysfunction of the skin, total	5 years	13.2% (N=114)	4.9% (N=122)		
	Lichtenstein vs. PHS	ADV	% Sensory dysfunction without the occurrence of pain	5 years	9.6% (N=114)	3.3% (N=122)		
	Lichtenstein vs. PHS	ADV	% Discomfort	5 years	28.1% (N=114)	18.9% (N=122)		

Key Question 4 Tables

Table 43. Key Question 4: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Butler et al., 2007[647]	USA	Navy Medical Center, Portsmouth, Virginia	1	RCT	Lichtenstein vs. TAPP vs. TEP	66	NR	Tertiary teaching hospital	"This study was sponsored by the Chief, Navy Bureau of Medicine and Surgery, Washington, DC, Clinical Investigation Program (CIP #P01-0019). The views expressed in this article are those of the authors, and do not reflect the official policy or position of the Department of the Navy, the Department of Defense, or the United States Government."
Dedemadi et al., 2006[669]	Greece	Korgialenio-Benakio Red Cross Hospital	1	RCT	Lichtenstein vs. TAPP vs. TEP	82	2/1999 to 11/2004	Non-university hospital	NR
Gong et al., 2011[701]	China	NR	NR	RCT	Mesh plug vs. TAPP vs. TEP	164	NR	NR	Study funding source not reported. However authors stated that they "have no conflicts of interest or financial ties to disclose"
Gunal et al., 2007[702]	Turkey	NR	NR	RCT	Lichtenstein vs. Nyhus vs. TAPP vs. TEP	160	2/1997 to 2/2001	NR	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Hamza et al., 2010[704]	Egypt	Department of Surgery, Faculty of Medicine, University of Alexandria, Egypt	1	RCT	Lichtenstein vs. TAPP vs. TEP vs. open pro-peritoneal mesh	100	NR	University hospital	Study was funded by the University of Alexandria.
Krishna et al. 2011[728]	India	All India Institute of Medical Sciences, Department of Surgery, India	1	RCT	TAPP vs. TEP	100 patients (number of hernias not reported)	05/2007 to 03/2009	University Hospital	NR
Mesci et al. 2011[750]	Turkey	Akdeniz University Medical School General Surgery Department, Turkey	1	RCT	TAPP vs. TEP	75 patients (number of hernias not reported)	03/2005 to 01/2008	University Hospital	NR
Pokorny et al., 2008[791,792]	Austria	12 centers in the Netherlands; specific centers not reported	12	RCT	Lichtenstein vs. TAPP vs. TEP vs. Shouldice vs. Bassini	365	1998 to 2002	general surgery clinics	NR
Sarli et al., 1997[800]	Italy	School of Medicine, University of Parma, Italy	1	RCT	TAPP vs. IPOM	115	05/1992 to 10/1994	University hospital	NR
Schrenk et al., 1996[803]	Austria	Second Department of Surgery and Ludwig Boltzmann Institute for Surgical Laparoscopy, Linz, Austria	1	RCT	TAPP vs. TEP	52	NR	Surgical Institute for Laparoscopy	NR
Zhang et al., 2009[837]	China	First Affiliated Hospital Hospital of Guangxi Medical University, China	1	RCT	Four types of TEP	99	08/2004 to 03/2008	University hospital	NR

Table Note:
For Pokorny et al., 2008[791,792] of the 365 patients enrolled, 198 provided data related to one of the Key Questions (those who received either Lichtenstein, TAPP, or TEP).

Table 44. Key Question 4: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Butler et al., 2007[647]			x	x												
Dedemadi et al., 2006[669]	x				x											
Gong et al., 2011[701]			x	x	x	x							x			
Gunal et al., 2007[702]			x	x												
Hamza et al., 2010[704]			x		x	x										
Krishna et al., 2011[728]			x		x	x	x									
Mesci et al., 2011[750]		x														
Pokorny et al., 2008[791,792]			x	x	x				x							
Sarli et al., 1997[800]					x	x	x									
Schrenk et al., 1996[803]			x	x	x	x	x									
Zhang et al., 2009[837]				x	x	x	x									

Table 45. Key Question 4: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Butler et al., 2007[647]	Adults	x													
Dedemadi et al., 2006[669]	Adults			x	x	3+			x		x		x		
Gong et al., 2011[701]	30 to 70				x	3+	x								
Gunal et al., 2007[702]	Adults				x	3+									
Hamza et al., 2010[704]	Adults	x					x				x				
Krishna et al., 2011[728]	18+				x		x				x				
Mesci et al., 2011[750]	18+														
Pokorny et al., 2008[791,792]	18+														
Sarli et al., 1997[800]	7 to 88				x	3+	x								
Schrenk et al., 1996[803]	18+														
Zhang et al., 2009[837]	16+				x						x		x		

Table 46. Key Question 4: Patient enrollment criteria, other

Study	Other enrollment criteria
Butler et al., 2007[647]	No other criteria
Dedemadi et al., 2006[669]	Excluded those unwilling to be randomized
Gong et al., 2011[701]	At least three years of postoperative data
Gunal et al., 2007[702]	Excluded those with "unsatisfactory data" (not defined by the authors), and those that could not be reached at their last follow-up, Nyhus IIIc or IV
Hamza et al., 2010[704]	Appendectomy was not an exclusion. Excluded obstructive airwary disease, constipation, or obstructive uropathy
Krishna et al., 2011[728]	Others excluded were patients with diabetes, hypertension, and coronary artery disease
Mesci et al., 2011[750]	Excluded were patients severe heart falure, rheumatoid arthritis or similar joint diseases, severe hypertension, hip or knee prosthesis, and those with neurological sequelae.
Pokorny et al., 2008[791,792]	No other criteria
Sarli et al., 1997[800]	Excluded also were those with a very wide inguinal defect (Nyhus class IIIb). Study age was IPOM; 47.3 (22 to 83) vs. TAPP: 46.3 (7 to 88)
Schrenk et al., 1996[803]	No other criteria
Zhang et al., 2009[837]	Exclude also were those with enlarged prostate, acute abdominal disease, and those undergoing concomitant operative procedures.

Table 47. Key Question 4: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Butler et al., 2007[647]	TAPP, all operations were either performed or were supervised by a surgeon experienced in laparoscopic repairs (did not report what level of experience or whether this experience was for hernia repair or for other clinical conditions), polypropylene mesh, other mesh details not reported	TEP, all operations were either performed or were supervised by a surgeon experienced in laparoscopic repairs (did not report what level of experience or whether this experience was for hernia repair or for other clinical conditions), polypropylene mesh, other mesh details not reported	Lichtenstein, all operations were either performed or were supervised by a surgeon experienced in laparoscopic repairs (did not report what level of experience or whether this experience was for hernia repair or for other clinical conditions), polypropylene mesh, other mesh details not reported	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Dedemadi et al., 2006[669]	TAPP, general anesthesia, dissection deep to the obturator vessels in the space of Retzius. mesh crossing the mdline, extending into the space of Retzius, and covring the cord structures extending laterally to the internal ring. mesh anchored to Cooper's ligament as well as superomedially and superolaterally.	TEP, general anesthesia. Balloon dissecting for preperitoneal space. Coopers ligament dissected, exposing of Hesselbach's triangle posteriorly. Nonabsorbable mesh positioned from the symphysis pubis to the ventral and lateral abdominal wall. mesh is held in place simply by the dorece of the peritoneum lying against the abdominal wall after desufflation.	Lichtenstein, general anesthesia. Dissection is not performed in the typical way because of the previous repair. mesh was left in situ in two patients with a previous open Lichtenstein. Direct sacs are inverted and imbricated with a nonabsorbable suture to flatten the posterior wall. Indirect sacs are dissected from the cord up to the extraperitoneal fat, then either excised or inverted, with a mesh cone inserted in the deep inguinal ring. Polypropylene mesh onlay applied to the posterior wall and tucked under the superior leaf of the external oblique, overlapping Poupart's ligament. Inferomedial corner of the mesh is sutured to the tissues overlying the pubic tubercle. One or two sutures are used where the tails of the mesh cross lateral to the cord.	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Gong et al., 2011[701]	TAPP, four surgeons, all were “experienced with both open and laparoscopic hernioplasty” (did not report the number of prior operations these surgeons had performed), general anesthesia. large Bard polypropylene mesh (Davol) 8.5 cm x 15 cm was placed preperitoneally and attached to Cooper’s ligament and the transverse fascia with the 5mm tacker (Auto Suture Protack, Tyco Inc). Peritoneum closed with running 3-0 Vicryl Plus suture.	TEP, four surgeons, all were “experienced with both open and laparoscopic hernioplasty” (did not report the number of prior operations these surgeons had performed), general anesthesia. Blunt digital dissection made in the preperitoneal space through the ipsilateral anterior rectus sheath. Dissection of hte preperitoneal space was perfomed medially across the midline and laterally cranial to the anterosuperior iliac spine. Hernia sac was reduced and a 8.5 x 13.7 cm Bard 3DMax mesh (preformed knitted polypropylene) placed in the preperitoneal space, covering the inguinal floor. Anterior rectus sheath then closed with a 3-0 Vicryl suture	Mesh plug, four surgeons, all were “experienced with both open and laparoscopic hernioplasty” (did not report the number of prior operations these surgeons had performed), regional anesthesia. Procedure as described by Rutkow and Robbins using a large Bard mesh Perfix plug (monofilament knitted polypropylene, Davol Inc.). Plug was secured and the patch fixed with interrupted sutures using 2-0 Prolene (polypropylene, Ethicon). Closure of the external oblique and Scarpa’s fascia with a running 3-0 Vicryl Plus (polyglactin, Ethicon) suture.	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Gunal et al., 2007[702]	TAPP, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). Carbon dioxide insufflation. 6 x 12 cm Prolene mesh fixed to the posterior abdominal wall using a hernia stapler.	TEP, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). Balloon trocar expansion of the preperitoneal space and carbon dioxide insufflation. 6 x 12 cm Prolene mesh fixed to the posterior inguinal wall using a hernia stapler.	Lichtenstein, general anesthesia, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). 6 x 12 cm Prolene mesh fixed to the anterior aspect of the posterior wall.	Nyhus, all operations performed by two consultant surgeons who were "highly experienced in open and laparoscopic hernia surgery" (authors did not state numbers of prior operations). 6 x 12 cm prolene mesh to the posterior aspect of the inguinal defect	X
Hamza et al., 2010[704]	TAPP, no other details reported	TEP, no other details reported	Lichtenstein, no other details reported	Open properitoneal mesh, no other details reported	All operations were performed by one consultant surgeon.
Krishna et al., 2011[728]	Peritoneum was incised lateral to the inferior epigastric vessels 2 cm above the deep ring. Adequate space was created to accommodate 15 x 10-cm polypropylene mesh. After the dissection, the mesh was rolled and introduced via a 10-12-mm umbilical port into the space created. The mesh was not fixed in place.	The rectus muscle was retracted laterally after incising the anterior rectus sheath and a blunt dissection was done. The dissection proceeded laterally, identifying the inferior epigastric vessels, and further laterally up to correspond to the anterior superior iliac spine.			One of the surgeons had more than 15 years' experience in laparoscopic surgery and the other two had 3-5 years' experience.
Mesci et al., 2011[750]	Not reported	Not reported			Study did not provide any details of the surgery. All operations were performed by by same surgeon at a university hospital

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Pokorny et al., 2008[791,792]	TAPP, all surgeons had either performed at least 30 prior laparoscopic repairs (for unreported clinical conditions) or had performed at least 30 prior open repairs (again for unreported clinical conditions), general anesthesia, no local anesthetic, polypropylene mesh (SurgiPro, Autosuture) no other mesh details reported.	TEP, all surgeons had either performed at least 30 prior laparoscopic repairs (for unreported clinical conditions) or had performed at least 30 prior open repairs (again for unreported clinical conditions), general anesthesia, no local anesthetic, polypropylene mesh, no other mesh details reported.	Lichtenstein, all surgeons had either performed at least 30 prior laparoscopic repairs (for unreported clinical conditions) or had performed at least 30 prior open repairs (again for unreported clinical conditions). Lichtenstein as described by Amid; general anesthesia, no local anesthetic, polypropylene mesh, no other mesh details reported.	NA	X
Sarli et al., 1997[800] (TAPP vs. IPOM)	TAPP was performed under general anesthesia. The hernia sac was reduced and a 15 x 12 cm piece of polypropylene mesh was placed lying over the spermatic cord and stapled to the Cooper ligament and to the fascia.	IPOM technique was performed under general anesthesia. A minimal peritoneal incision was made and a 10 x 7-cm piece of polytetrafluoroethylene mesh was passed through the 11/12-mm trocar into the intraperitoneal space.	NA	NA	The procedures were performed by two surgeons in a general surgery university practice
Schrenk et al., 1996[803] (TAPP vs. TPP)	TAPP. Laparoscopic peritoneal hernia repair with a polypropylene mesh (SurgiPro, Auto Suture, Vienna, Austria).	TEP. Patients had extraperitoneal repair with a polypropylene mesh (SurgiPro)	NA	NA	All surgeons in the study were experienced and no local anesthetic was used.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Zhang et al., 2009[837]	The MR used a midline approach between the rectus muscle and the posterior rectus sheath. A 5-mm port was placed halfway between the umbilicus and the pubic symphysis, and a second 5-mm port was inserted in the midline between the other two ports under direct vision.	In the MP group, a transverse incision was made through the linea alba or slightly laterally through both the anterior and posterior rectus sheath.	In the LR group, the second and third 5-mm trocar ports were placed at about 3 com proximal to the left and right anterior superior iliac spine, respectively.	In the LP group, a transverse incision was made through the linea alba or slightly laterally through both anterior and posterior rectus sheath and at least a 5-mm trocar port was not placed midline	Surgery was carried out by three of the authors. A 15 x 10 cm polypropylene mesh was introduced to cover the posterior wall of the inguinal canal, deep inguinal ring, and femoral ring on each side. However, all 99 patients underwent TEP without mesh fixation through 4 surgical approaches.

Table 48. Key Question 4: Baseline characteristics

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Butler et al., 2007[647]	% bilateral	0% (0/22)	0% (0/22)	0% (0/22)		
	% recurrent	0% (0/22)	0% (0/22)	0% (0/22)		
	% male	100% (22/22)	100% (22/22)	100% (22/22)		
Dedemadi et al., 2006[669]	% bilateral	4% (1/24)	4% (1/26)	6% (2/32)		
	% femoral	4% (1/24)	0% (0/26)	0% (0/32)		
	% irreducible	0% (0/24)	0% (0/26)	0% (0/32)		
	% Nyhus type 1	0% (0/24)	0% (0/26)	0% (0/32)		
	% Nyhus type 2 recurrent	58% (14/24)	62% (16/26)	56% (18/32)		
	% Nyhus type 3a recurrent	29% (7/24)	31% (8/26)	31% (10/32)		
	% Nyhus type 3c recurrent	13% (3/24)	8% (2/26)	13% (4/32)		
	% recurrent, two or more prior operations	13% (3/24)	12% (3/26)	16% (5/32)		
	% symptoms bulge	96% (23/24)	100% (26/26)	97% (31/32)		
	% symptoms irreducible	4% (1/24)	4% (1/26)	9% (3/32)		
	% symptoms pain	54% (13/24)	54% (14/26)	50% (16/32)		
	% male	100% (24/24)	100% (26/26)	100% (32/32)		
	% work manual	25% (6/24)	27% (7/26)	25% (8/32)		
	% work mixed manual office	29% (7/24)	27% (7/26)	25% (8/32)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Dedemadi et al., 2006[669] (continued)	% work office	29% (7/24)	31% (8/26)	31% (10/32)		
	% work retired	17% (4/24)	15% (4/26)	19% (6/32)		
	Age	Entire study: 65 (Range: 28 to 92) (N=50)				
	Body surface area	Entire study: 1.75 (SD: 5) (N=50)				
	Weight (kg)	Entire study: 78 (SD: 15.9) (N=50)				
	% use of analgesics	4% (1/24)	4% (1/26)	6% (2/32)		
Gong et al., 2011[701]	% bilateral	0% (0/50)	0% (0/52)	0% (0/62)		
	% combined direct/indirect	12% (6/50)	8% (4/52)	13% (8/62)		
	% direct	18% (9/50)	21% (11/52)	18% (11/62)		
	% direct, large	12% (6/50)	10% (5/52)	11% (7/62)		
	% direct, small	6% (3/50)	12% (6/52)	6% (4/62)		
	% emergency hernia	0% (0/50)	0% (0/52)	0% (0/62)		
	% femoral	0% (0/50)	0% (0/52)	0% (0/62)		
	% giant hernia	0% (0/50)	0% (0/52)	0% (0/62)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Gong et al., 2011[701] (continued)	% indirect	70% (35/50)	71% (37/52)	69% (43/62)		
	% indirect or scrotal hernia, insufficient internal ring	34% (17/50)	37% (19/52)	34% (21/62)		
	% indirect, internal ring enlarged	26% (13/50)	27% (14/52)	24% (15/62)		
	% indirect, internal ring not enlarged	10% (5/50)	8% (4/52)	11% (7/62)		
	% irreducible	0% (0/50)	0% (0/52)	0% (0/62)		
	% recurrent	0% (0/50)	0% (0/52)	0% (0/62)		
	% male	100% (50/50)	100% (52/52)	100% (62/62)		
	Age	56 (SD: 10) (N=50)	57 (SD: 9) (N=52)	56 (SD: 10) (N=62)		
Gunal et al., 2007[702]	% bilateral	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% Nyhus type 3c	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% Nyhus type 4	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	% recurrent	0% (0/39)	0% (0/40)	0% (0/42)	0% (0/40)	
	Age	25.72 (SD: 6.8) (N=39)	22.38 (SD: 4.1) (N=40)	22.76 (SD: 1.9) (N=42)	23.85 (SD: 3.1) (N=40)	SDs calculated by ECRI Institute based on reported SEMs and Ns
Hamza et al., 2010[704]	% direct	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% indirect	100% (25/25)	100% (25/25)	100% (25/25)	100% (25/25)	
	% irreducible	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Hamza et al., 2010[704] (continued)	% obstructed	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% recurrent	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/25)	
	% male	100% (25/25)	100% (25/25)	100% (25/25)	100% (25/25)	
	% smoking	44% (11/25)	36% (9/25)	40% (10/25)	44% (11/25)	
	% work heavy weight lifting	36% (9/25)	40% (10/25)	32% (8/25)	32% (8/25)	
	Age	36.73 (SD: 12.06) (N=25)	34.91 (SD: 13) (N=25)	35.12 (SD: 10.11) (N=25)	35.67 (SD: 12.965) (N=25)	
	BMI (kg/m^2)	22.4 (SD: 1.242) (N=25)	23.2 (SD: 5.3) (N=25)	24.34 (SD: 14.22) (N=25)	22.2 (SD: 1.568) (N=25)	
Krishna et al., 2011[728]	% direct hernia	31% (14/47)	41% (21/52)			
	% indirect hernia	70% (33/47)	59% (31/52)			
	% male	100% (47/47)	98% (51/52)			
	% unilateral hernia	81% (38/47)	76% (39/52)			
	Mean age (years)	51.3 (SD: 13.8) (N=47)	47.8 (SD: 16) (N=52)			
Mesci et al., 2011[750]	% bilateral	16% (4/25)	16% (4/25)			
	% Direct hernia	32% (8/25)	28% (7/25)			
	% Indirect and direct	20% (5/25)	24% (6/25)			
	% Indirect henia	48% (12/25)	48% (12/25)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Mesci et al., 2011[750] (continued)	% Left-sided hernia	36% (9/25)	28% (7/25)			
	% right hernia	48% (12/25)	56% (14/25)			
	Mean age (years)	48.2 (SD: NR) (N=25)	48.4 (SD: NR) (N=25)			
Pokorny et al., 2008[791,792]	% bilateral	0% (0/93)	0% (0/36)	0% (0/69)		
	% femoral	0% (0/93)	0% (0/36)	0% (0/69)		
	% incarcerated	0% (0/93)	0% (0/36)	0% (0/69)		
	% recurrent	0% (0/93)	0% (0/36)	0% (0/69)		
	% right-side	62% (58/93)	56% (20/36)	61% (42/69)		
	% male	92% (86/93)	97% (35/36)	93% (64/69)		
	Age	49 (Range: 21 to 78) (N=93)	48 (Range: 19 to 73) (N=36)	52 (Range: 19 to 84) (N=69)		
	BMI (kg/m^2)	25 (Range: 17 to 35) (N=93)	25 (Range: 21 to 30) (N=36)	25 (Range: 19 to 33) (N=69)		
Sarli et al., 1997[800]	% bilateral	58% (34/59)	57% (32/56)			
	% direct	29% (17/59)	29% (16/56)			
	% femoral	12% (7/59)	11% (6/56)			
	% indirect	51% (30/59)	54% (30/56)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Sarli et al., 1997[800] (continued)	% recurrent	37% (22/59)	36% (20/56)			
	% unilateral	71% (42/59)	71% (40/56)			
	% male	78% (46/59)	80% (45/56)			
	Age	46.3 (Range: 7 to 88) (N=59)	47.3 (Range: 22 to 83) (N=56)			
	% ASA score 1	32% (19/59)	38% (21/56)			
	% ASA score 2	68% (40/59)	63% (35/56)			
Schrenk et al., 1996[803]	% recurrent	0% (0/28)	0% (0/24)			
	Age	39.1 (SD: 14.3, Range: 21 to 63) (N=28)	42.3 (SD: 11.9, Range: 20 to 62) (N=24)			
	% bilateral	0% (0/28)	0% (0/24)			
	% direct	32% (9/28)	29% (7/24)			
	% indirect	68% (19/28)	71% (17/24)			
	% male	86% (24/28)	92% (22/24)			
	% work heavy employment	14% (4/28)	17% (4/24)			
	% work light employment	29% (8/28)	25% (6/24)			
	% work moderate employment	57% (16/28)	58% (14/24)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Zhang et al., 2009[837]	Age	52.92 (SD: 9.68) (N=25)	51.36 (SD: 12.96) (N=25)	50.44 (SD: 14.48) (N=25)	52.29 (SD: 16.95) (N=24)	
	% bilateral	0% (0/25)	0% (0/25)	0% (0/25)	0% (0/24)	
	% Nyhus type 2	44% (11/25)	40% (10/25)	36% (9/25)	58% (14/24)	
	% Nyhus type 3a	16% (4/25)	40% (10/25)	36% (9/25)	25% (6/24)	
	% Nyhus type 3b	36% (9/25)	16% (4/25)	20% (5/25)	8% (2/24)	
	% Nyhus type 4	4% (1/25)	4% (1/25)	8% (2/25)	8% (2/24)	
	% recurrent	4% (1/25)	4% (1/25)	8% (2/25)	8% (2/24)	
	Body weight (kg)	58.48 (SD: 9.04) (N=25)	59.4 (SD: 10.35) (N=25)	61.44 (SD: 8.82) (N=25)	58.58 (SD: 7.36) (N=24)	
	Height (cm)	165.12 (SD: 5.57) (N=25)	167 (SD: 5.83) (N=25)	165.52 (SD: 5.88) (N=25)	165 (SD: 5.13) (N=24)	
	Distance between the umbilicus and pubic symphysis (U2PS)	14.02 (SD: 1.73) (N=25)	13.84 (SD: 1.47) (N=25)	14 (SD: 1.27) (N=25)	14.17 (SD: 1.71) (N=24)	

Table 49. Key Question 4: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Butler et al., 2007[647]	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	one day	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	three days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	four days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	five days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	six days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: VAS score 0-100	one week	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
Dedemadi et al., 2006[669]	Hernia recurrence	one year	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	?	?	Mod.
	Hernia recurrence	Median: 3 years, SD: 1.6	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	?	Y	Y	Mod.
	Hernia recurrence	two years	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	?	?	Mod.
	Hernia recurrence	three years	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	?	?	Mod.
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Hospital stay more than 36 hours	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	Y	Y	Y	Y	Mod.
	Return to full ordinary and professional activities (days)	NA	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	six hours	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	12 hours	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	one day	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	two days	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	seven days	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain VAS at rest	20 days	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Pain: need for analgesia, days needed, oral paracetamol	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Dedemadi et al., 2006[669] (continued)	Pain: need for analgesia, grams paracetamol	postoperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	?	N	Y	Y	Y	Mod.
	Testicular pain	perioperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	Y	Y	Mod.
	Neuralgia	perioperative	Y	Y	Y	Y	Y	Y	?	?	Y	?	N	N	Y	Y	Y	Mod.
Gong et al., 2011[701]	Hernia recurrence	Mean: 15.6 months (SD: 8.5, Range: 4-35)	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	?	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normal activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one day	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	one week	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	Y	Mod.
	Hernia recurrence	TAPP 87.59 months (+/- 2.77, but authors didn't define "+/-"); TEP 87.20 months (+/- 1.1); Lichtenstein 97.71 (+/- 0.79), Nyhus 99 (+/- 0.70)	Y	?	Y	Y	Y	Y	Y	?	Y	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	six hours	Y	?	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	Y	?	?	Y	?	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	Y	?	Y	Y	?	Y	Y	Y	Y	Mod.
Hamza et al., 2010[704]	Recurrence	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	At least one night in hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	At least two nights in hospital	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	LOS 1 day, 2 days, >2 days	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Hamza et al., 2010[704] (continued)	Return to domestic activities (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to normal domestic activities & normal work activities	Up to 24 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	six hours	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain VAS	two days	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	Pain: Groin	postoperative	Y	?	Y	Y	Y	Y	?	?	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (0-10)	Days 1 & 2	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	?	Y	Y	Y	Y	?	?	Y	Y	Y	Y	Y	Y	Y	Mod.
	Complications	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Krishna et al., 2011[728]	VAS pain score	Immediate postoperative (1, 6, 24 hours), 7 days, 1, 3, 6, 12, 18, 24, and 38 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Patient satisfaction	3 months	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Hospital stay	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Complications	NA	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Recurrence	17-30 months (average 29.5)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Mesci et al., 2011[750]	VAS pain score	First postoperative day	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Low
	Postoperative need for analgesia	First postoperative day	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Pain score in the stair-climbing test	First postoperative day	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Low
	Hospital stay	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Return to work	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Complications	Postoperative period (early)	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
Pokorny et al., 2008[791,792]	Hernia recurrence	three years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain persistent	long-term	Y	Y	Y	Y	Y	Y	?	Y	?	Y	N	N	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Pokorny et al., 2008[791,792] (continued)	Pain: need for analgesia	perioperative	Y	Y	Y	Y	Y	Y	?	Y	?	Y	N	N	Y	Y	Y	Mod.
	Adverse events other than pain	any	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Neuralgia	long-term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	?	Y	Y	Mod.
Sarli et al., 1997[800]	Recurrence Rate (Total), %	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Recurrent, %	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	LOS in the hospital (days)	Postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Based on Hernia type-Indirect, %	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Complications	Postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Direct, %	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
	Femoral, %	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Low
Schrenk et al., 1996[803]	Recurrence	Up to 30 days	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to ADL- walking, running, climbing stairs, driving a car, sexual intercourse, bicycling, sports [days]	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Return to unrestricted work and time off work [weeks]	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Need for postoperative analgesics, %	Days 0, 1, 2, 3, 4, 5, & 30	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain scores (0-10)	Days 0, 1, 2, 3, 4, 5, & 30	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Zhang et al., 2009[837]	Analgesic requirement	Postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Low
	Arcuate line impending mesh positioning	Perioperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Low
	Peritoneal tear	Perioperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Low
	Seroma	Postoperative	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Low

Table 50. Key Question 4: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647]	TAPP vs. TEP	RTW	Return to work (days)	NA	12.9 (SEM: 0.9) (N=22)	9.9 (SEM: 1.0) (N=22)	p=0.075 ANOVA comparing the three groups	
	TAPP vs. TEP	Pain	Pain: VAS score 0-100	six days	35.6 (SD: NR) (N=22)	34.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. TEP	Pain	Pain: VAS score 0-100	one day	64.7 (SD: NR) (N=22)	54.2 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. TEP	Pain	Pain: VAS score 0-100	two days	61.2 (SD: NR) (N=22)	46.9 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. TEP	Pain	Pain: VAS score 0-100	three days	50.6 (SD: NR) (N=22)	49.8 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Butler et al., 2007[647] (continued)	TAPP vs. TEP	Pain	Pain: VAS score 0-100	four days	47.7 (SD: NR) (N=22)	42.1 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. TEP	Pain	Pain: VAS score 0-100	five days	41.8 (SD: NR) (N=22)	45.4 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. TEP	Pain	Pain: VAS score 0-100	one week	31.7 (SD: NR) (N=22)	30.7 (SD: NR) (N=22)	NR	Estimated based on Figure 3 in the article. Error bars appeared in the figure but it was impossible to determine which bars corresponded to which groups
	TAPP vs. TEP	ADV	Wound complications	postoperative	0% (0/22)	0% (0/22)	n.s. based on OR=1 (95% CI: 0.02 to 52.63)[@]	
Dedemadi et al., 2006[669]	TAPP vs. TEP	RC	Hernia recurrence	one year	1 (Ns NR)	1 (Ns NR)	NC	
	TAPP vs. TEP	RC	Hernia recurrence	two years	2 (Ns NR)	2 (Ns NR)	NC	
	TAPP vs. TEP	RC	Hernia recurrence	three years	2 (Ns NR)	2 (Ns NR)	NC	
	TAPP vs. TEP	RC	Hernia recurrence	Median: 3 years, SD: 1.6	8% (2/24)	8% (2/26)	n.s. based on OR=1.09 (95% CI 0.14 to 8.42)@	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TAPP vs. TEP	HOSP	Hospital stay (days)	NA	0.78 (SD: 0.29) (N=24)	0.77 (SD: 0.26) (N=26)	For TAP vs. open, p=0.206; for TEP vs. open, p=0.172. Either the “median test” or the t-test, did not report which	Calculated from reported hours
	TAPP vs. TEP	HOSP	Hospital stay more than 36 hours	NA	0% (0/24)	0% (0/26)	n.s. based on OR=1.08 (95% CI 0.02 to 56.64)@	
	TAPP vs. TEP	RTDA	Return to full ordinary and professional activities (days)	NA	14 (SD: 9) (N=24)	13 (SD: 8) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	Pain	Pain VAS at rest	six hours	Median: 4 (SD: NR) (N=24)	Median: 4 (SD: NR) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	Pain	Pain VAS at rest	12 hours	Median: 3 (SD: NR) (N=24)	Median: 3 (SD: NR) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	Pain	Pain VAS at rest	one day	Median: 1 (SD: NR) (N=24)	Median: 1 (SD: NR) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	Pain	Pain VAS at rest	two days	Median: 1 (SD: NR) (N=24)	Median: 1 (SD: NR) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TAPP vs. TEP	Pain	Neuralgia	perioperative	4% (1/24)	4% (1/26)	n.s. based on OR=1.08 (95% CI: 0.06 to 18.21)[@]	
	TAPP vs. TEP	Pain	Pain VAS at rest	seven days	Median: 1 (SD: NR) (N=24)	Median: 1 (SD: NR) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	Pain	Pain: need for analgesia, days needed, oral paracetamol	postoperative	1.9 (SD: NR) (N=24)	1.8 (SD: NR) (N=26)	For TAP vs. open, p=0.004; for TEP vs. open, p=0.0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	Pain	Pain: need for analgesia, grams paracetamol	postoperative	5.5 (SD: NR) (N=24)	5 (SD: NR) (N=26)	NR	
	TAPP vs. TEP	Pain	Testicular pain	perioperative	0% (0/24)	12% (3/26)	n.s. based on OR=0.14 (95% CI: 0.01 to 2.8)[@]	
	TAPP vs. TEP	Pain	Pain VAS at rest	20 days	Median: 0 (SD: NR) (N=24)	Median: 0 (SD: NR) (N=26)	For TAP vs. open, p=0.001; for TEP vs. open, p=0.001. Either the “median test” or the t-test, did not report which	
	TAPP vs. TEP	ADV	Epigastric vessel bleeding	perioperative	4% (1/24)	0% (0/26)	n.s. based on OR=3.38 (95% CI: 0.13 to 87.12)[@]	
	TAPP vs. TEP	ADV	Heart rhythm changes	perioperative	4% (1/24)	0% (0/26)	n.s. based on OR=3.38 (95% CI: 0.13 to 87.12)[@]	
	TAPP vs. TEP	ADV	Impaired sensibility	perioperative	8% (2/24)	8% (2/26)	n.s. based on OR=1.09 (95% CI 0.14 to 8.42)@	
	TAPP vs. TEP	ADV	Ischaemic orchitis	perioperative	0% (0/24)	0% (0/26)	n.s. based on OR=1.08 (95% CI: 0.02 to 56.64)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Dedemadi et al., 2006[669] (continued)	TAPP vs. TEP	ADV	Seroma/ wound hematoma	perioperative	17% (4/24)	12% (3/26)	n.s. based on OR=1.53 (95% CI 0.31 to 7.69)@	
	TAPP vs. TEP	ADV	Urinary retention	perioperative	4% (1/24)	4% (1/26)	n.s. based on OR=1.09 (95% CI 0.06 to 18.4)@	
	TAPP vs. TEP	ADV	Wound infection	perioperative	0% (0/24)	0% (0/26)	n.s. based on OR=1.08 (95% CI: 0.02 to 56.64)[@]	
Gong et al., 2011[701]	TAPP vs. TEP	RC	Hernia recurrence	Mean: 15.6 months (SD: 8.5, Range: 4-35)	0% (0/50)	0% (0/52)	n.s. based on OR=1.04 (95% CI: 0.02 to 53.4)[@]	
	TAPP vs. TEP	HOSP	Hospital stay (days)	NA	3.4 (SD: 1.7) (N=50)	3.6 (SD: 1.6) (N=52)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.614 TAPP vs. TEP (t-test)	
	TAPP vs. TEP	RTDA	Return to normal activities (days)	NA	6.6 (SD: 1.7) (N=50)	6.6 (SD: 1.5) (N=52)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.978 TAPP vs. TEP (t-test)	
	TAPP vs. TEP	Pain	Pain VAS	one day	1.6 (SD: 0.7) (N=50)	1.7 (SD: 0.7) (N=52)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.826 TAPP vs. TEP (t-test)	
	TAPP vs. TEP	Pain	Pain VAS	one week	0.3 (SD: 0.5) (N=50)	0.3 (SD: 0.5) (N=52)	p<0.001 mesh plug vs. TAPP (t-test), p<0.001 mesh plug vs. TEP (t-test); p=0.844 TAPP vs. TEP (t-test)	
	TAPP vs. TEP	ADV	Bowel injury	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/52)	n.s. based on OR=1.04 (95% CI: 0.02 to 53.4)[@]	
	TAPP vs. TEP	ADV	Hematoma	Mean: 15.6 months (SD: 8.5)	0% (0/50)	4% (2/52)	n.s. based on OR=0.2 (95% CI: 0.01 to 4.27)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gong et al., 2011[701] (continued)	TAPP vs. TEP	ADV	Infection	Mean: 15.6 months (SD: 8.5)	2% (1/50)	0% (0/52)	n.s. based on OR=3.18 (95% CI: 0.13 to 79.96)[@]	
	TAPP vs. TEP	ADV	Ischemic orchitis	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/52)	n.s. based on OR=1.04 (95% CI: 0.02 to 53.4)[@]	
	TAPP vs. TEP	ADV	Port site hernia	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/52)	n.s. based on OR=1.04 (95% CI: 0.02 to 53.4)[@]	
	TAPP vs. TEP	ADV	Small bowel obstruction	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/52)	n.s. based on OR=1.04 (95% CI: 0.02 to 53.4)[@]	
	TAPP vs. TEP	ADV	Testicular atrophy	Mean: 15.6 months (SD: 8.5)	0% (0/50)	0% (0/52)	n.s. based on OR=1.04 (95% CI: 0.02 to 53.4)[@]	
	TAPP vs. TEP	ADV	Urinary retention	Mean: 15.6 months (SD: 8.5)	6% (3/50)	8% (4/52)	n.s. based on OR=0.77 (95% CI 0.16 to 3.61)@	
	TAPP vs. TEP	ADV	Wound healing problems	Mean: 15.6 months (SD: 8.5)	4% (2/50)	2% (1/52)	n.s. based on OR=2.13 (95% CI 0.19 to 24.2)@	
Gunal et al., 2007[702]	TAPP vs. TEP	RC	Hernia recurrence	TAPP 87.59 months (±2.77, but authors didn't define "±"); TEP 87.20 months (±1.1); Lichtenstein 97.71 (±0.79), Nyhus 99 (±0.70)	3% (1/39)	0% (0/40)	n.s. based on OR=3.16 (95% CI: 0.12 to 79.85)[@]	
	TAPP vs. TEP	Pain	Pain VAS	six hours	6 (SD: 1.4) (N=39)	5.5 (SD: 1.2) (N=40)	F=12.754, p<0.001, ANOVA	
	TAPP vs. TEP	Pain	Pain VAS	two days	3.25 (SD: 1) (N=39)	3.3 (SD: 1.2) (N=40)	F=14.460, p<0.001, ANOVA	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gunal et al., 2007[702] (continued)	TAPP vs. TEP	ADV	Any complications	perioperative	8% (3/39)	5% (2/40)	n.s. based on OR=1.58 (95% CI 0.25 to 10.03)@	
	TAPP vs. TEP	ADV	Any complications	postoperative	5% (2/39)	8% (3/40)	n.s. based on OR=0.67 (95% CI 0.11 to 4.22)@	
	TAPP vs. TEP	ADV	Hematoma in penis	postoperative	0% (0/39)	0% (0/40)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.95)@	
	TAPP vs. TEP	ADV	Hematoma incisional	postoperative	0% (0/39)	0% (0/40)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.95)@	
	TAPP vs. TEP	ADV	Inferior epigastric vessel bleeding	perioperative	8% (3/39)	5% (2/40)	n.s. based on OR=1.58 (95% CI 0.25 to 10.03)@	
	TAPP vs. TEP	ADV	Nerve injury ilioinguinal	perioperative	0% (0/39)	0% (0/40)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.95)@	
	TAPP vs. TEP	ADV	Other complications (specifics not reported)	postoperative	0% (0/39)	5% (2/40)	n.s. based on OR=0.19 (95% CI: 0.01 to 4.19)@	
	TAPP vs. TEP	ADV	pampinioform plexus bleeding	perioperative	0% (0/39)	0% (0/40)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.95)@	
	TAPP vs. TEP	ADV	scrotal edema	postoperative	0% (0/39)	0% (0/40)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.95)@	
	TAPP vs. TEP	ADV	Subcutenous emphysema	postoperative	3% (1/39)	0% (0/40)	n.s. based on OR=3.16 (95% CI: 0.12 to 79.85)@	
	TAPP vs. TEP	ADV	Urinary retention	postoperative	3% (1/39)	3% (1/40)	n.s. based on OR=1.03 (95% CI: 0.06 to 16.96)@	
	TAPP vs. TEP	ADV	Vas deferens injury	perioperative	0% (0/39)	0% (0/40)	n.s. based on OR=1.03 (95% CI: 0.02 to 52.95)@	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Hamza et al., 2010[704]	TAPP vs. TEP	HOSP	At least one night in hospital	NA	12% (3/25)	4% (1/25)	n.s. based on OR=3.27 (95% CI 0.32 to 33.84)@	
	TAPP vs. TEP	HOSP	At least two nights in hospital	NA	4% (1/25)	0% (0/25)	n.s. based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. TEP	RTDA	Return to domestic activities (days)	NA	9.8 (SD: 5.979) (N=25)	7.53 (SD: 3.65) (N=25)	t=5.746 p<0.001 comparing the two lap groups with the two open groups	
	TAPP vs. TEP	RTW	Return to work (days)	NA	14.87 (SD: 8.774) (N=25)	13.22 (SD: 7.98) (N=25)	t=5.774 p=<0.001 comparing the two lap groups with the two open groups	
	TAPP vs. TEP	Pain	Pain VAS	six hours	5.8 (SD: 1.568) (N=25)	4.8 (SD: 2.33) (N=25)	t=3.424 p=0.002 comparing the two lap groups with the two open groups	
	TAPP vs. TEP	Pain	Pain VAS	two days	4.133 (SD: 1.125) (N=25)	3.98 (SD: 4.35) (N=25)	t=2.438 p=0.020 comparing the two lap groups with the two open groups	
	TAPP vs. TEP	Pain	Pain: Groin	postoperative	4% (1/25)	0% (0/25)	n.s. based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. TEP	ADV	Scrotal hematoma	postoperative	4% (1/25)	0% (0/25)	n.s. based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	TAPP vs. TEP	ADV	Wound infection	postoperative	4% (1/25)	0% (0/25)	n.s. based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
Krishna et al., 2011[728]	TAPP vs. TEP	ADV	% cord edema	7 days	23%x(11/47)	38%x(20/53)		
	TAPP vs. TEP	RC	% recurrence	17-30 months (average 29.5)	0%x(0/47)	0%x(0/53)		
	TAPP vs. TEP	ADV	% seroma	7 days	17%x(8/47)	38%x(20/53)		
	TAPP vs. TEP	ADV	% seroma	30 days	4%x(2/47)	6%x(3/53)		
	TAPP vs. TEP	ADV	% wound infection	7 days	6%x(3/47)	2%x(1/53)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Krishna et al., 2011[728] (continued)	TAPP vs. TEP	ADV	% wound infection	30 days	0%x(0/47)	0%x(0/53)		
	TAPP vs. TEP	HOSP	Hospital stay (hours)	NA	25.2x(SD: 5.1)x(N=47)	24.4x(SD: 3.2)x(N=53)	NR	
	TAPP vs. TEP	SFN	Patient satisfaction (on a verbal rating rating scale of 0-3)	3 months	2.51x(SD: 0.547)x(N=47)	2.72x(SD: 0.455)x(N=53)	NR	
	TAPP vs. TEP	Pain	VAS pain score	1 hour	2.79x(SD: 0.55)x(N=47)	1.98x(SD: 0.24)x(N=53)	P =0.0001	
	TAPP vs. TEP	Pain	VAS pain score	6 hours	1.47x(SD: 0.54)x(N=47)	2.21x(SD: 0.55)x(N=53)	P =0.108	
	TAPP vs. TEP	Pain	VAS pain score	24 hours	1.83x(SD: 0.43)x(N=47)	1.09x(SD: 0.3)x(N=53)	p=0.007	
	TAPP vs. TEP	Pain	VAS pain score	7 days	1.91x(SD: 0.65)x(N=47)	1.23x(SD: 0.54)x(N=53)	p=0.705	
	TAPP vs. TEP	Pain	VAS pain score	1 month	1.28x(SD: 0.45)x(N=47)	1.09x(SD: 0.45)x(N=53)	0=0.001	
	TAPP vs. TEP	Pain	VAS pain score	3 months	1.28x(SD: 0.45)x(N=47)	0.96x(SD: 0.4)x(N=53)	p=0.002	
	TAPP vs. TEP	Pain	VAS pain score	6 months	0.96x(SD: 0.4)x(N=47)	0.96x(SD: 0.4)x(N=53)	p=0.231	
	TAPP vs. TEP	Pain	VAS pain score	12 months	0.7x(SD: 0.45)x(N=47)	0.78x(SD: 0.6)x(N=53)	p=0.342	
	TAPP vs. TEP	Pain	VAS pain score	18 months	0x(SD: NR)x(N=47)	0x(SD: NR)x(N=53)	NR	
	TAPP vs. TEP	Pain	VAS pain score	24 months	0x(SD: NR)x(N=47)	0x(SD: NR)x(N=53)	NR	
	TAPP vs. TEP	Pain	VAS pain score	38 months	0x(SD: NR)x(N=47)	0x(SD: NR)x(N=53)	NR	
Mesci et al., 2011[750]	TAPP vs. TEP	ADV	% seroma	Postoperative period (early)	0%x(0/25)	4%x(1/25)		
	TAPP vs. TEP	ADV	% urinary retention	Postoperative period (early)	8%x(2/25)	0%x(0/25)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Mesci et al., 2011[750] (continued)	TAPP vs. TEP	ADV	% wound infection	Postoperative period (early)	0%x(0/25)	0%x(0/25)		
	TAPP vs. TEP	HOSP	Hospital stay (days)	NA	1x(SD: NR)x(N=25)	1x(SD: NR)x(N=25)	NR	
	TAPP vs. TEP	Pain	Pain score in the stair-climbing test	First postoperative day	2.2x(SD: NR)x(N=25)	1.8x(SD: NR)x(N=25)	NR	
	TAPP vs. TEP	RTW	Return to work (days)	NA	5.2x(SD: NR)x(N=25)	6.4x(SD: NR)x(N=25)	NR	
	TAPP vs. TEP	Pain	VAS pain score	First postoperative day	1.8x(SD: NR)x(N=25)	1.8x(SD: NR)x(N=25)	NR	
	TAPP vs. TEP	ADV	% atelectasis	Postoperative period (early)	4%x(1/25)	0%x(0/25)		
	TAPP vs. TEP	ADV	% hematoma	Postoperative period (early)	0%x(0/25)	0%x(0/25)		
	TAPP vs. TEP	Pain	% Postoperative need for analgesia (N)	First postoperative day	24%x(6/25)	20%x(5/25)		
Pokorny et al., 2008[791,792]	TAPP vs. TEP	RC	Hernia recurrence	three years	5% (4/85)	9% (2/23)	n.s. based on OR=0.52 (95% CI 0.09 to 3.03)@	
	TAPP vs. TEP	Pain	Pain: need for analgesia	perioperative	12% (10/84)	0% (0/35)	n.s. based on OR=10.01 (95% CI: 0.57 to 175.63)[@]	
	TAPP vs. TEP	Pain	Neuralgia	long-term	0% (0/85)	0% (0/34)	n.s. based on OR=0.4 (95% CI: 0.01 to 20.75)[@]	
	TAPP vs. TEP	Pain	Pain persistent	long-term	4% (3/85)	9% (3/34)	n.s. based on OR=0.38 (95% CI 0.07 to 1.97)@	
	TAPP vs. TEP	ADV	Any complications	intraoperative	8% (7/87)	0% (0/35)	n.s. based on OR=6.61 (95% CI: 0.37 to 119.01)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pokorny et al., 2008[791,792] (continued)	TAPP vs. TEP	ADV	Spermatic cord injury	intraoperative	0% (0/87)	0% (0/35)	n.s. based on OR=0.41 (95% CI: 0.01 to 20.85)[@]	
	TAPP vs. TEP	ADV	Urinary bladder injury	intraoperative	0% (0/87)	0% (0/35)	n.s. based on OR=0.41 (95% CI: 0.01 to 20.85)[@]	
	TAPP vs. TEP	ADV	Any complications	perioperative	32% (27/84)	17% (6/35)	n.s. based on OR=2.29 (95% CI 0.85 to 6.17)@	
	TAPP vs. TEP	ADV	Hematoma	perioperative	8% (7/84)	6% (2/35)	n.s. based on OR=1.5 (95% CI 0.3 to 7.61)@	
	TAPP vs. TEP	ADV	Seroma	perioperative	8% (7/84)	3% (1/35)	n.s. based on OR=3.09 (95% CI 0.37 to 26.11)@	
	TAPP vs. TEP	ADV	Urinary retention	perioperative	4% (3/84)	9% (3/35)	n.s. based on OR=0.4 (95% CI 0.08 to 2.06)@	
	TAPP vs. TEP	ADV	Wound infection	perioperative	0% (0/84)	0% (0/35)	n.s. based on OR=0.42 (95% CI: 0.01 to 21.59)[@]	
	TAPP vs. TEP	ADV	Any complications	long-term	7% (6/85)	21% (7/34)	p<0.05 based on OR=0.29 (95% CI 0.09 to 0.95)@	
	TAPP vs. TEP	ADV	Foreign body sensation	long-term	2% (2/85)	6% (2/34)	n.s. based on OR=0.39 (95% CI 0.05 to 2.85)@	
	TAPP vs. TEP	ADV	Hydrocele	long-term	1% (1/85)	0% (0/34)	n.s. based on OR=1.22 (95% CI: 0.05 to 30.81)[@]	
	TAPP vs. TEP	ADV	Hypesthesia	long-term	0% (0/85)	6% (2/34)	n.s. based on OR=0.08 (95% CI: 0 to 1.63)[@]	
	TAPP vs. TEP	ADV	Impotence	long-term	0% (0/85)	0% (0/34)	n.s. based on OR=0.4 (95% CI: 0.01 to 20.75)[@]	
	TAPP vs. TEP	ADV	Meterosensitivity	long-term	0% (0/85)	0% (0/34)	n.s. based on OR=0.4 (95% CI: 0.01 to 20.75)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Pokorny et al., 2008[791,792] (continued)	TAPP vs. TEP	ADV	Penis edema	long-term	0% (0/85)	0% (0/34)	n.s. based on OR=0.4 (95% CI: 0.01 to 20.75)[@]	
	TAPP vs. TEP	ADV	Testicular atrophy	long-term	0% (0/85)	0% (0/34)	n.s. based on OR=0.4 (95% CI: 0.01 to 20.75)[@]	Estimated based on Figure 1 in the article
Sarli et al., 1997[800]	TAPP vs. IPOM	RC	Hernia recurrence	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	0% (0/72)	15% (11.1/72)	p<0.001, t-test	N is hernias
	TAPP vs. IPOM	RC	Hernia recurrence	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	0% (0/22)	50% (10/20)	p<0.05 based on OR=0.02 (95% CI: 0 to 0.42)[@]	N is hernias
	TAPP vs. IPOM	HOSP	LOS in the hospital (days)	Postoperative	2.4 (Range: 1-4) (N=59)	3.5 (Range: 1-7) (N=56)	NR	
	TAPP vs. IPOM	Pain	Neuralgia	Postoperative	5% (3/59)	20% (11/56)	p<0.05, t-test	
	TAPP vs. IPOM	ADV	Local hematoma	Postoperative	10% (6/59)	5% (3/56)	n.s. based on OR=2 (95% CI 0.48 to 8.42)@	
	TAPP vs. IPOM	ADV	Urinary retention	Postoperative	2% (1/59)	0% (0/56)	n.s. based on OR=2.9 (95% CI: 0.12 to 72.62)[@]	
	TAPP vs. IPOM	ADV	Femoral, %	TAPP (Mean: 28 months [Range: 18-51], IPOM (Mean: 32 months [21-54]	0% (0/7)	0% (0/6)	n.s. based on OR=0.87 (95% CI: 0.01 to 50.16)[@]	N is hernias
Schrenk et al., 1996[803]	TAPP vs. TEP	HOSP	Length of stay (LOS) (days	NA	3.7 (SD: 1.4, Range: 2-7) (N=28)	4.4 (SD: 0.9, Range: 3-7) (N=24)	p=0.04 Kruskal Wallis ANOVA	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Schrenk et al., 1996[803] (continued)	TAPP vs. TEP	RTDA	Bicycling (days)	NA	26.6 (SEM/Range: 2.2/6-50) (N=28)	27.4 (SEM/Range: 2.7/8-40) (N=24)	NR	
	TAPP vs. TEP	RTDA	Climbing stairs (days)	NA	12.3 (SEM/Range: 1.4/2-21) (N=28)	14.2 (SEM/Range: 1.2/4-21) (N=24)	NR	
	TAPP vs. TEP	RTDA	Driving a car (days)	NA	10.1 (SEM/Range: 1.4/2-21) (N=28)	12.4 (SEM/Range: 1.7/3-25) (N=24)	NR	
	TAPP vs. TEP	RTDA	Return to ADL-walking (days)	NA	8.6 (SEM/Range: 1.4/2-21) (N=28)	8.5 (SEM/Range: 1.3/2-21) (N=24)	NR	
	TAPP vs. TEP	RTDA	Running (days)	NA	29 (SEM/Range: 3.2/3-60) (N=28)	27 (SEM/Range: 3/7-55) (N=24)	NR	
	TAPP vs. TEP	RTDA	Sexual intercourse (days)	NA	17.7 (SEM/Range: 2.7/3-40) (N=28)	18.9 (SEM/Range: 2.6/4-40) (N=24)	NR	
	TAPP vs. TEP	RTDA	Sports (days)	NA	35.5 (SEM/Range: 4.9/4-60) (N=28)	35.3 (SEM/Range: 4.6/15-60) (N=24)	NR	
	TAPP vs. TEP	RTW	Return to unrestricted work (weeks)	NA	5.9 (SEM/Range: 0.7/2-12) (N=28)	6.5 (SEM/Range: 0.7/2-12) (N=24)	NR	
	TAPP vs. TEP	RTW	Time off work (weeks)	NA	4.9 (SEM/Range: 0.7/1-8) (N=28)	4.6 (SEM/Range: 0.6/1-8) (N=24)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Schrenk et al., 1996[803] (continued)	TAPP vs. TEP	SFN	Patient opinion of cosmetic result - not satisfied	NA	0% (0/28)	0% (0/24)	n.s. based on OR=0.86 (95% CI: 0.02 to 44.96)[@]	
	TAPP vs. TEP	SFN	Patient opinion of cosmetic result - satisfied	NA	32% (9/28)	29% (7/24)	n.s. based on OR=1.15 (95% CI 0.35 to 3.76)@	
	TAPP vs. TEP	SFN	Patient opinion of cosmetic result - very satisfied (higher % is better)	NA	68% (19/28)	71% (17/24)	n.s. based on OR=0.87 (95% CI 0.27 to 2.84)@	
	TAPP vs. TEP	SFN	Patient opinion of surgery - not satisfied	NA	4% (1/28)	0% (0/24)	n.s. based on OR=2.67 (95% CI: 0.1 to 68.7)[@]	
	TAPP vs. TEP	SFN	Patient opinion of surgery - satisfied	NA	43% (12/28)	42% (10/24)	n.s. based on OR=1.05 (95% CI 0.35 to 3.17)@	
	TAPP vs. TEP	SFN	Patient opinion of surgery - very satisfied (higher % is better)	NA	54% (15/28)	58% (14/24)	n.s. based on OR=0.82 (95% CI 0.27 to 2.48)@	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 0	35% (Ns NR)	57% (Ns NR)	NC	
	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 0	4.7 (SEM: 0.4) (N=28)	6.5 (SEM: 0.4) (N=24)	NR	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 1	17% (Ns NR)	57% (Ns NR)	p=0.003, t-test	
	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 1	3.9 (SEM: 0.4) (N=28)	6 (SEM: 0.4) (N=24)	p=0.01, t-test	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 2	7% (Ns NR)	16% (Ns NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Schrenk et al., 1996[803] (continued)	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 2	3.1 (SEM: 0.4) (N=28)	3.1 (SEM: 0.4) (N=24)	NR	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 3	0% (Ns NR)	0% (Ns NR)	NC	
	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 3	2.8 (SEM: 0.3) (N=28)	2.3 (SEM: 0.4) (N=24)	NR	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 4	0% (Ns NR)	0% (Ns NR)	NC	
	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 4	2.4 (SEM: 0.4) (N=28)	2.1 (SEM: 0.3) (N=24)	NR	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 5	0% (Ns NR)	0% (Ns NR)	NC	
	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 5	1.5 (SEM: 0.4) (N=28)	1.4 (SEM: 0.3) (N=24)	NR	
	TAPP vs. TEP	Pain	Need for postoperative analgesics, %	Day 30	0% (Ns NR)	0% (Ns NR)	NC	Recurrent hernia was reported as suspected (YES or NO). Follow-up was only up to 30 days and recurrence data was not abstracted for this study.
	TAPP vs. TEP	Pain	VAS pain scores (0-10)	Day 30	0.3 (SEM: 0.4) (N=28)	0.3 (SEM: 0.4) (N=24)	NR	
Zhang et al., 2009[837]	TEP LR vs. TEP LP	Pain	Analgesic requirement	Postoperative	24% (6/25)	17% (4/24)	p=0.016, t-test	
	TEP LR vs. TEP LP	ADV	Arcuate line impending mesh positioning	Perioperative	40% (10/25)	0% (0/24)	p=0, t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Zhang et al., 2009[837] (continued)	TEP LR vs. TEP LP	ADV	Peritoneal tear	Perioperative	36% (9/25)	38% (9/24)	P=0.034, t-test	
	TEP LR vs. TEP LP	ADV	Seroma	Postoperative	24% (6/25)	25% (6/24)	p=0.814, t-test	
	TEP MP vs. TEP LP	Pain	Analgesic requirement	Postoperative	0% (0/25)	17% (4/24)	p=0.016, t-test	
	TEP MP vs. TEP LP	ADV	Arcuate line impending mesh positioning	Perioperative	0% (0/25)	0% (0/24)	p=0, t-test	
	TEP MP vs. TEP LP	ADV	Peritoneal tear	Perioperative	16% (4/25)	38% (9/24)	p=0.034, t-test	
	TEP MP vs. TEP LP	ADV	Seroma	Postoperative	16% (4/25)	25% (6/24)	p=0.814, t-test	
	TEP MP vs. TEP LR	Pain	Analgesic requirement	Postoperative	0% (0/25)	24% (6/25)	p=0.016, t-test	
	TEP MP vs. TEP LR	ADV	Arcuate line impending mesh positioning	Perioperative	0% (0/25)	40% (10/25)	p=0, t-test	
	TEP MP vs. TEP LR	ADV	Peritoneal tear	Perioperative	16% (4/25)	36% (9/25)	p=0.034, t-test	
	TEP MP vs. TEP LR	ADV	Seroma	Postoperative	16% (4/25)	24% (6/25)	p=0.814, t-test	
	TEP MR vs. TEP LP	Pain	Analgesic requirement	Postoperative	4% (1/25)	17% (4/24)	p=0.016, t-test	
	TEP MR vs. TEP LP	ADV	Arcuate line impending mesh positioning	Perioperative	40% (10/25)	0% (0/24)	p=0, t-test	
	TEP MR vs. TEP LP	ADV	Peritoneal tear	Perioperative	8% (2/25)	38% (9/24)	P=0.034, t-test	
	TEP MR vs. TEP LP	ADV	Seroma	Postoperative	16% (4/25)	25% (6/24)	p=0.814, t-test	
	TEP MR vs. TEP LR	Pain	Analgesic requirement	Postoperative	4% (1/25)	24% (6/25)	p=0.016, t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Zhang et al., 2009[837] (continued)	TEP MR vs. TEP LR	ADV	Arcuate line impending mesh positioning	Perioperative	40% (10/25)	40% (10/25)	p=0, t-test	
	TEP MR vs. TEP LR	ADV	Peritoneal tear	Perioperative	8% (2/25)	36% (9/25)	p=0.034, t-test	
	TEP MR vs. TEP LR	ADV	Seroma	Postoperative	16% (4/25)	24% (6/25)	p=0.814, t-test	
	TEP MR vs. TEP MP	Pain	Analgesic requirement	Postoperative	4% (1/25)	0% (0/25)	p=0.016, t-test	
	TEP MR vs. TEP MP	ADV	Arcuate line impending mesh positioning	Perioperative	40% (10/25)	0% (0/25)	p=0, t-test	
	TEP MR vs. TEP MP	ADV	Peritoneal tear	Perioperative	8% (2/25)	16% (4/25)	p=0.034, t-test	
	TEP MR vs. TEP MP	ADV	Seroma	Postoperative	16% (4/25)	16% (4/25)	p=0.814, t-test	

Key Question 5 Tables

Table 51. Key Question 5: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Gundre et al., 2011[703]	India	Maharashtra	1	RCT	Tension-free repair with polyethylene mesh vs. Tension-free repair with polypropylene	70	September 2004 to September 2009	Department of General surgery in a general hospital	NR
Sadowski et al., 2011[797]	United States	Temple, Texas	1	RCT	Lichtenstein with polyester mesh vs. polypropylene	78	NR	Hospital	NR
Bittner et al., 2011[636,637]	Germany	Furth	1	RCT	TAPP with Prolene (heavyweight mesh) vs. TAPP with Premilene (middleweight mesh) vs. TAPP with Ultrapro (lightweight mesh) vs. TiMesh (titanized lightweight mesh)	600	30 months; dates not specified	Hospital, department of general surgery	NR
Agarwal et al., 2009[623]	India	New Delhi	1	RCT	TEP with heavyweight mesh vs. TEP with lightweight mesh	25	December 2005 to July 2007	Minimal access surgery facility	NR
Ansaloni et al., 2009[627,628]	Italy	Bologna	1	RCT	Lichtenstein with polypropylene (PP) mesh vs. Surgisis Inguinal Hernia Matrix (SIHM)	70	1/11/2003 to 12/17/2003	General emergency and Transplant Surgery unit of university hospital	Department of Surgery, St. Orsola-Malpighi University Hospital of Bologna, Italy

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Bringman et al., 2004[642-644]	Sweden and Finland	Stockholm, Sweden; Oulu, Finland; Uppsala, Sweden; Mora, Sweden; Helsingborg Sweden; Soderalje, Sweden	6	RCT	Lichtenstein with Prolene vs. Lichtenstein with VYPRO II	600	NS	Surgical departments of two Swedish and one Finnish university hospitals, and three Swedis county hospitals	Supported by a grant from Ethicon Scandinavia and from the County Council of Stockholm
Bringman et al., 2005[645]	Sweden and Finland	Sodertalje, Uppsala, Mora Sweden; Oulu, Finland	4	RCT	TEP with Prolene vs. TEP with Vypro II	140	February 2001 to May 2003	3 hospitals and one county hospital	Study supported by grants from Ethicon Scandinavia, Ethicon europe, the County Council of Stockholm
Champault et al., 2007[88,655,656]	France	NR	NR	RCT	Lichtenstein with polypropylene mesh vs. Lichtenstein with Glucamesh vs. Laparoscopic repair with polypropylene mesh vs. Laparoscopic with Glucamesh	410	2001 to 2003	Hospital	NR
Chauhan et al., 2007[658]	India	NR	1	RCT	Prolene vs. indiginous devide	84	January 2005 to January 2006	Surgical outpatient department	NR
Chowbey et al., 2010[660]	India	New Delhi	1	RCT	Endoscopic TEP with Prolene vs. endoscopic TEP with Ultrapro	441	March 2006 to June 2007	Tertiary referral hospital	Authors state no financial ties or conflicts of interest to disclose

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Chui et al., 2010[661]	Hong Kong	New territories	1	RCT	TEP with lightweight mesh vs. TEP with heavyweight mesh	50	September 2007 to February 2009	One hospital - department of surgery	NR
Collaborative group, 2008[663]	Poland	Gdansk	15	RCT	Lichtenstein and Amid with lightweight mesh vs. Lichtenstein and Amid with heavyweight mesh	600	NR	Hospitals	Supported by a minor grant from Ethicon Poland to cover the costs of workshops and triallists meetings
DeBord et al., 1999[668]	U.S.	NR	6	RCT	Open or laparoscopic with standard patch vs. Open or laparoscopic with impregnated patch	37	July 18, 1996 to October 25, 1996	NR	W.L. Gore & Associates supported the article
Di Vita et al., 2010[670]	Italy	Palermo	1	RCT	Lichtenstein with Prolene (Polypropylene [PP]) mesh vs. Lichtenstein with Vypro II (nonabsorbable PP and absorbable polygrlactin [PG])	30	NR	Surgical unit of department of surgical and oncological science of university	Authors state they received no financial support for the reasearch and/or authorship of article
Freudenberg et al., 2006[696]	Burkina Faso	Ouagadougou	1	RCT	Lichtenstein with Nylon mesh vs. Lichtenstein with Ultrapro mesh	35	August 2005 to October 2005	University hospital	German academic exchange service (DAAD) for sponsorship and financial support

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Heikkinen et al., 2006[709]	Sweden and Finland	Oulu, Finland; Uppsala, Sweden; Mora, Sweden; Helsingborg, Sweden; Sodertalje, Sweden	5	RCT	TEP with PROLENE mesh vs. TEP with VYPRO II mesh	140	3/2001 to 12/2003	Surgical departments of two Swedish and one Finnish University hospitals; two Swedish County Hospitals	Supported by a grant from Ethicon Scandinavia and from the County Concil of Stockholm
Kapischke et al., 2010[716]	Germany	NR	1	RCT	Lichtenstein with Parietene Progrip® vs. Lichtenstein with Optilene®	50	September 2007 to April 2008	Hospital	NR
Khan et al., 2010[717]	Pakistan	Peshawar	1	RCT	Lichtenstein with lightweight (Vypro II®) mesh vs. Lichtenstein with Polypropylene	300	January 1, 2007 to December 31, 2008	Hospital	Study responded Nil to 'Source of Support' (located at end of references)
Koch et al., 2008[724]	Sweden	Linkoping	1	RCT	Lichtenstein with lightweight mesh (TiMeshTC) vs. Lichtenstein with Standard polypropylene mesh	330	NR	All operations performed in same outpatient clinic	All costs covered by the national healthcare system
Langenbach et al., 2003[733]	Germany	Wuppertal	1	RCT	TAPP with monofile, heavyweight, rigid polypropylene mesh vs. TAPP with smooth, heavy-weighted variant of polypropylene mesh	40	August 1999 to May 2001	NR	NR
Langenbach et al., 2006[734]	Germany	Wuppertal and Essen	2	RCT	TAPP with polypropylene vs. TAPP with smooth polypropylene vs. TAPP with compound mesh	90	August 2001 to May 2004	Surgery department of two hospitals	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Langenbach et al., 2008[735]	Germany	NR	NR	RCT	TAPP with Prolene vs. TAPP with Serapen vs. TAPP with Vypro II	180	1999 to 2001	Hospital	NR
Nikkolo et al., 2010[773]	Estonia	Tartu	1	RCT	Lichtenstein with heavyweight (HW) mesh vs. Lichtenstein with lightweight (LW) mesh	135	January 2007 to July 2008	University hospital, department of surgery	NR
O'Dwyer et al., 2005[775]	NR	NR	5	RCT	Lichtenstein with Lightweight mesh vs. Lichtenstein with Heavyweight mesh	330	NR	Surgical units	Ethicon Ltd; Two authors are consultants with them
Paajanen, 2007[781]	Finland	Mikkeli	1	RCT	Lichtenstein with Vypro II vs. Lichtensteing with Premilene mesh LP vs. Lichtenstein with Premilene	228	March 2003 to August 2004	Ambulatory surgery unit of hospital	NR
Paradowski et al., 2009[784]	Poland	NR	NR	RCT	Lichtenstein with Surgimesh vs. Lichtensteing with Micromesh vs. Lichtenstein with Surgipro	75	NR	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Peters et al., 2010[788]	Belgium	Leuven	1	RCT	TEP with Marlex vs. TEP with Vypro II vs. TEP with TiMesh	59	April 2003 to October 2006	Department of Abdominal Surgery at university hospital	Supported by a PhD grant of the institute for the Promotion of Innovation through Science and Technology in Flanders (IWT Vlaanderen) (to E.P.) and from the Fund for Scientifie Research Flanders (FWO-Vlaanderen (to M.M.)
Post et al., 2004[793]	Germany	Heidelberg	1	RCT	Lichtensteing with Surgipro vs. Lichtenstein with Vypro	113	July 1999 to December 2000	hospital	Study supported by minor grant from Ethicon Products (Norderstedt, Germany) to cover the administrative costs of follow-up examinations.
Puccio et al., 2005[794]	Italy	Manerbio	1	RCT	Lichtenstein with Prolene vs. Lichtenstein with Vypro vs. Lichtenstien with Surgisis	45	January 2003 to December 2003	Hospital	NR
Schopf et al., 2011[802]	Germany	Hausham/ Oberbayern	1	RCT	TAPP with TiMesh-light vs. TAPP with TiMesh-Extralight	380	October 2002 to January 2006	Teaching hospital	Authors state study was not sponsored or supported in any way by industry.

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Sutalo et al., 2010[818]	Bosnia and Herze-govina	Mostar	1	RCT	Non-tension technique with flat polypropylene mesh vs. Non-tension technique with three-dimensional prolene (PHS) mesh	80	July 2006 to January 2007	University hospital	NR
Torcivia et al., 2010[825]	France	NR	NR	RCT	Lichtensteing with Prolene vs. Lichtenstein with Glucamesh	47	January 2008 to September 2008	Hospital	NR

Table Note:
Bringman et al., 2005[645] and Heikkinen et al., 2006[709] were similar studies but one (Bringman) enrolled only bilateral hernia and the other enrolled only recurrent hernia.
For Di Vita et al., 2010[670] The authors initially proposed 3 study treatments: 1 arm without the mesh and the other two with 2 different types of meshes. The local ethics committee did not approve this design because of the prerequisite of inferiority as regards hernia recurrences.

Table 52. Key Question 5: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Gundre et al., 2011[703]			X				X	X								
Sadowski et al., 2011[797]																
Bittner et al., 2011[636,637]	X					X								X		
Agarwal et al., 2009[623]		x														
Ansaloni et al., 2009[627,628]			x													
Bringman et al., 2003[642-644]			x	x												
Bringman et al., 2005[645]		x			x	x	x									
Champault et al., 2007[88]																
Chauhan et. al 2007[658]			x													
Chowbey et al., 2010[660]		x					x	x								
Chui et al., 2010[661]		x														
DeBord et al., 1999[668]																
Di Vita et al., 2010[670]				x												x
Freudenberg et al., 2006[696]																

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Heikkinen et al., 2006[709]	x			x												
Kapischke et al., 2010[716]			x		x											
Khan et al., 2010[717]																
Koch et al., 2008[724]			x	x	x	x	x									
langenbach et al., 2003[733]			x	x	x				x					x		
Langenbach et al., 2006[734]			x	x	x				x					x		
Langenbach et al., 2008[735]			x	x	x				x					x		
Nikkolo et al., 2010[773]			x		x		x									
O'Dwyer et al., 2005[775]					x		x									
Paajanen, 2007[781]					x	x	x		x							
Paradowski et al., 2009[784]						x	x		x							
Peeters et al., 2010[788]			x													
Post et al., 2004[793]					x	x	x		x							
Puccio et al., 2005[794]			x	x												
Schopf et al., 2011[802]																
Smietanski et al., 2008[663]			x													

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Sutalo et al., 2010[818]			x		x											
Torcivia et al., 2010[825]			x	x	x	x	x									x

Table 53. Key Question 5: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Gundre et al., 2011[703]	15-75														
Sadowski et al., 2011[797]	18+							x		x					
Bittner et al., 2011[636,637]	30+														
Agarwal et al., 2009[623]	Adults														
Ansaloni et al., 2009[627,628]	18+					4+									
Bringman et al., 2003[642-644]	>25	x													
Bringman et al., 2005[645]	25+	x													
Champault et al., 2007[88]	Adults														
Chauhan et. al 2007[658]	Adults														
Chowbey et al., 2010[660]	Adults						x								
Chui et al., 2010[661]	18+			x	x										
DeBord et al., 1999[668]	18+									x		x			
Di Vita et al., 2010[670]	Adults	x													
Freudenberg et al., 2006[696]	Adults														

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Heikkinen et al., 2006[709]	25+	x													
Kapischke et al., 2010[716]	18+														
Khan et al., 2010[717]	16-80													x	
Koch et al., 2008[724]	20-75	x													
langenbach et al., 2003[733]	35-72	x													
Langenbach et al., 2006[734]	35-75	x													
Langenbach et al., 2008[735]	35-75	x													
Nikkolo et al., 2010[773]	18+														
O'Dwyer et al., 2005[775]	18+							x							
Paajanen, 2007[781]	Adults							x							
Paradowski et al., 2009[784]	18+														
Peeters et al., 2010[788]	20-50	x													
Post et al., 2004[793]	18+														
Puccio et al., 2005[794]	26-74	x					x								
Schopf et al., 2011[802]	18+				x	4+	x					x			
Smietanski et al., 2008[663]	20-75							x		x					

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Sutalo et al., 2010[818]	18-50					2+									
Torcivia et al., 2010[825]	Adults														

Table 54. Key Question 5: Patient enrollment criteria, other

Study	Other enrollment criteria
Gundre et al., 2011[703]	Excluded: daibetec or hypertensive patients; patients who were immunocompromised
Sadowski et al., 2011[797]	Included: patients with no other concomitant surgical procedures planned, were cognitively able to discuss the study
Bittner et al., 2011[636,637]	Included: patients had a reducible primary or recurrent inguinal or femoral hernia, scheldued to undergo elective repair; hernia opening between 3 and 5 cm confirmed intraoperatively. Excluded: irreducible hernia, trainee operation (less than 50 self-performed TAPP's), patients with inguinal neuralgia, or inability to understand the study design.
Agarwal et al., 2009[623]	Included: uncomplicated hernia, married, living with sexually active partners, have children, signed informed consent.
Ansaloni et al., 2009[627,628]	Included: noncomplicated inguinal hernia (classification according to Gilbert I through IV); Exclusion: any condition preventing a correct evaluation of pain (noncooperative, blind patient, drug addicted, or depressed patient, etc.), hypersensitivity to any drug in study, intraoperative findings of pathology other than inguinal hernia
Bringman et al., 2003[642-644]	Excluded: patients not able to walk 500 m and patients not assumed to cooperate in the follow-up (e.g., due to language difficulties or drug abuse)
Bringman et al., 2005[645]	Excluded: patients not able to walk 500 m, patients assumed to be unable to cooperate in the follow-up
Champault et al., 2007[88]	No other criteria
Chauhan et. al 2007[658]	Excluded complicated inguinal hernia
Chowbey et al., 2010[660]	No other criteria
Chui et al., 2010[661]	Excluded: elderly patients with comorbidity in whom it was preferable to perform surgery with intravenous sedation and local anesthesia
DeBord et al., 1999[668]	Excluded patients with a know sensitivity to chlorihexidine diacetate or silver salts, a metabolic condition that might affect test results, or a wound-healing or autoimmune disorder.
Di Vita et al., 2010[670]	Excluded: patients with metabolic, endocrine, hepatic, or renal disease
Freudenberg et al., 2006[696]	Included: patients written consent or guardians consent
Heikkinen et al., 2006[709]	Excluded: patients not able to walk 500 m and patients not assumed to cooperate in follow-up (e.g., due to language difficulties or drug abuse)
Kapischke et al., 2010[716]	Excluded: use of systemic steroids, a collagen, or vascular disease.
Khan et al., 2010[717]	Excluded those without will to abide by the proposed duration of follow-up, history of immunosuppression, other medically co-morbid conditions and violation of visit schedule.
Koch et al., 2008[724]	Excluded: patients unable to walk 500 m or unlikely to participate in follow-up (language difficulties, etc.)
langenbach et al., 2003[733]	Included only those weighing less than 90kg. Excluded peripheral arterial sclerosis worse than clinical stage Iib, neurologic complications or paraesthesia of genital region or lateral region of proximal lower extremity, polyneuropathy, disturbance of testicular circulation with testicular atrophy, therapy with anticoagulative drugs, chronic back pain, intraoperative conversion to open procedures, hydrocele, epididymitis, funiculitis

Study	Other enrollment criteria
Langenbach et al., 2006[734]	Included: BMI <30. Exclusion: peripheral arterial disease worse than clinical stage IIb, neurologic effects of parathesia of the genital region or the lateral region of the proximal lower extremity, polyneuropathy, disturbance of the testicular blood circulation with testicular atrophy, therapy with anticoagulant drugs, chronic back pain, intraoperative conversion to open procedures, hydrocele, epididymitis, funiculitis
Langenbach et al., 2008[735]	Included: BMI less than 30 kg/m^2. Excluded: peripheral arterial disease worse than clinical stage IIb, neurological affections or paresthesia of the genital region or the lateral region of the proximal lower extremity, polyneuropathy, disturbance of the testicular blood circulation with testicular atrophy, therapy with anticoagulative drugs, chronic back pain, intraoperative conversion to open procedures, hydrocele, epididymitis, funiculitis
Nikkolo et al., 2010[773]	Excluded those unable to understand the questionnaire.
O'Dwyer et al., 2005[775]	No other criteria
Paajanen, 2007[781]	Included: fulfilling the day-case surgery criteria, received written and oral information about the aims and content of study in accordance with Helsinki Declaration. Excluded: allergy to polypropylene
Paradowski et al., 2009[784]	Excluded skin infection in the groin.
Peeters et al., 2010[788]	Excluded: men previously sterilized, experienced periods of high fever prior to semen analysis, or taking medications with a known negative impact on sperm quality.
Post et al., 2004[793]	Included: had given informed consent for trial participation and re-examination after 6 months. Excluded: allergy to polypropylene.
Puccio et al., 2005[794]	Included those whose prior lower abdominal surgery was for either cancer or immune deficiency
Schopf et al., 2011[802]	Excluded: history of ileus, participation in another trial, mentally immature.
Smietanski et al., 2008[663]	Excluded: those receiving chronic immunosuppressive or corticosteroid therapy, radiotherapy or chemotherapy, those who had received radiotherapy or chemotherapy in the past 3 months, those with chronic renal failure (on dialysis), clinically diagnosed hepatic failure or active bacterial endocarditis, proven mental illness or thrombocytopenia (platelet counts less than 100x10(9)/1)
Sutalo et al., 2010[818]	No other criteria
Torcivia et al., 2010[825]	Included patients managed in an outpatient setting according to a clinical pathway developed in an outpatient surgery unit; patients with perfect understanding of their intervention and the constraints of their participation in the study. Excluded: patients refusing outpatient management, or with a medical contra-indication for outpatient management; or with a non-medical contra-indication for ambulatory management; living alone, not self-sufficient, more 60 minutes away from hospital, unable to return home and spend their first night unaccompained, without a telephone or any particular means of transport; patients who were taking analgesics for any associated illnesses at the time of study.

Table 55. Key Question 5: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Gundre et al., 2011[703]	Tension-free repair with 15 cm x 7.5 cm polyethylene mesh	Tension-free repair with 15 cm x 7.5 cm polypropylene mesh	NA	NA	Same antibiotic (ciprofloxacin) and analgesic (diclofenac sodium) were gaven to all patients. Authors subjected polyethylene mesh to different tests to study composition and properties.
Sadowski et al., 2011[797]	Lichtenstein with polyester mesh	Lichtenstein with polypropylene mesh	NA	NA	All subjects were given a prescription for 30 tablets of hydrocodone/APAP 5/500. Those with an allergy or intolerance of hydrocodone/APAP were given a similar prescription for propoxyphene/APAP. One patient received polypropylene mesh instead of polyester which was their original randomized allocation. This patient was included in the polyester mesh group for intention to treat analysis and in the polypropylene mesh group for per protocol analysis.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Bittner et al., 2011[636,637]	TAPP with Prolene mesh, 10 x 15 cm, polypropylene monofilamental mesh of 90 g/m^2, pore size 1.2mm (Ethicon)	TAPP with Premilene mesh, 10 x 15 cm, pure polypropylene 55 g/m^2, pore size 0.75 mm. (Aesculap)	TAPP with Ultrapro mesh, 10 x 15 cm, composite mesh 28 g/m^2, pore size 3-4 mm (Ethicon)	TAPP with TiMesh, 10 x 15 cm, 35 g/m^2, pore size >1 mm, monofilamental polypropylene mesh coated with titanium (GfE).	All meshes were fixed with a 1 mL fibrin glue (1 mL sealer protein solution and 1 mL thrombin solution Tissucol, Baxter). All operations done under general anesthestia (sevoflurane/desflurane in combination with a 70:30% mixture of nitrous oxide and oxygen). All patients received thromboembolic prophylaxis with a low molecular weight heparin and a one-shot antibiotic prohylaxis immediately before surgery. More than 10,000 repairs had been carried out since that time before starting this trial.
Agarwal et al., 2009[623]	TEP with heavyweight polypropylene mesh (PPM)	TEP with lightweight mesh (LWM) reduced polypropylene large pore	NA	NA	Surgeon experienced in TEP; a 15 x 12 cm size mesh (PPM on one side and LWM on the other side) positioned to cover the myopectineal orfice.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Ansaloni et al., 2009[627,628]	Lichtenstein with PP 6 x 14 cm that was slit part way 1 cm from its inferior edge to accommodate the spermatic cord (Angimesh 9, PRE 6 x 14), sutured with Prolene 3/0	Lichtenstein with SIHM, an acellular collagenic matrix obtained from pig small intestine; 8 x 13 cm and fixed with polydioxanone 2/0	NA	NA	The surgeon was highly specialized, performing more than 500 hernia repairs a year and with over 30 years of experience in general surgery; For all direct hernias, independent of size, the nerniation was inverted behind a narrowing stay suture of 2/0 polypropylene. The meshw as tailored to cover the area from the inguinal ligament to the lateral border of the rectus sheet, and from the superior pubic ramus to 6 cm lateral to the internal orfice of the inguinal canal. The corners were curved and 1 cm of the mesh was doubled and incorporated into the suture along the inguinal ligament, in order to reinforce the suture line and prevent rupture of the mesh.
Bringman et al., 2003[642-644]	Lichtenstein with 7.5 x 15 cm Prolene (Ethicon)	Lichtenstein with 7.5 x 15 cm VYPRO II (Ethicon)	NA	NA	General anesthesia for 69% (204/295) in the Prolene group and 58% (172/296) in the Vypro group. Local anesthesia for 11% (32/295) in the Prolene group and 12% (35/296) in the Vypro group
Bringman et al., 2005[645]	TEP with Prolene 12 x 15 cm	TEP with Vypro II 12 x 15 cm	NA	NA	All meshes fixed with staples. There were two fixed operation teams with profound experience in TAPP (more than 200).
Champault et al., 2007[88]	Lichtenstein with polypropylene of weight per unit area 105 g/m^2 (Bard, Ethicaon)	Lichtenstein with Glucamesh (Genzyme) a polypropylene with a weight per unit of 50 g/m^2 coated with beta-d-glucan	Laparoscopic repair with polypropylene of weight per unit area 105 g/m^2 (Bard, Ethicaon)	Laparoscopic repair with Glucamesh (Genzyme) a polypropylene with a weight per unit of 50 g/m^2 coated with beta-d-glucan	All operations were performed by the same team of two certified general surgeons; Meshes fixed with nylon sutures underneath the external fascia (inlay technique)

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Chauhan et al., 2007[658]	Group 1: indigenous device - from standard prolene sheet two patches are designed. Dimensions are tailored to the individual patient's anatomy and held together by a single loose Prolene suture in the middle.	Group 2: conventional Prolene Hernia System (PHS) (Ethicon)	NA	NA	
Chowbey et al., 2010[660]	Endoscopic TEP with Prolene: polypropylene mesh (Ethicon), heavyweight, made up of multifilaments of polypropylene (nonabsorbable) fibers. 105 g/m^2, 0.8 to 1 mm pore size, 0.685 mm mesh thickness, 1,630 mmHg maximum tensile strength	Endoscopic TEP with Ultrapro: composed of a weave of lightweight polypropylene (nonabsorbable) fibers and poliglecaparone (absorbable) fibers. Poliglecaparone which is a monofilament, gives mesh added stiffness for handling, particularly during mesh placement in endoscopic inguinal hernia repair. Absorbed in approx. 90 days, 28 g/m^2, approx 3 to 4 mm pore size, 0.5 mm mesh thickness, 650 mmHg maximum tensile strength.	NA	NA	All meshes used were 5 x 10 cm^2. All surgical procedures were performed by the same senior surgeon (GD). All hernias were classified as type II and IIIa according to Nyhus. Lichtenstein technique using a prosthesis that was positioned and fixed to the inguina ligament with a continuous nonabsorbable suture (2/0 Prolene, Ethicon)

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Chui et al., 2010[661]	TEP with lightweight mesh: Dynamesh (FEG Textiltchnik); rectangular mesh was tailor-made with a tongue-like flap fashioned with scissors forming the posterior fold to accommodate the spermatic pedicle, and inserted without need for further fixation; patients received 1G of cefazolin intravenously at start of operation (prophylactic antibiotic)	TEP with heavyweight mesh: Surgipro (Tyco Healthcare); rectangular mesh was tailor-made with a tongue-like flap fashioned with scissors forming the posterior fold to accommodate the spermatic pedicle, and inserted without need for further fixation; patients received 1G of cefazolin intravenously at start of operation (prophylactic antibiotic)	NA	NA	All procedures were performed by or under the supervision of a single consultant surgeon with comprehensive 15 year experience in a board variety of advanced laparo-endoscopic procedures.
DeBord et al., 1999[668]	Open or Laparoscopic with Standard patch: polytetrafluoroethylene (ePTFE)	Open or Laparoscopic with Impregnanted Patch: expanded polytertafluoroethylene (ePTFE) soft-tissue patches impregnante with antimicrobial preservative agents (GORE-TEX® Dual-Mesh® Plus Biomaterial and GORE-TEX® MycroMesh® PLUS Biomaterial - W.L. Gore & Associates)	NA	NA	The decision to use a prosthetic device and to use a dual-surface (Dual Mesh Biomaterial) or uniform-surface (MycroMesh Biomaterial) ePTFE patch was made by the attending surgeon; however, the dual-surface material was used in all laparscopic procedures. Both standard and impregnated patches were available in the operating room. Each surgeon in the study implanted a total of three standard patches and three impregnated patches in random orde. When dual-surface ePTFE patches were used for a ventral hernia repair, the textured surface of the prosthesis was placed adjacent to the fascia and the smooth surface toward bowel.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Di Vita et al., 2010[670]	Lichtenstein with Prolene: high density, double monofilament of PP, pore size <1 mm, thickness = 0.40 mm, total density = 108 g m(-2), Ethicon.	Lichtenstein with Vypro II: partially absorbable mesh consisting of nonabsorbable PP and absorbable PG, pore size 2-3 mm, thickness of 0.4 mm, and density 83 g m (-2), Ethicon	NA	NA	TEP performed by the same surgeon with expertise in this technique. Meshes were only fixed in selected cases (large direct hernia) with a spiral tacker (Protrack, Covidien) on the Cooper ligament. In the case of bilateral hernia, identical meshes were used on both sides.
Freudenberg et al., 2006[696]	Lichtenstein with Nylon Mesh: nylon mesh was bought as knotted mosquito net at local market; trimmed to a standard size of 10 x 15 cm, cleaned with alcohol and water; packed into cotton gauze; and sterilized in the autoclave of hospital. Manufacturer confirmed that it was 100% nylon (polyamide 6/6). The mosquito net was not impregnante with pyrethrum or other insecticides. It's weight is 27 g/m^2, it's thickness 0.22 mm, and maximal diameter of pores is 2.5 mm	Lichtenstein with Ultrapro mesh (Ethicon Products): 10 x 15 cm, a composition of aborbable polyglactin fibers and nonabsorbable polypropylene fibers. Its weight is 28 g/m^2, its thickness 0.5 mm, maximal diameter of pores is 3.5 mm	NA	NA	Lichtenstein was performed as described by Amid et al using 2-0 polypropylene (Prolene) to secure mesh. Five surgeons, experienced in the lichtenstein technique participated in study.
Heikkinen et al., 2006[709]	TEP with 12 x 15 cm piece of PROLENE (Ethicon)	TEP with a 12 x 15 cm piece of VYPRO II (Ethicon)	NA	NA	Local anesthesia to the wounds in all patients except one in the Prolene group
Kapischke et al., 2010[716]	Lichtenstein with Parietene progrip® (Covidien, germany): 11 x 9 cm mesh fixed by short steady pressure exerted by the surgeon	Lichtenstein with Optilene® (braun, Germany): polypropylene (PP) mesh, 12 x 10 cm. Suture material was 2/0 polypropylene (Surgipro, Covidien, Germany)	NA	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Khan et al., 2010[717]	Lichtenstein with lightweight mesh composite (Vypro II®)	Lichtenstein with heavyweight mesh propylene (Prolene®) mesh	NA	NA	fixed interiorly at the medial end with continous 2/0 polypropylene suture. Three or four interrupted sutures were use dto fix the mesh superiorly.
Koch et al., 2008[724]	Lichtenstein descriebd by Amid with 10 x 15 cm titanium coated polypropylene lightweight mesh of 35 g/m^2 in weight (TiMesh TC)	Lichtensteing described by Amid with 10 x 15 cm standard polypropylene mesh weighing more than 80 g/m^2 (Prolene)	NA	NA	Mesh was fixated with separate stitches of polypropylen (Prolene 3/0, Ethicon product)
Langenbach et al., 2003[733]	TAPP with monofile, heavyweight (108 g/m^2) rigid polypropylene; synthetic, colorless mesh (Ethicon) with thickness of 0.9mm	TAPP with smooth heavy weighted variant (116 g/m^2) or polypropylene mesh composed of mutifile material; synthetic, colorless mesh (Serag-Wiessner) with thickness of 0.5 mm	NA	NA	The participation surgeons were all experienced in laparoscopic hernia repair. Meshes were fixed using spiral tacks (Protract, Tyco healthcare)
Langenbach et al., 2006[734]	TAPP with polypropylene (Ethicon): monofilament, 4.6 pores/cm, 108 g/m^2, 1.0-1.6 mm pore size, 0.9 mm thickness, traction lengthwise (N) 597, traction crosswise (N) 767	TAPP with smooth polypropylene (Serag-Wiessne): multifilament, 6 pores/cm, 116 g/m^2, 0.08-1.0 mm pore size, 0.5 mm thickness, traction lengthwise (N) 595, traction crosswise (N) 77	TAPP with Compound mesh (Ethicon): polypropylene/polyglactin, multifilament, 2 pores/cm, PP 26.8 g/m^2/ PG 54.6 g/m^2, 2.0-5.0 mm pore size, 0.9 mm thickness, traction lengthwise (N) 387, traction crosswise (N) 63	NA	In patients with bilateral hernias, a different type of mesh was placed on each side by randomization. The patients were operated on by the same senior consultant with good experience of inguiunal hernia surgery. All meshes were 9 x 13 cm
Langenbach et al., 2008[735]	TAPP with Prolene: a double-filament heavyweight (108 g/m^2) polypropylene mesh	TAPP with Serapen: multifilament heavyweight variant (116 g/m^2) of polypropylene mesh	TAPP with Vypro II: composite multifilament mesh made of polyglactin (PG) and polypropylene (PP) (PP 35 g/m^2)	NA	Laparoscopic repair (totally extraperitoneal approach or TEP) was preferred for bilatera hernias or for hernias that recurred after herniorrhaphy in young (20-45 years) active professionals or sportsmen or women with not anesthetic risk, with a BMI under 30. All other patients underwent lichtenstein repair

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Nikkolo et al., 2010[773]	Lichtenstein with heavyweight (HW) mesh: monofilament polypropylene mesh with a pore size of 0.8mm and a weight of 82 g/m^2 (Premilene® Mesh, Braun).	Lichtenstein with lightweight (LW) mesh: monofilament polypropylene mesh with a pore size of 1.0mm and a weight of 36 g/m^2 (Optilene® Mesh LP; braun).	NA	NA	In both groups, a mesh of dimensions 4.5 x 10 cm was applied and polypropylene 2/0 suture material was used for mesh implantation.
O'Dwyer et al., 2005[775]	Lichtenstein with lightweight mesh: constructed of multifilaments of polypropylene with additional absorbable polyglactin (Vypro II, Ethicon); pore size of 4 mm, weighs 82 g/m^2 at implantation and 32 g/m^2 after absorption of polyglactin compoenet (approx 56-70 days)	Lichtenstein with heavyweight mesh (Atrium, Atrium Medical): pore size 1 mm, weighs 85 g/m^2	NA	NA	
Paajanen, 2007[781]	Lichtenstein with Vypro II: partly absorbable polypropylene-polyglctin mesh 50 g/m^2	Lichtenstein with Premilene Mesh LP: lightweight polypropylene mesh 55 g/m^2	Lichtenstein with Premilene: conventional densely woven polypropylene mesh 82 g/m^2	NA	All meshes were the same size 15 x 10 cm; the two surgeons who carried out the operative procedure had a training status of more than 300 laparoscopic hernia repairs.
Paradowski et al., 2009[784]	Lichtenstein with Surgimesh (WN, Aspide Medical): a reinforcement patch not knitted, not woven, made from polypropylene consolidated by heat sealing, low weight 43 g/m^2	Lichtenstein with Micromesh (W.L. Gore & Associates): polytetrafluoroethylene (PTFE) mesh	Licthenstein with Surgipro (Auto Suture): standard woven polypropylene (PP) mesh, heavyweight 80 g/m^2	NA	

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Peeters et al., 2010[788]	TEP with Marlex (Bard): 95 g/m^2, 1 mm pore size, standard PP, heavyweight	TEP with Vypro II (Ethicon): 30 g/m^2, 3-4 mm pore size, lightweight	TEP with TiMesh: 35 g/m^2, ≥1 mm pore size, lightweight	NA	Patients with bilateral hernias, both sides were repaired with same type of mesh. Standardized TAPP repair in the prescence of a surgeon experience in TAPP repair who either performed the procedure himself or supervised it in a teaching situation. There were 13 surgeons who performed the operations. In all cases, titanized meshes either TiMesh Light or TiMesh Extralight (15 x 10 cm or 15 x 15 cm mostly cut down to 15 x 12 cm). Staple fixation of the mesh was done in the vast majoriy repairs. In special cases, e.g., extremely large hernias, suture fixation was used, and in very small lateral hernias no fixation was used. Mesh was fixed with two to six titanium staples by using either an Endopath Multifire stapler (EMS, Ethicon Endo-Surgery) or an Endo-Universal stapler (auto-Suture)
Post et al., 2004[793]	Lichtenstein with Surgipro: 8 x 13 cm polypropylene mesh of 100-110 g/m^2 in weight.	Lichtenstein with Vypro: 10 x 15 cm multifilament mesh which consisted of non-absorbable polypropylene and absorbable polyglactin fibers in equal parts and in which the weight or polypropylene was 27-30 g/m^2	NA	NA	

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Puccio et al., 2005[794]	Lichtenstein with Prolene: polypropylene mesh, nonresorbable	Lichtenstein with Vypro: 50% resorbable suture polyglactin, 50% nonresorbable suture polypropylene mesh; polyglactin fibers are resorbed in 56-70 days, remaining polypropylene fibers incorporated by collagen in-growth, and the abdominal wall is reinforced.	Lichtenstein with Surgisis: natual bioactive biomaterial harvested from the porcine small intestinal submucosa and made into a biocompatiable medical product, extracellular matrix comprised of collagen, noncollagenous proteins, and other biomolecules	NA	mesh size for all meshes: 15 x 12 cm^2. All meshes fixed at two points on the Cooper's ligament using Protrack (Autosuture, Tyco Healthcare)

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Schopf et al., 2011[302]	TAPP with TiMesh-Light (pfm medical): 35 g/m^2	TAPP with TiMesh-Extralight (pfm medical): 16 g/m^2, titanized polypropylene mesh	NA	NA	Surgery: oblique 405 cm skin incision in the inguinal hernia region, inguinal canal was opened. Cord structures looped up in region of pubi tubercle and held. Cremaster incised and cord structures and hernial sac dissected by blunt and sharp dissection. Hernal sac the delineated and dissected free from cord structures. Direct sacs inverted and reduced into peritoneal cavity, indirect sacs transfixed and excised. Transversalis fascia covering posterior wall of inguinal canal cut open for a length of 2 cm. Blunt dissection using a finger and gauze, pereperitoneal space of Bodgros dissected oyt to create plane for underlay part of mesh. Underlay patch was spread out in the preperitoneal space created, the defect in the Transversalis fascia narrowed with one or two uninterrupted sutures of 2-0 polypropylene. Patients with lax internal ring, the preperitoneal plane was created by passing finger or piece of gauze through internal ring. Onlay mesh was spread out over posterior wall of inguinal canal. Fixed with 4-5 interuptted sutures of 1-0 polyprpoylene. Hemostasis achieved and inguinal canal closed in layers. Same procedure done for both devices. Mean operative time calculated from time of incision to placement of onlay component of device.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Smietanski et al., 2008[663]	Lichtenstein and Amid with braided monofilamentous mesh with large pores (3-4 mm) made from poliglecaprone and polypropylene (UltraPro); 7.5 x 15 cm; weight decreases by about 50% in 3 months; three modifications in this lightweight group: a larger suture margin (minimum 4 pores of lightweight mesh), a shorter distance bewteen the suture passes (by about 2 times, maximum 1 cm) was used for the running suture on the inguinal ligament, one additional suture was placed to fix the mesh near the pubic bone between the pubic tubercle and the middle line; polypropylene 2/0 used for mesh implantation	Lichtenstein and Amid with heavyweight polypropylene mesh (Prolene, Ethicon); 7.5 x 15 cm; polypropylene used for mesh implantation	NA	NA	All patients were treated with a lightweight and heavyweight mesh - one on each side (bilateral hernia)
Sutalo et al., 2010[818]	Non-tension technique with flat polypropylene mesh (Ethicon inc USA)	Non-tension technique with three-dimensional prolene (PHS) mesh (Ethicon inc USA)	NA	NA	

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Torcivia et al., 2010[825]	Lichtenstein with Prolene (Ethicon): pre-cut, fibrillated, standard, macro-porous, multi-filament polypropylene with a grammage of 100 g/m^2	Lichtenstein with Glucamesh (Genzyme France): Light micro-porous polypropylene with a grammage of 55 g/m^2 and 3% beta-D-glucan natural oat-derived coating known for its tissue integration qualities; the exact size pore of Glucamesh is 65 micrometer	NA	NA	

Table 56. Key Question 5: Baseline characteristics

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Gundre et al., 2011[703]	% between 35 and 55 years	Entire study: 51.4% (36/70)				
	% Right-sided hernia	Entire study: 57.1% (40/70)				
	% Indirect hernia	Entire study: 65.7% (46/70)				
	% Direct hernia	Entire study: 24.3% (17/70)				
	% Pantaloon type	Entire study: 10% (7/70)				
	% Male	Entire study: 100%				
	% Female	Entire study: 0%				
Sadowski et al., 2011[797]	% Male	97.4% (38/39)	97.4% (38/39)			
	% Female	2.6% (1/39)	2.6% (1/39)			
	Mean Age (SD)	54 (17.9)	56 (16.4)			
	Median Age (min-max)	57 (25-81)	60 (20-78)			
	% Professional/technical job	41% (16/39)	21% (8/39)			
	% Manager/sales	5.1% (2/39)	15.4% (6/39)			
	% Craft/skilled	21% (8/39)	15.4% (6/39)			
	% Unskilled	7.7% (3/39)	18% (7/39)			
	% Clerical	0% (0/39)	0% (0/39)			
	% Student	0% (0/39)	0% (0/39)			
	% Housewife	0% (0/39)	2.6% (1/39)			
	% Retired	23.1% (9/39)	28.2% (11/39)			
	% Other	2.6% (1/39)	0% (0/39)			
	% Work involves lifting activity	69.2% (27/39)	77% (30/39)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Sadowski et al., 2011[797] (continued)	% Work does not involve lifting activity	31% (12/39)	23.1% (9/39)			
	% Previous anterior hernia w/o mesh (Yes)	21% (8/39)	26% (10/39)			
	% Previous anterior hernia w/o mesh (no)	79.5% (31/39)	74.3% (29/39)			
	Pre-op VAS (SD)	0.58 (1.23)	0.86 (1.90)			
	% General anesthestia	90% (35/39)	92.3% (36/39)			
	% Local mac	7.7% (3/39)	2.6% (1/39)			
	% Spinal	0% (0/39)	0% (0/39)			
	% Other	2.6% (1/39)	5.1% (2/39)			
	Minutes under anesthesia (SD)	118.53 (38.30)	125.29 (41.41)			
	Minutes in surgery (SD)	77.56 (34.29)	88.23 (38.28)			
	% Direct	39.4% (15/39)	38% (14/39)			
	% Indirect	50% (19/39)	46% (17/39)			
	% Combination	11% (4/39)	16.2% (6/39)			
Bittner et al., 2011[636,637]	% Male	92.7% (139/150)	98% (147/150)	99.3% (149/150)	92.7% (139/150)	
	% Female	7.3% (11/150)	2% (3/150)	0.7% (1/150)	7.3% (11/150)	
	Mean Age (SD)	59.1 (13.9)	56.3 (12.7)	56.2 (13.8)	59.2 (13.9)	
	BMI (SD)	25.3 (2.7)	25 (2.7)	25.2 (2.8)	24.9 (3)	
	% Primary hernia	92.7% (139/150)	96.7% (145/150)	95.3 (143/150)	97.3% (146/150)	
	% Recurrent hernia	7.3% (11/150)	3.3% (5/150)	4.7% (7/150)	2.7% (4/150)	
	% Nyhus II	27.3% (41/150)	26.7% (40/150)	32.7% (49/150)	27.3% (41/150)	
	% Nyhus IIIa	42.7% (64/150)	48% (72/150)	40% (50/150)	48.7% (73/150)	
	% Nyhus IIIb	22.7% (34/150)	22% (33/150)	23.3% (35/150)	19.3% (29/150)	
	% Nyhus IIIc	0% (0/150)	0% (0/150)	0% (0/150)	0.7% (1/150)	

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Bittner et al., 2011[636,637] (continued)	% Nyhus IV	7.3% (11/150)	3.3% (5/150)	4% (6/150)	4% (6/150)	
	% Right side	57.3% (86/150)	52% (78/150)	57.3% (86/150)	52.7% (79/150)	
	% Left side	42.7% (64/150)	48% (72/150)	42.7% (64/150)	47.3% (71/150)	
	% Perioperative pain in inguinal region when walking	42% (63/150)	39.3% (59/150)	40.7% (61/150)	34% (51/150)	
	% Preopertive impairment of physical activity	48.7% (73/150)	49.3% (74/150)	58% (87/150)	42.7% (64/150)	
Agarwal et al., 2009[623]	% Bilateral direct	Entire study: 64% (16/25)				All patients were treated with a heavyweight and lightweight – one on each side (bilateral hernia)
	% Bilateral indirect	Entire study: 20% (5/25)				
	% Direct (including pantaloon)	Entire study: 72% (36/50)				N is hernias
	% Direct and indirect on one side each	Entire study: 12% (3/25)				
	% indirect	Entire study: 28% (14/50)				N is hernias
	% Pantaloon and indirect on one side each	Entire study: 4% (1/25)				
	Age	62.68 (Range: 32-85) (N=25)	62.68 (Range: 32-85) (N=25)			
	% Chronic lung disease	8% (2/25)	8% (2/25)			
	% Coronary artery disease	4% (1/25)	4% (1/25)			
	% diabetes	12% (3/25)	12% (3/25)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Agarwal et al., 2009[623] (continued)	% Hypertension	24% (6/25)	24% (6/25)			
Ansaloni et al., 2009[627,628]	% Gilbert I	6% (2/35)	6% (2/35)			123 patients assessed for eligibililty; 53 patients excluded (6 refused partici-pation, 42 operated on by a surgeon not participating in the study; 5 ASA score >3)
	% Gilbert II	34% (12/35)	31% (11/35)			
	% Gilbert III	17% (6/35)	26% (9/35)			
	% Gilbert IV	20% (7/35)	23% (8/35)			
	% Gilbert V	6% (2/35)	11% (4/35)			
	% Gilbert VI	17% (6/35)	3% (1/35)			
	% recurrent	0% (0/35)	0% (0/35)			
	% right-side	51% (18/35)	54% (19/35)			
	% work Heavy manual labor	14% (5/35)	20% (7/35)			
	% work Mild manual labor occupation	40% (14/35)	37% (13/35)			
	% work Sedentary occupation	46% (16/35)	43% (15/35)			
	Age	61.3 (SD: 17.7) (N=35)	56.2 (SD: 18) (N=35)			
	BMI (kg/m^2)	26.7 (SD: 2.8) (N=35)	25.7 (SD: 2.7) (N=35)			
	% (SVS) Degree of baseline discomfort at rest - Mild	9% (3/35)	20% (7/35)			
	% (SVS) Degree of baseline discomfort at rest - None	91% (32/35)	80% (28/35)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Ansaloni et al., 2009[627,628] (continued)	% (SVS) Degree of baseline discomfort on coughing - Mild	60% (21/35)	54% (19/35)			
	% (SVS) Degree of baseline discomfort on coughing - Moderate	26% (9/35)	17% (6/35)			
	% (SVS) Degree of baseline discomfort on coughing - None	14% (5/35)	23% (8/35)			
	% (SVS) Degree of baseline discomfort on coughing - Severe	0% (0/35)	6% (2/35)			
	% (SVS) Degree of baseline discomfort on movement - Mild	60% (21/35)	54% (19/35)			
	% (SVS) Degree of baseline discomfort on movement - Moderate	26% (9/35)	17% (6/35)			
	% (SVS) Degree of baseline discomfort on movement - None	14% (5/35)	23% (8/35)			
	% (SVS) Degree of baseline discomfort on movement - Severe	0% (0/35)	6% (2/35)			
	% (SVS) Degree of baseline pain at rest - Mild	26% (9/35)	31% (11/35)			
	% (SVS) Degree of baseline pain at rest - None	74% (26/35)	69% (24/35)			
	% (SVS) Degree of baseline pain on coughing - Mild	63% (22/35)	60% (21/35)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Ansaloni et al., 2009[627,628] (continued)	% (SVS) Degree of baseline pain on coughing - Moderate	0% (0/35)	3% (1/35)			
	% (SVS) Degree of baseline pain on coughing - None	34% (12/35)	29% (10/35)			
	% (SVS) Degree of baseline pain on coughing - severe	3% (1/35)	9% (3/35)			
	% (SVS) Degree of baseline pain on movement - Mild	40% (14/35)	37% (13/35)			
	% (SVS) Degree of baseline pain on movement - Moderate	14% (5/35)	17% (6/35)			
	% (SVS) Degree of baseline pain on movement - None	46% (16/35)	46% (16/35)			
	% Freq. of perop pain - Never	31% (11/35)	29% (10/35)			
	% Freq. of preop discomfort - Always	29% (10/35)	29% (10/35)			
	% Freq. of preop discomfort - Never	14% (5/35)	14% (5/35)			
	% Freq. of preop discomfort - Rarely	14% (5/35)	26% (9/35)			
	% Freq. of preop discomfort - Sometimes	43% (15/35)	23% (8/35)			
	% Freq. of preop pain - Rarely	23% (8/35)	43% (15/35)			
	% Freq. or preop pain - Sometimes	46% (16/35)	29% (10/35)			
	% Positive family history for hernia	40% (14/35)	29% (10/35)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Ansaloni et al., 2009[627,628] (continued)	% Presence of preop discomfort	86% (30/35)	77% (27/35)			
	% Presence of preoperative pain	69% (24/35)	71% (25/35)			
	(VAS) Degree of baseline discomfort at rest	1.5 (SD: 5.1) (N=35)	3.7 (SD: 8.0) (N=35)			
	(VAS) Degree of baseline discomfort on coughing	22.5 (SD: 12.4) (N=35)	18.8 (SD: 14.2) (N=35)			
	(VAS) Degree of baseline discomfort on movement	23.3 (SD: 12.0) (N=35)	19.8 (SD: 10.0) (N=35)			
	(VAS) Degree of baseline pain at rest	3.5 (SD: 6.3) (N=35)	4.4 (SD: 6.8) (N=35)			
	(VAS) Degree of baseline pain on coughing	10.8 (SD: 13.7) (N=35)	13.8 (SD: 19.1) (N=35)			
	(VAS) Degree of baseline pain on movement	9.1 (SD: 9.2) (N=35)	11 (SD: 13.7) (N=35)			
Bringman et al., 2003[642-644]	% 1.5 to 3 cm	53% (155/295)	52% (153/296)			
	% bilateral	0% (0/295)	0% (0/296)			
	% Combined	8% (25/295)	8% (25/296)			
	% direct	34% (100/295)	37% (109/296)			
	% hernia <1.5 cm	16% (48/295)	19% (55/296)			
	% hernia >3 cm	31% (92/295)	30% (88/296)			
	% indirect	58% (170/295)	55% (162/296)			
	% left-sided	41% (122/295)	46% (137/296)			
	% right-side	59% (173/295)	54% (159/296)			
	Age	54 (SD: 14) (N=295)	55 (14) (N=296)			
	% Epidural/spinal	20% (59/295)	30% (89/296)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Bringman et al., 2003[642-644] (continued)	SF-36 bodily pain	Median: 61 (41-83) (N=295)	Median: 61 (41-85) (N=296)			
	% recurrent	0% (0/295)	0% (0/296)			
Bringman et al., 2005[645]	% 1.5 to 3 cm	116% (81/70)	116% (80/69)			
	% Combined	7% (5/70)	14% (10/69)			
	% direct	153% (107/70)	146% (101/69)			
	% femoral	1% (1/70)	3% (2/69)			
	% hernia <1.5 cm	6% (4/70)	17% (12/69)			
	% hernia >3 cm	73% (51/70)	67% (46/69)			
	% indirect	39% (27/70)	36% (25/69)			
	% recurrent	24% (17/70)	23% (16/69)			
	Age	55 (SD: 11; Range: 34-79) (N=70)	55 (SD: 12; Range: 28-77) (N=69)			
	VAS for pain - resting in bed	Median: 0 (0-5) (N=70)	Median: 0 (0-7) (N=69)			
	VAS for pain - rising from a horizontal to vertical position	Median: 4 (1-17) (N=70)	Median: 5 (3-22) (N=69)			
	VAS for pain - standing	Median: 4 (0-10) (N=70)	Median: 5 (0-17) (N=69)			
	VAS for pain - walking	Median: 5 (1-20) (N=70)	Median: 10 (4-28) (N=69)			
Champault et al., 2007[88]	% bilateral	Entire study 23% (96/410)				
	% recurrent	Entire study 14% (56/410)				
	% BMI above 30	Entire study 18% (72/410)				
	% male	Entire study 97% (396/410)				
	Age	Entire study 54 (NR) (N=410)				

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Champault et al., 2007[88] (continued)	% ASA score 1 or 2	Entire study 95% (390/410)				
Chauhan et al., 2007[658]	% recurrent	0% (0/40)	0% (0/44)			
	% "Type of hernia" (not defined by the authors)	38% (19/40)	50% (22/44)			
	Age	46.98 (NR) (N=40)	44.18 (NR) (N=44)			
Chowbey et al., 2010[660]	% Combined	18% (38/211)	12% (22/191)			441 patients enrolled, 39 patients were lost to follow-up (17 in Prolene and 22 in Ultrapro). Study population/baseline characteristics were reported for 402 patients.
	% direct	72% (152/211)	69% (132/191)			
	% femoral	4% (8/211)	5% (10/191)			
	% indirect	106% (224/211)	114% (218/191)			
	% male	91% (193/211)	92% (175/191)			
	Age	52.8 (Range: 20-92) (N=211)	53.4 (Range: 18-83) (N=191)			
Chui et al., 2010[661]	% direct	Entire study: 56% (56/100)				All patients were treated with a lightweight and heavyweight mesh - one on each side (bilateral hernia)
	% femoral	Entire study: 1% (1/100)				
	% indirect	Entire study: 39% (39/100)				
	% pantaloon	Entire study: 4% (4/100)				

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Chui et al., 2010[661] (continued)	% male	98% (49/50)	98% (49/50)			
	Age	61.6 (SD: 11.7) (N=50)	61.6 (SD: 11.7) (N=50)			
Collaborative group, 2008[663]	% recurrent	0% (0/215)	0% (0/177)			
DeBord et al., 1999[668]	% Inguinal hernia with Laparoscopic repair	26% (5/19)	6% (1/18)			
	% inguinal Hernia with open repair	47% (9/19)	56% (10/18)			
	% Ventral hernia with laparoscopic repair	11% (2/19)	22% (4/18)			
DeBord et al., 1999[668]	% Ventral hernia with open repair	16% (3/19)	17% (3/18)			
	% male	89% (17/19)	72% (13/18)			
	Age	55.8 (Range: 18-72) (N=19)	54.2 (Range: 18-83) (N=18)			
Di Vita et al., 2010[670]	% bilateral	0% (0/15)	0% (0/15)			
	% left-sided	40% (6/15)	33% (5/15)			
	% Nyhus type 2	60% (9/15)	47% (7/15)			
	% Nyhus type 3a	40% (6/15)	53% (8/15)			
	% right-side	60% (9/15)	67% (10/15)			
	Age	54 (SD: 13) (N=15)	52 (SD: 17) (N=15)			
	BMI (kg/m^2)	28 (SD: 10) (N=15)	27 (SD: 11) (N=15)			
	% ASA score 1	60% (9/15)	53% (8/15)			
	% ASA score 2	40% (6/15)	47% (7/15)			
Freudenberg et al., 2006[696]	% bilateral	30% (6/20)	20% (4/20)			N is hernias
	% Incarcerated	25% (5/20)	15% (3/20)			N is hernias

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Freudenberg et al., 2006[696] (continued)	% Inguinal not scrotal hernia	65% (13/20)	80% (16/20)			N is hernias
	% left-sided	20% (4/20)	45% (9/20)			N is hernias
	% recurrent	0% (0/20)	0% (0/20)			N is hernias
	% right-side	80% (16/20)	55% (11/20)			N is hernias
	% Scrotal	35% (7/20)	20% (4/20)			N is hernias
	Age	35.3 (SD 14.3) (N=20)	33.3 (SD: 11.2) (N=20)			
	% Ability to walk - good	67% (12/18)	67% (12/18)			
	% Ability to walk - restricted	28% (5/18)	28% (5/18)			
	% Ability to walk - unable	6% (1/18)	6% (1/18)			
	% Ability to work - good	33% (6/18)	39% (7/18)			
	% Ability to work - restricted	39% (7/18)	28% (5/18)			
	% Ability to work - unable	28% (5/18)	33% (6/18)			
	% Appetite - good	78% (14/18)	83% (15/18)			
	% Appetite - restricted	22% (4/18)	17% (3/18)			
	% ASA score 2	20% (4/20)	30% (6/20)			
	% ASA score 5	80% (16/20)	70% (14/20)			
	% Bicycle riding - good	39% (7/18)	39% (7/18)			
	% Bicycle riding - restricted	28% (5/18)	50% (9/18)			
	% Bicycle riding - unable	33% (6/18)	11% (2/18)			
	% Esthetic satisfaction - bad	22% (4/18)	28% (5/18)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Freudenberg et al., 2006[696] (continued)	% Esthetic satisfaction - good	44% (8/18)	44% (8/18)			
	% Esthetic satisfaction - medium	33% (6/18)	28% (5/18)			
	% Foreign body sensation - no	100% (18/18)	100% (18/18)			
	% Foreign body sensation - yes	0% (0/18)	0% (0/18)			
	% General happiness - bad	17% (3/18)	6% (1/18)			
	% General happiness - good	44% (8/18)	56% (10/18)			
	% General happiness - medium	6% (1/18)	6% (1/18)			
	% General happiness - very good	33% (6/18)	33% (6/18)			
	% Local comfort - normal	22% (4/18)	17% (3/18)			
	% Local comfort - severe discomfort	17% (3/18)	44% (8/18)			
	% Local comfort - some discomfort	61% (11/18)	39% (7/18)			
	% Miction - good	83% (15/18)	100% (18/18)			
	% Miction - restricted	17% (3/18)	0% (0/18)			
	% Sensitivity loss of skin - little	0% (0/18)	0% (0/18)			
	% Sensitivity loss of skin - no	100% (18/18)	100% (18/18)			
	% Sensitivity loss of skin - severe	0% (0/18)	0% (0/18)			
	% Sexual function - good	50% (9/18)	39% (7/18)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Freudenberg et al., 2006[696] (continued)	% Sexual function - restricted	22% (4/18)	39% (7/18)			
	% Sexual function - unable	28% (5/18)	22% (4/18)			
	% Social activity - normal	78% (14/18)	61% (11/18)			
	% Social activity - restricted	17% (3/18)	39% (7/18)			
	% Social activity - unable	6% (1/18)	0% (0/18)			
	% who lost greater than 10 minutes/day by health care	17% (3/18)	17% (3/18)			
	% who lost less than 10 minutes/day by health care	6% (1/18)	6% (1/18)			
	% who lost no time as a result of health care	78% (14/18)	78% (14/18)			
	Pain QoL	9 (0-10) (N=18)	10 (3-10) (N=18)			
	QoL index	72.6 (19.8 [32.5-97.5]) (N=18)	72.5 (15.2 [42.5-92.5]) (N=18)			
Heikkinen et al., 2006[709]	% 1.5 cm to 3 cm	72% (50/69)	53% (36/68)			There were three postrandomisation exclusions due to the use of wrong mesh (1 patient) and due to incorrect randomization (2 patients)
	% bilateral	0% (0/69)	0% (0/68)			
	% Combined	12% (8/69)	24% (16/68)			
	% direct	64% (44/69)	46% (31/68)			
	% femoral	0% (0/69)	1% (1/68)			
	% hernia <1.5 cm	6% (4/69)	10% (7/68)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Heikkinen et al., 2006[709] (continued)	% hernia >3 cm	22% (15/69)	37% (25/68)			
	% indirect	26% (18/69)	29% (20/68)			
	% left-sided	38% (26/69)	43% (29/68)			
	% right-side	62% (43/69)	57% (39/68)			
	% Symptomatic contralateral hernia (fixed during same operation)	1% (1/69)	4% (3/68)			
	Age	59 (SD: 13) (N=69)	60 (SD: 12.8) (N=68)			
	% 1 previous ipsilateral hernioplasty	86% (59/69)	81% (55/68)			
	% 2 previous ipsilateral hernioplasties	13% (9/69)	16% (11/68)			
	% 3 previous ipsilateral hernioplasties	1% (1/69)	3% (2/68)			
	% Prophylactic antibiotic	22% (15/69)	13% (9/68)			
	VAS resting in bed	Median: 2 (0-5) (N=69)	Median: 2 (0-5) (N=68)			
	VAS rising from horizontal to vertical position	Median: 5 (1-20.5) (N=69)	Median: 5 (2-14) (N=68)			
	VAS standing	Median: 3 (1-19) (N=69)	Median: 5 (3-21) (N=68)			
	VAS walking	Median: 5 (2-20) (N=69)	Median: 9 (4-30) (N=68)			
Kapischke et al., 2010[716]	% lateral hernia	33% (8/24)	27% (7/26)			
	% left-sided	54% (13/24)	38% (10/26)			
	% Medial	29% (7/24)	42% (11/26)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Kapischke et al., 2010[716] (continued)	% Medial and Lateral	38% (9/24)	31% (8/26)			
	% recurrent	0% (0/24)	0% (0/26)			
	% right-side	46% (11/24)	62% (16/26)			
	Hernia defect size (cm)	Median: 3 (Range: 1-5) (N=24)	Median: 2.5 (Range: 1-4) (N=26)			
	% male	92% (22/24)	88% (23/26)			
	Age	64.2 (SD: 12.97) (N=24)	66.8 (SD: 11.66) (N=26)			
	% Chronic Obstructive Lung Disease	0% (0/24)	8% (2/26)			
	% Coronary disease	17% (4/24)	23% (6/26)			
	% diabetes	21% (5/24)	15% (4/26)			
	% Hypertension	50% (12/24)	50% (13/26)			
	% Renal disease	13% (3/24)	4% (1/26)			
Khan et al., 2010[717]	% Nyhus type 1	40% (44/111)	49% (67/138)			51 patients were lost to follow-up leaving a total of 249 patients of the 300 eligible patients. Baseline characteristics were provided for the 249.
	% Nyhus type 2	38% (42/111)	31% (43/138)			
	% Nyhus type 3a	3% (3/111)	1% (2/138)			
	% Nyhus type 3b	16% (18/111)	16% (22/138)			
	% Nyhus type 4	4% (4/111)	3% (4/138)			
	Time from occurrence of hernia till surgery (months)	10.23 (SD: 6.3) (N=111)	8.92 (SD: 5.72) (N=138)			
	% male	100% (111/111)	99% (137/138)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Khan et al., 2010[717] (continued)	Age	38.2 (SD: 13.34) (N=111)	39.55 (SD: 13.7) (N=138)			
	% in pain as measured by VAS	5% (6/111)	4% (6/138)			
	% pain before surgery	5% (6/111)	4% (6/138)			
Koch et al., 2008[724]	% bilateral	0% (0/156)	0% (0/161)			
	% Combined	4% (7/156)	6% (10/161)			13 patients were excluded after consenting to randomization: four operated on with a different technique; three did not have the operation; three >75 years at the time of surgery; one registered twice; one operated on by a different surgeon; one recurrent hernia
	% direct	31% (48/156)	27% (44/161)			
	% indirect	65% (101/156)	66% (107/161)			
	% recurrent	0% (0/156)	0% (0/161)			
	% Retired	28% (44/156)	26% (42/161)			
	% work Heavy physical	18% (28/156)	22% (36/161)			
	% work Light physical	30% (47/156)	24% (39/161)			
	% work Medium physical	21% (32/156)	24% (38/161)			
	% work Unspecified	3% (5/156)	4% (6/161)			
	Age	Median: 56 (Range: 22-75) (N=156)	Median: 57 (Range: 24-75) (N=161)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Koch et al., 2008[724] (continued)	BMI (kg/m^2)	Median: 25 (Range: 18-32) (N=156)	Median: 25 (Range: 19-32) (N=161)			
	VAS pain at rest	Median: 15 (5-28) (N=161)	Median: 15 (5-31) (N=156)			
	VAS pain with activity	Median: 17 (6-26) (N=161)	Median: 17 (6-36) (N=156)			
Langenbach et al., 2003[733]	% bilateral	0% (0/20)	0% (0/20)			
	% Left side lateral inguinal hernia lateral	40% (8/20)	45% (9/20)			
	% Left side medial inguinal hernia	0% (0/20)	10% (2/20)			
	% recurrent	0% (0/20)	0% (0/20)			
	% Right side lateral inguinal hernia	45% (9/20)	35% (7/20)			
	% Right side medial inguinal hernia	15% (3/20)	10% (2/20)			
	Hernia surface measure	NR (Range: 4-20 cm^2) (N=20)	NR (4-20 cm^2) (N=20)			
	Pain VAS	2 (NR) (N=20)	1.5 (NR) (N=20)			
Langenbach et al., 2006[734]	% bilateral	0% (0/30)	0% (0/30)	0% (0/30)		
	% recurrent	0% (0/30)	0% (0/30)	0% (0/30)		
	Age	63.5 (NR) (N=30)	65.4 (NR) (N=30)	NR (NR) (N=30)		
Langenbach et al., 2008[735]	% bilateral	0% (0/58)	0% (0/59)	0% (0/58)		
	% Nyhus type 2	26% (15/58)	22% (13/59)	21% (12/58)		
	% Nyhus type 3a	21% (12/58)	19% (11/59)	16% (9/58)		
	% Nyhus type 3b	22% (13/58)	15% (9/59)	14% (8/58)		
	% Nyhus type 3c	3% (2/58)	2% (1/59)	3% (2/58)		
	% Nyhus type 4	5% (3/58)	3% (2/59)	2% (1/58)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Langenbach et al., 2008[735] (continued)	% recurrent	0% (0/58)	0% (0/59)	0% (0/58)		
	Age	61.5 (SD: 3.4) (N=58)	62.3 (SD: 4.3) (N=59)	63.3 (SD: 3.8) (N=58)		
	BMI (kg/m^2)	24.2 (SD: 2.1) (N=58)	25.6 (SD: 1.9) (N=59)	25.2 (SD: 2.3) (N=58)		
	% Arterial Hypertony	43% (25/58)	39% (23/59)	43% (25/58)		
	% chronic obstructive pulmonary disease	5% (3/58)	3% (2/59)	5% (3/58)		
	% Coronary heart disease	12% (7/58)	10% (6/59)	10% (6/58)		
	% diabetes	21% (12/58)	17% (10/59)	22% (13/58)		
	% Hypercholesterinemia	40% (23/58)	37% (22/59)	36% (21/58)		
	% Overall comorbidity	57% (33/58)	54% (32/59)	52% (30/58)		
	SF-36 development of pain after TAPP	Median: 65 (NR) (N=58)	Median: 64 (NR) (N=59)	Median: 65 (NR) (N=58)		
	SF-36 physical function after TAPP	Median: 81 (NR) (N=58)	Median: 80.5 (NR) (N=59)	Median: 80 (NR) (N=58)		
Nikkolo et al., 2010[773]	% 1.5-3 cm	67% (43/64)	73% (49/67)			Four patients (two from each group) were lost to follow-up. The baseline characteristics are provided for the number of patients with follow-up data (131 of the 135 enrolled).
	% combined direct/indirect	5% (3/64)	3% (2/67)			
	% direct	36% (23/64)	51% (34/67)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Nikkolo et al., 2010[773] (continued)	% hernia <1.5 cm	20% (13/64)	16% (11/67)			
	% hernia >3 cm	13% (8/64)	10% (7/67)			
	% indirect	59% (38/64)	46% (31/67)			
	% recurrent	0% (0/64)	0% (0/67)			
	Time from hernia occurrence to operation (months)	14.3 (Range: 0.5-360) (N=64)	21.5 (Range: 0.4-360) (N=67)			
	% male	94% (60/64)	91% (61/67)			
	Age	57.2 (NR) (N=64)	59.2 (NR) (N=67)			
	BMI (kg/m^2)	25.5 (Range: 17.7-33.6) (N=64)	25 (Range: 17.5-32.9) (N=67)			
	% VAS severity of pain (>50, severe)	9% (6/64)	12% (8/67)			
	% VAS severity of pain (0-none)	8% (5/64)	15% (10/67)			
	% VAS severity of pain (1-10, mild)	20% (13/64)	25% (17/67)			
	% VAS severity of pain (11-50, moderate)	63% (40/64)	48% (32/67)			
	SF-36 vitality	67.2 (NR) (N=64)	68.6 (NR) (N=67)			
	SF-36 bodily pain	69.5 (NR) (N=64)	63.7 (NR) (N=67)			
	SF-36 emotional role	63.5 (NR) (N=64)	66.7 (NR) (N=67)			
	SF-36 general health	60.8 (NR) (N=64)	59.8 (NR) (N=67)			
	SF-36 mental health	75.0 (NR) (N=64)	75.8 (NR) (N=67)			
	SF-36 physical functioning	67.9 (NR) (N=64)	67.4 (NR) (N=67)			
	SF-36 physical role	53.5 (NR) (N=64)	44.0 (NR) (N=67)			
	SF-36 social functioning	81.1 (NR) (N=64)	83.2 (NR) (N=67)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Nikkolo et al., 2010[773] (continued)	VAS pain scores	Median: 20.1 (0-75) (N=64)	Median: 19.9 (0-100) (N=67)			
O'Dwyer et al., 2005[775]	% 1.5 cm to 3 cm	46% (74/162)	43% (68/159)			9 patients either withdrew consent or failed to complete the postoperative assessment after the 330 patients were randomized, leaving 321 patients.
	% Combined	13% (21/162)	19% (30/159)			
	% direct	40% (64/162)	32% (51/159)			
	% hernia <1.5 cm	17% (27/162)	15% (24/159)			
	% hernia >3 cm	38% (61/162)	41% (65/159)			
	% indirect	48% (77/162)	49% (78/159)			
	% left-sided	51% (82/162)	46% (73/159)			
	% right-side	49% (80/162)	54% (86/159)			
	% male	96% (156/162)	97% (154/159)			
	Age	55.7 (SD: 16.4) (N=162)	57.3 (SD: 15.8) (N=159)			
	BMI (kg/m^2)	25.5 (SD: 3.4) (N=162)	25.7 (SD: 3) (N=159)			
	VAS Pain (at rest)	10.1 (17.1) (N=162)	10.3 (16.4) (N=159)			
	VAS Pain (moving)	17.1 (22.4) (N=162)	17.9 (21.6) (N=159)			
Paajanen, 2007[781]	% 1.5 to 3 cm	51% (40/79)	47% (35/75)	45% (35/78)		N is hernias
	% Combined	5% (4/79)	7% (5/75)	4% (3/78)		N is hernias
	% direct	38% (30/79)	45% (34/75)	41% (32/78)		N is hernias
	% hernia <1.5 cm	20% (16/79)	19% (14/75)	17% (13/78)		N is hernias
	% hernia >3 cm	29% (23/79)	35% (26/75)	38% (30/78)		N is hernias
	% indirect	57% (45/79)	48% (36/75)	55% (43/78)		N is hernias
	% left-sided	56% (44/79)	59% (44/75)	62% (48/78)		N is hernias

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Paajanen, 2007[781] (continued)	% primary	95% (75/79)	96% (72/75)	96% (75/78)		N is hernias
	% recurrent	5% (4/79)	4% (3/75)	4% (3/78)		N is hernias
	% right-side	44% (35/79)	41% (31/75)	38% (30/78)		N is hernias
	% male	95% (75/79)	97% (73/75)	5% (4/78)		
	Age	56 (SD: 13) (N=79)	55 (SD: 13) (N=75)	59 (SD: 15) (N=78)		
	BMI (kg/m^2)	24 (SD: 3.2) (N=79)	25 (SD: 3.2) (N=75)	24 (SD: 2.5) (N=78)		
	VAS pain scores	3.7 (NR) (N=79)	3.5 (NR) (N=75)	3.45 (NR) (N=78)		
Paradowski et al., 2009[784]	% Nyhus type 1	20% (5/25)	32% (8/25)	28% (7/25)		
	% Nyhus type 2	32% (8/25)	24% (6/25)	28% (7/25)		
	% Nyhus type 3a	28% (7/25)	28% (7/25)	36% (9/25)		
	% Nyhus type 3b	12% (3/25)	8% (2/25)	4% (1/25)		
	% Nyhus type 4a	4% (1/25)	4% (1/25)	0% (0/25)		
	% BMI >35	16% (4/25)	24% (6/25)	20% (5/25)		
	% male	100% (25/25)	100% (25/25)	84% (21/25)		
	% Retired	44% (11/25)	28% (7/25)	28% (7/25)		
	% work Labour occupation	36% (9/25)	44% (11/25)	48% (12/25)		
	% work Sedentary occupation	20% (5/25)	28% (7/25)	24% (6/25)		
	Age	59 (NR) (N=25)	56.12 (NR) (N=25)	53.88 (NR) (N=25)		
	% ASA score 2	36% (9/25)	40% (10/25)	32% (8/25)		
	% ASA score 3	0% (0/25)	4% (1/25)	0% (0/25)		
	% ASA score 4	64% (16/25)	56% (14/25)	68% (17/25)		
Peeters et al., 2010[788]	% bilateral	35% (7/20)	35% (7/20)	32% (6/19)		
	% L1 defect	45% (9/20)	70% (14/20)	74% (14/19)		
	% L2 defect	40% (8/20)	15% (3/20)	16% (3/19)		
	% L3 defect	0% (0/20)	5% (1/20)	11% (2/19)		

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Peeters et al., 2010[788] (continued)	% M1 defect	0% (0/20)	5% (1/20)	21% (4/19)		
	% M2 defect	50% (10/20)	30% (6/20)	5% (1/19)		
	% M3 defect	5% (1/20)	10% (2/20)	5% (1/19)		
	% unilateral	65% (13/20)	65% (13/20)	68% (13/19)		
	Age	43.5 (Range: 34.5-47.5) (N=20)	34.5 (Range: 28.5-47) (N=20)	37 (Range: 33-46) (N=19)		
	BMI (kg/m^2)	24 (Range: 22-25) (N=20)	24.2 (Range: 22-26.5) (N=20)	25 (Range: 21-27) (N=19)		
	% Good mesh handling quatlity	85% (17/20)	65% (13/20)	63% (12/19)		
	% Moderate mesh handling quality	15% (3/20)	35% (7/20)	32% (6/19)		
	% Poor mesh handling quality	0% (0/20)	0% (0/20)	5% (1/19)		
	% recurrent	0% (0/20)	0% (0/20)	0% (0/19)		
Post et al., 2004[793]	% Bilateral	19% (9/48)	15% (9/60)			
	% Combined	13% (6/48)	15% (9/60)			
	% direct	54% (26/48)	43% (26/60)			
	% indirect	44% (21/48)	48% (29/60)			
	% left-sided	42% (20/48)	42% (25/60)			
	% recurrent	13% (6/48)	12% (7/60)			
	% right-side	69% (33/48)	65% (39/60)			
	% male	90% (43/48)	93% (56/60)			
	Age	62 (Range: 20-85) (N=48)	60 (Range: 31-84) (N=60)			
	SF-36 bodily pain	Median: 58 (NR) (N=60)	Median: 58 (NR) (N=48)			
	SF-36 general health	Median: 69 (NR) (N=60)	Median: 70 (NR) (N=48)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Post et al., 2004[793] (continued)	SF-36 mental health	Median: 70.5 (NR) (N=60)	Median: 80 (NR) (N=48)			
	SF-36 physical functioning	Median: 72 (NR) (N=60)	Median: 66 (NR) (N=48)			
	SF-36 role emotional	Median: 79 (NR) (N=60)	Median: 84 (NR) (N=48)			
	SF-36 role physical	Median: 56 (NR) (N=60)	Median: 55 (NR) (N=48)			
	SF-36 social functioning	Median: 88 (NR) (N=60)	Median: 90 (NR) (N=48)			
	SF-36 vitality	Median: 60.9 (NR) (N=60)	Median: 58 (NR) (N=48)			
Puccio et al., 2005[794]	% bilateral	0% (0/15)	0% (0/15)	0% (0/15)		
	% direct	33% (5/15)	40% (6/15)	40% (6/15)		
	% indirect	67% (10/15)	60% (9/15)	60% (9/15)		
	% recurrent	0% (0/15)	0% (0/15)	0% (0/15)		
	% Work any	80% (12/15)	87% (13/15)	80% (12/15)		
	% work Unemployed	20% (3/15)	13% (2/15)	20% (3/15)		
	Age	54 (NR) (N=15)	53 (NR) (N=15)	54 (NR) (N=15)		
	BMI (kg/m^2)	26 (NR) (N=15)	26 (NR) (N=15)	26 (NR) (N=15)		
Schopf et al., 2011[802]	% Elective surgery	95% (195/206)	98% (170/174)			
	% emergency hernia	5% (11/206)	2% (4/174)			
	% First recurrent hernia	17% (36/206)	13% (23/174)			
	% Hernia recurrent more than once	2% (4/206)	3% (5/174)			
	% left-sided	55% (114/206)	56% (97/174)			
	% Primary hernia	102% (210/206)	108% (188/174)			
	% right-side	66% (136/206)	68% (119/174)			
	% male	84% (174/206)	85% (148/174)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Schopf et al., 2011[802] (continued)	Age	55.6 (NR) (N=206)	51.3 (NR) (N=174)			
	% ASA score 1	51% (106/206)	63% (109/174)			
	% ASA score 2	35% (73/206)	29% (51/174)			
	% ASA score 3	13% (27/206)	8% (14/174)			
Smietanski et al., 2008[663]	% Combined direct and indirect (Rutkow)	8% (17/215)	8% (14/177)			208 patients were excluded after allocation due to monitoring visits that found protocol violations (seven hospitals)
	% Direct, large defect of the canal floor (Rutkow)	17% (37/215)	29% (51/177)			
	% Direct, small medial orfice (Rutkow)	7% (16/215)	5% (9/177)			
	% Indirect, dilated ring <4 cm (Rutkow)	36% (78/215)	37% (66/177)			
	% Indirect, normal deep internal ring (Rutkow class.)	19% (40/215)	8% (15/177)			
	% Indirect, ring >4 cm (Rutkow)	13% (27/215)	12% (22/177)			
	Time from hernia occurrence to operation (days)	12 (Range: 1-300) (N=215)	12 (Range: 1-480) (N=177)			
	% male	99% (212/215)	98% (173/177)			
	Age	Median: 56 (Range: 18-80) (N=215)	Median: 56 (Range: 23-87) (N=177)			
	Height (cm)	175 (Range: 160-195) (N=215)	174 (Range: 158-190) (N=177)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Smietanski et al., 2008[663] (continued)	Weight (kg)	77.7 (SD: 9.7) (N=215)	78.4 (SD: 10.8) (N=177)			
	% Pain before hernia sac occurrence	6% (12/215)	7% (12/177)			
	% pain before surgery	49% (105/215)	49% (86/177)			
	% with Pain	47% (102/215)	47% (83/177)			
	Pain before operation (days)	0 (Range: 0-101) (N=215)	0 (Range: 0-101) (N=177)			
	VAS	Median: 2.1 (95% CI: 1.75-2.4) (N=215)	Median: 1.9 (95% CI: 1.6-2.3) (N=177)			
Sutalo et al., 2010[818]	% Combined	8% (3/40)	13% (5/40)			
	% direct	35% (14/40)	28% (11/40)			
	% hernia ≤20 years	0% (0/40)	3% (1/40)			
	% indirect	58% (23/40)	60% (24/40)			
	% left-sided	45% (18/40)	50% (20/40)			
	% recurrent	0% (0/40)	0% (0/40)			
	% right-side	55% (22/40)	50% (20/40)			
	% age 21 to 30 years	35% (14/40)	38% (15/40)			
	% age 31 to 40 years	40% (16/40)	33% (13/40)			
	% age 41 to 50 years	25% (10/40)	28% (11/40)			
	Age	34.9 (SD: 7.7) (N=40)	33.8 (SD: 8.0) (N=40)			
Torcivia et al., 2010[825]	% bilateral	0% (0/23)	0% (0/24)			
	% recurrent	0% (0/23)	0% (0/24)			
	Hernia duration (days)	259 (NR) (N=23)	519 (NR) (N=24)			

Study	Characteristic	Group A	Group B	Group C	Group D	Comments
Torcivia et al., 2010[825] (continued)	% male	83% (19/23)	92% (22/24)			
	% Retired	52% (12/23)	33% (8/24)			
	Age	54.5 (NR) (N=23)	53.4 (NR) (N=24)			
	BMI (kg/m^2)	26.6 (NR) (N=23)	24.4 (NR) (N=24)			
	ASA score	1.3 (NR) (N=23)	1.2 (NR) (N=24)			
	Pain VAS	18 (NR) (N=23)	21.7 (NR) (N=24)			
	SF 12 score	38.4 (6.3) (N=23)	37 (5.4) (N=24)			
	SF12 score	37 (NR) (N=23)	38.3 (NR) (N=24)			
	VAS score	18.3 (4.2) (N=23)	21.7 (3.8) (N=24)			

Table 57. Key Question 5: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Gundre et al., 2011[703]	VAS score	12 hours post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain 0-2	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain 2-4	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain 4-6	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain 6-8	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain 8-10	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Seroma	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound infection	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to Daily Activities	1-3 days post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Scar satisfaction	NS	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Recurrence	5 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	VAS score <4	12 hours post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
Sadowski et al., 2011[797]	VAS score	2 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (None)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (1-2)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (3-5)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (>5)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, or tearing (None)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, or tearing (1-2)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, tearing (3-5)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, or tearing (>5)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Sadowski et al., 2011[797] (continued)	Numbness or dullness (None)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (1-2)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (3-5)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (>5)	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Recurrence	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Excessive pain	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Seroma	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Neuropathy	2 week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound Infection	2 Week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Other	2 Week follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (None)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (1-2)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (3-5)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Throbbing, stabbing, aching, burning (>5)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, or tearing (None)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, or tearing (1-2)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, tearing (3-5)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Catching, pulling, tugging, or tearing (>5)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (None)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (1-2)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (3-5)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Numbness or dullness (>5)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Sadowski et al., 2011[797] (continued)	Recurrence	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Excessive pain	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Seroma	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Neuropathy	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound Infection	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Other	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	VAS score (SD) not identified illioinguinal nerve	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) illioinguinal nerve divided	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score illioinguinal nerve preserved	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) illiohypogastric nerve not identified	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) illiohypogastric nerve divided	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) illiohypogastric nerve preserved	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) genitofemoral nerve not identified	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) genitofemoral divided	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score (SD) genitofemoral preserved	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
Bittner et al., 2011[636,637]	Complication rate	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Recurrence	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Pain in inguinal region when walking	Early post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bittner et al., 2011[636,637] (continued)	Pain in inguinal region when walking	After 4 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain in inguinal region when walking	After 6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain in inguinal region when walking	After 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Impairment of physical activity	Early post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Impairment of physical activity	After 4 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Impairment of physical activity	After 6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Impairment of physical activity	After 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS average intensity of pain in the groin when getting up	Preop	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS average intensity of pain in the groin when getting up	1 year Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS maximal intensity of pain in the groin when getting up	Pre-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS maximal intensity of pain in the groin when climbing stairs	Preop	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS maximal intensity of pain in the groin when getting up	1 year post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS maximal intensity of pain in the groin when climbing stairs	1 year post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS maximal pain intensity when climbing stairs, getting up, or walking	4 weeks post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain when climbing stairs or walking	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bittner et al., 2011[636,637] (continued)	Average intensity of pain in the testis	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Necessity for pain medication	Early post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Necessity for pain medication	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency feeling of foreign body	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of impairment of physical activity	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of impairment of physical activity	4 weeks post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of impairment of physical activity	1 year post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Severity of impairment of physical activites (VAS)	Preop	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Severity of impairment of physical activites (VAS)	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Severity of impairment of physical activites (VAS)	4 weeks post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Severity of impairment of physical activites (VAS)	1 year post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Seroma formation	Preop	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Agarwal et al., 2009[623]	Recurrence	Mean: 16 months (6-25)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain with ejaculation	NA	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS pain scores (avg)	Day 3 post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (avg)	Day 7 post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (avg)	Week 3 post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (avg)	Month 3 post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain scores (avg)	Year 1	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Discomfort during sexual activity	NA	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Discomfort during sexual activity	3 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Agarwal et al., 2009[623] (continued)	Incidence of infection	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
Ansaloni et al., 2009[627,628]	Recurrence	3 year post surgical follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Patient satisfaction with analgesia provided (excellent)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Patient satisfaction with analgesia provided (good)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Patient satisfaction with analgesia provided (satisfactory)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Patient satisfcation with analgesia provided (poor)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain (moderate)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (mild)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (mild)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (mild)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (mild)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (mild)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (mild)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (moderate)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (moderate)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (none)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (none)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (none)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Degree of pain at rest (none)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (none)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (none)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain at rest (severe)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (mild)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Degree of pain on coughing (moderate)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (moderate)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (none)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (none)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (none)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (none)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (none)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (severe)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (severe)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on coughing (severe)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (mild)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (mild)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (mild)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (mild)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Degree of pain on movement (mild)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (mild)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (mild)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (moderate)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (moderate)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (moderate)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (moderate)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (moderate)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (severe)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of pain on movement (severe)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Degree of pain on ocughing (none	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequecny of pain (never)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (always)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (always)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (never)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (never)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (never)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (never)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (never)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (never)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (rarely)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of pain (sometimes)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	VAS score pain at rest	12-24 hours	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain at rest	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	12-24 hours	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on coughing	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	12-24 hours	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	VAS score pain on movement	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score pain on movement	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Complications (none)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Degree of discomfort at rest (mild)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (mild)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (mild)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (mild)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (mild)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (none)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (none)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (none)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (none)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort at rest (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (mild)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (mild)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (mild)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Degree of discomfort on coughing (moderate)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (moderate)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (moderate)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (moderate)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (none)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (none)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (none)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughing (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on coughong (moderate	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (mild)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (mild)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (mild)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (mild)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (moderate)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (moderate)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (moderate)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (moderate)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Degree of discomfort on movement (moderate)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (no)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (none)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (none)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (none)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on movement (none)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on ocughing (mild)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfort on ocughing (none	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Degree of discomfot on coughing (mild	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	frequecncy of discomfort (never)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequenc of discomfort (sometimes)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (always)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (always)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (always)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (always)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (always)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Frequency of discomfort (never)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (never)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (never)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (never)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (rarely)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (rarely)	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (rarely)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (rarely)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (rarely)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (sometimes)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (sometimes)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (sometimes)	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Frequency of discomfort (sometimes)	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hperpyrexia (temperature >38 degrees C)	12 to 24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Intraoperative complications	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	No complications	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Ansaloni et al., 2009[627,628] (continued)	Self-subsidizing hyperpyrexia (temperature >38 degrees C)	24 hours post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Seroma	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Seroma	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	VAS score discomfort at rest	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort at rest	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort at rest	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort at rest	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort at rest	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on coughing	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on coughing	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on coughing	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on coughing	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on coughing	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on movement	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on movement	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on movement	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on movement	2 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score discomfort on movement	3 years	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bringman et al., 2004[642-644]	Recurrence	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Recurrent hernia	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Have you been to your doctor during past six months because of problems after hernia operation	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Hospital stay in admitted patients	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Does pain impede daily activities	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Does pain impeded sports or exercise	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Time to return to normal daily activities	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Have you been on sick leave during past 6 months because of problems with hernia or groin	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Time to return to work (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF-36 bodily pain	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF-36 general health	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF-36 mental health	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF-36 physical functioning	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF-36 social functioning	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF-36 vitality	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Do you use analgesics because of pain from hernia repair	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Groin pain	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain in groin at rest	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain in groin during physical activitiy	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bringman et al., 2004[642-644] (continued)	Pain in groin on coughing	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain in groin when rising from lying to sitting	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain in groin right now	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Pain on palpation	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Prolonged pain or neuralgia	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bringman et al., 2004[642-644] (continued)	VAS walking	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Bulge in groin	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Cardiac surgery	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Deep vein thrombosis	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Division of ileoinguinal nerve	Perioperative	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Do you experience any other discomfort in the groin	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Do you feel that you have a mesh in the groin	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Do you have normal sensation in the groin	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.
	Epigastric artery injury	Perioperative	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hematoma	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hypoaesthesia or hyperaesthesia	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Infection	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Ischemic orchitis	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Neuralgia	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Neuralgia	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Nin-hernia-related problems	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Other	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Other problems	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Partial division of spermatic cord	Perioperative	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Sensory loss	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Seroma	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bringman et al., 2004[642-644] (continued)	Testis atrofia	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Testitcular atrophy	3 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Urinary retention	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	urinary tract infection	Post <8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Bringman et al., 2005[645]	Time to return to normal daily activities	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	y	Y	Y	Mod.
	Time to return to work (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	y	Y	Y	Mod.
	Pain	Post op within 8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - resting in bed	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - resting in bed	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - resting in bed	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - resting in bed	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - resting in bed	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - resting in bed	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - rising from a horizontal to vertical position	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - rising from a horizontal to vertical position	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - rising from a horizontal to vertical position	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - rising from a horizontal to vertical position	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Bringman et al., 2005[645] (continued)	VAS for pain - rising from a horizontal to vertical position	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - rising from a horizontal to vertical position	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - standing	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - walking	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - walking	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - walking	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - walking	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS for pain - walking	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Hydrocele	Post op within 8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	minor bleeding	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	?	Y	Y	Mod.
	Peritoneal tear	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	?	Y	Y	Mod.
	Seroma	Post op within 8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Some abdominal discomfort in physical activity	Post op within 8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Transient sensory loss	Post op within 8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Urinary tract infection	Post op within 8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
Champault et al., 2007[88,655,656]	Recurrence	2 years	Y	?	Y	Y	Y	Y	?	N	Y	Y	Y	Y	Y	Y	Y	Mod.
	Incidence of chronic pain (Lichten)	2 years	Y	?	Y	Y	Y	Y	?	N	?	Y	?	N	Y	Y	Y	Mod.
	Incidence of chronic pain (TEP)	2 years	Y	?	Y	Y	Y	Y	?	N	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Champault et al., 2007[88,655,656] (continued)	Incidence of severe pain (VAS >5) (Lichten)	2 years	Y	?	Y	Y	Y	Y	?	N	?	Y	?	N	Y	Y	Y	Mod.
	Incidence of severe pain (VAS >5) (TEP)	2 years	Y	?	Y	Y	Y	Y	?	N	?	Y	?	N	Y	Y	Y	Mod.
	Pain location groin	2 years	Y	?	Y	Y	Y	Y	?	N	?	Y	?	N	Y	Y	Y	Mod.
	Pain location testicle	2 years	Y	?	Y	Y	Y	Y	?	N	?	Y	?	N	Y	Y	Y	Mod.
Chauhan et al., 2007[658]	Recurrence	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Mean VAS	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Mean VAS	Day 7 post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Hematoma	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Infection	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Post op neuralgia	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Total complications	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
Chowbey et al., 2010[660]	Recurrence	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Return to normal daily activities (days)	NA	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	y	Y	Y	Mod.
	Return to work (days)	NA	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	y	Y	Y	Mod.
	Chronic pain - mild	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - mild	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - moderate	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - moderate	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - Overall	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - Overall	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - severe	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Chronic pain - severe	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain	Day 0; post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain	Day 7 post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Testicular pain (mean)	NA	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Chowbey et al., 2010[660] (continued)	Seroma (mean)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
Chui et al., 2010[661]	VAS HW	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS HW	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS HW	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS HW	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS LW	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS LW	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS LW	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS LW	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score Left	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score left	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score left	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score left	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score right	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score right	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score right	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain score right	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Foreign body sensation post op - LW	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Foreign body sensation post op - HW	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Foreign body sensation post op - LW	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Foreign body sensation post op - HW	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Foreign body sensation post op - HW	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Foreign body sensation post op - LW	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Post op acute retention of urine	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Chui et al., 2010[661] (continued)	Post op seroma formation	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Post op wound infection	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
Collaborative group, 2008[663]	Recurrence	After 12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	SF-36 bodily pain	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 bodily pain	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 general health	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 general health	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 mental health	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 mental health	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 physical functioning	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 physical functioning	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 role emotional	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 role emotional	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 role physical	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 role physical	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 social functioning	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 social functioning	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 vitality	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	SF-36 vitality	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	Analgesic consumption	Day 1	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Pain	3 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	Pain	7 days	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	Pain	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	Pain	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	VAS	Day 7	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	VAS	3 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	VAS	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	VAS	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Collaborative group, 2008[663] (continued)	VAS	Day 1	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	?	Mod.
	Need for urinary catheter placement	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Perioperative nerve injury	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	?	Mod.
	Redness of wound or wound edema	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Superficial hematoma	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Urine retention	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Wound infection	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
DeBord et al., 1999[668]	Pain in left thigh and numbeness in left knee	5 days post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Infection	3 weeks post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Prolonged ileus	12 days post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Seroma	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Di Vita et al., 2010[670]	Recurrence	Mean: 24 months (24-30)	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay (hours)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	y	Y	Y	Mod.
Freudenberg et al., 2006[696]	Ability to walk - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Ability to walk - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Ability to walk - unable	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Ability to work - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Ability to work - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Ability to work - unable	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Appetite - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Appetite - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Bicycle riding - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Bicycle riding - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Bicycle riding - unable	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sexual function - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sexual function - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Freudenberg et al., 2006[696] (continued)	Sexual function - unable	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Social activity - normal	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Social activity - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Social activity - unable	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Time lost caused by health care - <10/min day	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Time lost caused by health care - >10/min day	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Time lost caused by health care - none	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	QoL index	Post op (30 days)	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Esthetic satisfaction - bad	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Esthetic satisfaction - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Esthetic satisfaction - medium	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	General happiness - bad	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	General happiness - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	General happiness - medium	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	General happiness - very good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain QoL	Postop	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Foreign body sensation - no	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Foreign body sensation - yes	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Local comfort - normal	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Local comfort - severe discomfort	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Local comfort - some discomfort	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Miction - good	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Miction - restricted	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Freudenberg et al., 2006[696] (continued)	Operative outcome	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	?	Y	Y	Mod.
	Sensitivity loss of skin - little	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sensitivity loss of skin - no	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sensitivity loss of skin - severe	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
Heikkinen et al., 2006[709]	Median hospital stay for admitted patients (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Time to return to normal daily activities (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Time to return to work (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Transient testicular pain	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS resting in bed	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS rising from horizontal to vertical position	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Heikkinen et al., 2006[709] (continued)	VAS standing	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS standing	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Day 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 2	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 3	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 4	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS walking	Week 8	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Acute myocardial (AMI) and coronary bypass	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Deep vein thrombosis	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Inguinal discomfort	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Ophthalmic embolism	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Seroma	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Some abdominal discomfort	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Umbilical wound infection	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Urine retention and infection	Post op ≤8 weeks	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
Kapischke et al., 2010[716]	VAS pain score	Post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain score	6 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Mesh infection	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
Khan et al., 2010[717]	Recurrence	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	VAS pain	7 days post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain	6 months post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain	12 months post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain	3 months post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Khan et al., 2010[717] (continued)	hematoma formation	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Ilioinguinal nerve injury	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Seroma formation	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Urinary retention	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Wound infection	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	Y	Mod.
Koch et al., 2008[724]	Recurrence	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Return to normal activity (all groups) (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to heavy physical work (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to light physical work (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to medium physical work (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to normal activity (heavy physical work)(days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to normal activity (light physical work) (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to normal activity (medium physical work) (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to normal activity (retired) (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Return to work general (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	y	Y	Y	Low
	Pain with normal activity	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain with strenous activity	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Unspecified pain	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain at rest	Day 1	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain at rest	Week 1	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain at rest	Week 2	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain at rest	Week 3	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Koch et al., 2008[724] (continued)	VAS pain at rest	Week 4	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain at rest	Week 8	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain with activity	Day 1	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain with activity	Week 1	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain with activity	Week 2	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain with activity	Week 3	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain with activity	Week 4	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain with activity	Week 8	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Discomfort	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Hematoma	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Infection	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Neuralgia	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Neuralgia (genitofemoral)	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Seroma	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Mod.
	Testicular atrophy	12 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Langenbach et al., 2003[733]	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	y	Y	Y	Mod.
	Average inability to work (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	y	Y	Y	Mod.
	Pain with ejaculation	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain with ejaculation	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain with ejaculation	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain with ejaculation	Week 12 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular contact pain	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular contact pain	Day 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular contact pain	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular contact pain	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular contact pain	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular contact pain	Week 12 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Langenbach et al., 2003[733] (continued)	VAS impairment of sexual life	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS impairment of sexual life	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS impairment of sexual life	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS impairment of sexual life	Week 8 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS impairment of sexual life	Week 12 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Day 3 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Week 8 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS pain development	Week 12 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Abdominal wall seroma	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Abdominal wall seroma	Day 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Abdominal wall seroma	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Abdominal wall seroma	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Abdominal wall seroma	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Discomfort with urination	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Discomfort with urination	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Discomfort with urination	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Discomfort with urination	Week 12 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Scrotal hematoma	Day 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Scrotal hematoma	Day 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Scrotal hematoma	Week 1 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Scrotal hematoma	Week 2 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Scrotal hematoma	Week 4 post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Langenbach et al., 2003[733] (continued)	Testicular atrophy	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	y	Y	Y	Low
	Average inability to work (days)	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	y	Y	Y	Low
	Pain with ejaculation	First post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Fourth post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Week 12 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Day 1 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Day 2 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Second post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Fourth post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	First post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Week 12 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life	Week 1 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS impairment of sexual life	Week 2 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS impairment of sexual life	Week 4 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS impairment of sexual life	Week 8 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS impairment of sexual life	Week 12 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Day 1 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Day 3 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Week 1 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Week 2 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Week 4 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Week 8 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	VAS pain development	Week 12 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	N	?	Mod.
	Abdominal wall seroma	Day 1 post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Langenbach et al., 2003[733] (continued)	Abdominal wall seroma	Day 2 post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	Second post op week	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	Fourth post op week	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	First post op week	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Discomfort with urination	First post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	Fourth post op week	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	Week 12 post op	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	Scrotal hematoma	Day 1 post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Day 2 post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	First post op week	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Second post op week	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Fourth post op week	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Testicular atrophy	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Langenbach et al., 2008[735]	Recurrence rate	Post op 24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Recurrence rate	Post op 60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	y	Y	Y	Low
	Average duration of incapacity for work (days)	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	y	Y	Y	Low
	SF-36 development of pain after TAPP	24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	SF-36 development of pain after TAPP	60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	SF-36 physical function after TAPP	24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	SF-36 physical function after TAPP	60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Post op week 12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Langenbach et al., 2008[735] (continued)	Pain with ejaculation	Post op 24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Pain with ejaculation	Post op 60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Post op day 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Post op day 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Testicular contact pain	Post op week 12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op week 8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op week 12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op 24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS impairment of sexual life after TAPP	Post op 60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op day 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op day 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Langenbach et al., 2008[735] (continued)	VAS pain development after TAPP	Post op week 8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op week 12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op 24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	VAS pain development after TAPP	Post op 60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Abdominal wall seroma	Post op day 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	Post op day 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Abdominal wall seroma	Post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Discomfort with urination	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	Post op week 12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	Post op 24 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Discomfort with urination	Post op 60 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Low
	Scrotal hematoma	Post day 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Post op day 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Post op week 1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Post op week 2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Scrotal hematoma	Post op week 4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Nikkolo et al., 2010[773]	Recurrences	NR	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Mean duration of hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	y	Y	Y	Mod.
	SF-36 bodily pain	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	SF-36 emotional role	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	SF-36 general health	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	SF-36 mental health	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Nikkolo et al., 2010[773] (continued)	SF-36 physical functioning	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	SF-36 physical role	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	SF-36 social functioning	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	SF-36 vitality	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain at operation site	6 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain at rest	1 month	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain at rest	6 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain during physical activity	1 month	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain of any severity (VAS ≥1) during any physical activity	After 6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain while exercising	1 month	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain scores	Week 1	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain scores	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS pain scores	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (>50, severe)	Week 1 post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (>50, severe)	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (>50, severe)	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (0-none)	Week 1 post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (0-none)	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (0-none)	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (1-10, mild)	Week 1 post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (1-10, mild)	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Nikkolo et al., 2010[773] (continued)	VAS severity of pain (1-10, mild)	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (11-50, moderate)	Week 1 post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (11-50, moderate)	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS severity of pain (11-50, moderate)	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Feeling of foreign body	After 6 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Superficial hematoma	Day 7 post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound seroma	Day 7 post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound suppuration	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
O'Dwyer et al., 2005[775]	Recurrence	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hobbies (days)	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Looking after house (days)	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sex (days)	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Social life (days)	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Return to paid work (days)	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain of any severity	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Testicular pain	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS Pain (at rest)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS Pain (at rest)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS Pain (moving)	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS Pain (moving)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Contralateral hernia	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Testicular atrophy	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Treatment effect	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Wound infections	Post-op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Wound sinus	12 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Paajanen, 2007[781]	Recurrences	After 2 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Normal car driving (most patients retired and used car very seldom)	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Normal running	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Normal walking	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Painless walking	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	No problems in work	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Sick leave	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Analgesic use	After 2 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use daily	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use daily	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use daily	After 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use none	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use none	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use sometimes	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use sometimes	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Analgesic use sometimes	After 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Pain feeling 1 year	After 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain scores	Post op day 1	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain scores	Post op week 1	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain scores	Post op 1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain scores	Post op 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain scores	Post op 2 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Feeling of foreign body	After 1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Feeling of foreign body	After 2 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Normal wound healing	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Wound hematoma	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Wound infection	First week post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Wound swelling/bruises	First month post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Paradowski et al., 2009[784]	Recurrence	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Time of hospital stay (hours)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	y	Y	Y	Mod.
	Time to return to normal activity (days)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	y	Y	Y	Mod.
	Bodily pain score SF-36	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	?	Mod.
	VAS	After 7 days	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS (>2)	After 1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	?	Mod.
	VAS (>5)	After 3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS (1-2)	After 3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS (1-2)	After 1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	?	Mod.
	VAS (3-5)	After 3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Infection	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Redness of wound	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Peters et al., 2010[788]	Recurrence	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	?	?	Mod.
	Return to daily activities	NA	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Return to sports activities	NA	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Return to professional activities	NA	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Mild inguinal pain	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	?	?	Mod.
	Moderate inguinal pain	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	?	?	Mod.
	Severe inguinal pain	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	?	?	Mod.
	Hematoma	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Numbness	1 year	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	?	?	Mod.
	Seroma	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Suction drain	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Post et al., 2004[793]	Recurrence	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	SF-36 bodily pain	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	SF-36 general health	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	SF-36 mental health	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Post et al., 2004[793] (continued)	SF-36 physical functioning	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	SF-36 role emotional	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	SF-36 role physical	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	SF-36 social functioning	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	SF-36 vitality	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain at rest	2 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	VAS pain on physical activity	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Collection of serous fluid around mesh	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Feeling of foreign body	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	?	Mod.
	Hematoma	2 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Intraoperative complications	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	?	Y	?	Mod.
	Seroma >10 ml	2 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Seroma >10 ml	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Testicular atrophy	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	?	Mod.
Puccio et al., 2005[794]	Recurrence	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	?	Y	Y	Mod.
	Median time to full recovery (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	y	Y	Y	Mod.
	Prolonged pain	<30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Prolonged pain	>30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Required extra analgesia (need to add to data sheet)	4 hours after surgery	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Delayed wound healing	<30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Discomfort	<30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Feeling of stiffness and a foreign body in groin	Post op	Y	Y	Y	Y	Y	Y	?	?	Y	Y	N	N	Y	Y	Y	Mod.
	Hematoma	<30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Hyperesthesia	>30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Sensory loss	<30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Puccio et al., 2005[794] (continued)	Sensory loss	>30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Seroma	<30 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
Schopf et al., 2011[802]	Recurrence	3 year observation period	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	Y	Y	Y	Y	Mod.
	Acute pain	Post op (immediate post op period 3 months or less)	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Chronic inguinal pain	Post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Need painkillers - no	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	Y	?	Y	Y	Mod.
	Need painkillers - yes	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	Y	?	Y	Y	Mod.
	NSAR painkillers	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	Y	?	Y	Y	Mod.
	Pain affect daily life - little	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain affect daily life – no problem	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain affect daily life – very limiting	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain related to hernia repair - every day	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain related to hernia repair - no	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain related to hernia repair - occasionally	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain related to hernia repair - once a week	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Pain related to hernia repair - yes	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 0	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 1	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 10	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 2	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 3	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 4	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 5	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Schopf et al., 2011[802] (continued)	VAS 6	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 7	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 8	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	VAS 9	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
	Acupuncture	Follow-up	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	N	?	Y	Y	Mod.
Sutalo et al., 2010[818]	Incidence of recurrence	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain and numbness at rest	1 month	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness at rest	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness at rest	6 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness at rest	12 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness during physical activity	1 month	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness during physical activity	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness during physical activity	6 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain and numbness during physical activity	12 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Hematoma	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Sensory loss	1 month	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Sensory loss	3 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Sensory loss	6 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Sensory loss	12 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Seroma	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Without complications	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound infection	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Torcivia et al., 2010[825]	Average length of stay in hospital (min)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	QoL scores	Day 7	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	QoL scores	Day 30	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	SF 12 score	Preoperative	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Torcivia et al., 2010[825] (continued)	VAS	Day 1 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 1 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 2 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 2 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 3 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 3 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 4 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 4 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 5 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 5 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 6 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 6 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 7 am	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	Day 7 pm	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS=0	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Post operative complications	Post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Table 58. Key Question 5: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gundre et al., 2011[703]	Polyethylene mesh vs. Polypropylene mesh	Pain	VAS score	12 hours post-op	3.029	3.228	Chi square: p=0.571	
	Polyethylene mesh vs. Polypropylene mesh	Pain	Pain 0-2	Post-op	6 (17.1%)	5 (14.3%)		
	Polyethylene mesh vs. Polypropylene mesh	Pain	Pain 2-4	Post-op	21 (60%)	23 (65.7%)		
	Polyethylene mesh vs. Polypropylene mesh	Pain	Pain 4-6	Post-op	8 (22.9%)	7 (20%)		
	Polyethylene mesh vs. Polypropylene mesh	Pain	Pain 6-8	Post-op	0 (0%)	0 (0%)		
	Polyethylene mesh vs. Polypropylene mesh	Pain	Pain 8-10	Post-op	0 (0%)	0 (0%)		
	Polyethylene mesh vs. Polypropylene mesh	ADV	Seroma	Post-op	2 (5.7%)	3 (8.57%)	Chi square: p=0.643	
	Polyethylene mesh vs. Polypropylene mesh	ADV	Wound infection	Post-op	1 (2.86%)	1 (2.86%)	Chi square: p=0.368	
	Polyethylene mesh vs. Polypropylene mesh	RTDA	Return to Daily Activities	1-3 days post-op	29 (82.9%)	30 (85.7%)	Chi square: p=0.938	
	Polyethylene mesh vs. Polypropylene mesh	SFN	Scar satisfaction	NS	32 (91.4%)	33 (94.3%)		Author's report a statistically insignificant difference
	Polyethylene mesh vs. Polypropylene mesh	RC	Recurrence	5 years	0 (0%)	0 (0%)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Gundre et al., 2011[703] (continued)	Polyethylene mesh vs. Polypropylene mesh	Pain	VAS score <4	12 hours post-op	27 (77.1%)	27 (78%)		
Sadowski et al., 2011[797]	Polyester mesh vs. Polypropylene mesh	Pain	VAS score	2 weeks	1.18 (SD: 1.42)	1.39 (SD: 1.36)	Wilcoxen test: p=0.3740); 2t test p=0.4989	
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score	3 months	0.46 (SD: 1.22)	0.56 (SD: 1.13)	Wilcoxen test p=0.6727; 2t-test p=0.7213	
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (None)	2 week follow-up	14/39 (36%)	16/39 (42.1%)	Chi-squared or fishers exact test p=0.1527	
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (1-2)	2 week follow-up	11/39 (28.2%)	8/39 (21.2%)		
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (3-5)	2 week follow-up	1/39 (2.6%)	6/39 (16%)		
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (>5)	2 week follow-up	13/39 (33.3%)	8/39 (21.1%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, or tearing (None)	2 week follow-up	18/39 (46.2%)	24/39 (63.2%)	Chi-squared or fishers exact test p=0.1104	
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, or tearing (1-2)	2 week follow-up	10/39 (25.64%	6/39 (15.8%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, tearing (3-5)	2 week follow-up	2/39 (5.1%)	5/39 (13.2%)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sadowski et al., 2011[797] (continued)	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, or tearing (>5)	2 week follow-up	9/39 (23.1%)	3/39 (8%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (None)	2 week follow-up	25/39 (64.1%)	22/39 (58%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (1-2)	2 week follow-up	5/39 (13%)	7/39 (18.4%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (3-5)	2 week follow-up	1/39 (2.6%)	2/39 (5.3%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (>5)	2 week follow-up	8/39 (21%)	7/39 (18.4%)		
	Polyester mesh vs. Polypropylene mesh	RC	Recurrence	2 week follow-up	0/39 (0%)	0/38 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Excessive pain	2 week follow-up	0/39 (0%)	0/39 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Hematoma	2 week follow-up	0/39 (0%)	0/39 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Seroma	2 week follow-up	0/39 (0%)	0/39 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Neuropathy	2 week follow-up	0/39 (0%)	0/39 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Wound Infection	2 Week follow-up	0/39 (0%)	0/39 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Other	2 Week follow-up	3/39 (7.7%)	1/39 (2.6%)		
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (None)	3 months	22/35 (63%)	27/35 (77%)		
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (1-2)	3 months	5/35 (14.3%)	4/35 (11.4%)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sadowski et al., 2011[797] (continued)	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (3-5)	3 months	6/35 (17.1%)	3/35 (8.6%)		
	Polyester mesh vs. Polypropylene mesh	Pain	Throbbing, stabbing, aching, burning (>5)	3 months	2/35 (5.7%)	1/35 (2.9%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, or tearing (None)	3 months	23/35 (65.7%)	33/35 (94.3%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, or tearing (1-2)	3 months	6/35 (17.1%)	1/35 (2.9%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, tearing (3-5)	3 months	5/35 (14/3%)	1/35 (2.9%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Catching, pulling, tugging, or tearing (>5)	3 months	1/35 (2.8%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (None)	3 months	23/35 (65.7%)	28/35 (80%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (1-2)	3 months	6/35 (17.1%)	5/35 (14.3%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (3-5)	3 months	1/35 (2.9%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Numbness or dullness (>5)	3 months	5/35 (14.3%)	2/35 (5.7%)		
	Polyester mesh vs. Polypropylene mesh	RC	Recurrence	3 months	0/35 (0%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Excessive pain	3 months	0/35 (0%)	0/35 (0%)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sadowski et al., 2011[797] (continued)	Polyester mesh vs. Polypropylene mesh	ADV	Hematoma	3 months	0/35 (0%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Seroma	3 months	0/35 (0%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Neuropathy	3 months	0/35 (0%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Wound Infection	3 months	0/35 (0%)	0/35 (0%)		
	Polyester mesh vs. Polypropylene mesh	ADV	Other	3 months	3/35 (8.6%)	1/35 (2.9%)		
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) not identified illioinguinal nerve	3 months	0.00 (SD: 0) (n=3)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) illioinguinal nerve divided	3 months	0.64 (SD 1.43) (n=23)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score illioinguinal nerve preserved	3 months	0.50 (SD 1.09) (n=42)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) illiohypogastric nerve not identified	3 months	0.68 (SD 1.33) (n=28)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) illiohypogastric nerve divided	3 months	0.81 (SD 1.58) (n=14)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) illiohypogastric nerve preserved	3 months	0.22 (SD 0.68) (n=25)			Entire study results

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sadowski et al., 2011[797] (continued)	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) genitofemoral nerve not identified	3 months	0.45 (SD 1.08) (n=56)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) genitofemoral divided	3 months	1.14 (SD 2.04) (n=7)			Entire study results
	Polyester mesh vs. Polypropylene mesh	Pain	VAS score (SD) genitofemoral preserved	3 months	0.51 (SD 0.71) (n=5)			Entire study results
Bittner et al., 2011[636,637]	Prolene vs. Premilene	ADV	Complication rate	Post-op	2.64%	0.66%		Prolene – 3 trocar hernias at the umbilicus, one lesion of the cutaneous femoral nerve, persistent seroma. TiMesh – 1 trocar hernia at the umbilicus, 2 lesions of cutaneous femoral nerve, one lesion of the genital brance of genitor-femoral nerve
	Prolene vs. Ultrapro	ADV	Complication rate	Post-op	2.64%	1.98%		Prolene – 3 trocar hernias at the umbilicus, one lesion of the cutaneous femoral nerve, persistent seroma.

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Prolene vs. TiMesh	ADV	Complication rate	Post-op	2.64%	3.3%		TiMesh – 1 trocar hernia at the umbilicus, 2 lesions of cutaneous femoral nerve, one lesion of the genital brance of genitor-femoral nerve
	Premilene vs. Ultrapro	ADV	Complication rate	Post-op	0.66%	1.98%		Prolene – 3 trocar hernias at the umbilicus, one lesion of the cutaneous femoral nerve, persistent seroma.
	Premiline vs. TiMesh	ADV	Complication rate	Post-op	0.66%	3.3%		TiMesh – 1 trocar hernia at the umbilicus, 2 lesions of cutaneous femoral nerve, one lesion of the genital brance of genitor-femoral nerve
	Ultrapro vs. TiMesh	ADV	Complication rate	Post-op	1.98%	3.3%		Prolene – 3 trocar hernias at the umbilicus, one lesion of the cutaneous femoral nerve, persistent seroma.
	Prolene vs. Premilene	RC	Recurrence	1 year	1 (0.66%)	0 (0%)		
	Prolene vs. Ultrapro	RC	Recurrence	1 year	1 (0.66%)	0 (0%)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Prolene vs. TiMesh	RC	Recurrence	1 year	1 (0.66%)	2 (1.3%)		
	Premilene vs. Ultrapro	RC	Recurrence	1 year	0 (0%)	0 (0%)		
	Premilene vs. TiMesh	RC	Recurrence	1 year	0 (0%)	2 (1.3%)		
	Ultrapro vs. TiMesh	RC	Recurrence	1 year	0 (0%)	2 (1.3%)		
	Prolene vs. Premilene	Pain	Pain in inguinal region when walking	Early post-op	53.3% (80/150)	48% (72/150)		
	Prolene vs. Premilene	Pain	Pain in inguinal region when walking	After 4 weeks	6.7% (10/150)	4.7% (7/150)		
	Prolene vs. Premilene	Pain	Pain in inguinal region when walking	After 6 months	4% (6/150)	6.7% (10/150)		
	Prolene vs. Premilene	Pain	Pain in inguinal region when walking	After 1 year	8% (12/150)	2.7% (4/150)		
	Prolene vs. Ultrapro	Pain	Pain in inguinal region when walking	Early post-op	53.3% (80/150)	57.3% (86/150)		
	Prolene vs. Ultrapro	Pain	Pain in inguinal region when walking	After 4 weeks	6.7% (10/150)	5.3% (8/150)		
	Prolene vs. Ultrapro	Pain	Pain in inguinal region when walking	After 6 months	4% (6/150)	2.7% (4/150)		
	Prolene vs. Ultrapro	Pain	Pain in inguinal region when walking	After 1 year	8% (12/150)	2.7% (4/150)		
	Prolene vs. TiMesh	Pain	Pain in inguinal region when walking	Early post-op	53.3% (80/150)	62.7% (94/150)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Prolene vs. TiMesh	Pain	Pain in inguinal region when walking	After 4 weeks	6.7% (10/150)	7.3% (11/150)		
	Prolene vs. TiMesh	Pain	Pain in inguinal region when walking	After 6 months	4% (6/150)	5.3% (8/150)		
	Prolene vs. TiMesh	Pain	Pain in inguinal region when walking	After 1 year	8% (12/150)	4% (6/150)		
	Premilene vs. Ultrapro	Pain	Pain in inguinal region when walking	Early Post-op	48% (72/150)	57.3% (86/150)		
	Premilene vs. Ultrapro	Pain	Pain in inguinal region when walking	After 4 weeks	4.7% (7/150)	5.3% (8/150)		
	Premilene vs. Ultrapro	Pain	Pain in inguinal region when walking	After 6 months	6.7% (10/150)	2.7% (4/150)		
	Premilene vs. Ultrapro	Pain	Pain in inguinal region when walking	After 1 year	2.7% (4/150)	2.7% (4/150)		
	Premilene vs. TiMesh	Pain	Pain in inguinal region when walking	Early Post-op	48% (72/150)	62.7% (94/150)		
	Premilene vs. TiMesh	Pain	Pain in inguinal region when walking	After 4 weeks	4.7% (7/150)	7.3% (11/150)		
	Premilene vs. TiMesh	Pain	Pain in inguinal region when walking	After 6 months	6.7% (10/150)	5.3% (8/150)		
	Premilene vs. TiMesh	Pain	Pain in inguinal region when walking	After 1 year	2.7% (4/150)	4% (6/150)		
	Ultrapro vs. TiMesh	Pain	Pain in inguinal region when walking	Early Post-op	57.3% (86/150)	62.7% (94/150)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Ultrapro vs. TiMesh	Pain	Pain in inguinal region when walking	After 4 weeks	5.3% (8/150)	7.3% (11/150)		
	Ultrapro vs. TiMesh	Pain	Pain in inguinal region when walking	After 6 months	2.7% (4/150)	5.3% (8/150)		
	Ultrapro vs. TiMesh	Pain	Pain in inguinal region when walking	After 1 year	2.7% (4/150)	4% (6/150)		
	Prolene vs. Premilene	Pain	Impairment of physical activity	Early post op	77.3% (116/150)	70.7% (106/150)		
	Prolene vs. Premilene	Pain	Impairment of physical activity	After 4 weeks	15.3% (23/150)	6% (9/150)		
	Prolene vs. Premilene	Pain	Impairment of physical activity	After 6 months	0% (0/150)	1.3% (2/150)		
	Prolene vs. Premilene	Pain	Impairment of physical activity	After 1 year	0.7% (1/150)	0.7% (1/150)		
	Prolene vs. Ultrapro	Pain	Impairment of physical activity	Early post op	77.3% (116/150)	74.7% (112/150)		
	Prolene vs. Ultrapro	Pain	Impairment of physical activity	After 4 weeks	15.3% (23/150)	8.7% (13/150)		
	Prolene vs. Ultrapro	Pain	Impairment of physical activity	After 6 months	0% (0/150)	1.3% (2/150)		
	Prolene vs. Ultrapro	Pain	Impairment of physical activity	After 1 year	0.7% (1/150)	1.3% (2/150)		
	Prolene vs. TiMesh	Pain	Impairment of physical activity	Early post op	77.3% (116/150)	80% (120/150)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Prolene vs. TiMesh	Pain	Impairment of physical activity	After 4 weeks	15.3% (23/150)	12.7% (19/150)		
	Prolene vs. TiMesh	Pain	Impairment of physical activity	After 6 months	0% (0/150)	2% (3/150)		
	Prolene vs. TiMesh	Pain	Impairment of physical activity	After 1 year	0.7% (1/150)	0% (0/150)		
	Premilene vs. Ultrapro	Pain	Impairment of physical activity	Early post op	70.7% (106/150)	74.7% (112/150)		
	Premilene vs. Ultrapro	Pain	Impairment of physical activity	After 4 weeks	6% (9/150)	8.7% (13/150)		
	Premilene vs. Ultrapro	Pain	Impairment of physical activity	After 6 months	1.3% (2/150)	1.3% (2/150)		
	Premilene vs. Ultrapro	Pain	Impairment of physical activity	After 1 year	0.7% (1/150)	1.3% (2/150)		
	Premilene vs. TiMesh	Pain	Impairment of physical activity	Early post op	70.7% (106/150)	80% (120/150)		
	Premilene vs. TiMesh	Pain	Impairment of physical activity	After 4 weeks	6% (9/150)	12.7% (19/150)		
	Premilene vs. TiMesh	Pain	Impairment of physical activity	After 6 months	1.3% (2/150)	2% (3/150)		
	Premilene vs. TiMesh	Pain	Impairment of physical activity	After 1 year	0.7% (1/150)	0% (0/150)		
	Ultrapro vs. TiMesh	Pain	Impairment of physical activity	Early post op	74.7% (112/150)	80% (120/150)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Ultrapro vs. TiMesh	Pain	Impairment of physical activity	After 4 weeks	8.7% (13/150)	12.7% (19/150)		
	Ultrapro vs. TiMesh	Pain	Impairment of physical activity	After 6 months	1.3% (2/150)	2% (3/150)		
	Ultrapro vs. TiMesh	Pain	Impairment of physical activity	After 1 year	1.3% (2/150)	0% (0/150)		
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS average intensity of pain in the groin when getting up	Preop	Entire study: 3.6 (SD 9.5)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS average intensity of pain in the groin when getting up	1 year post-op	Entire study: 0.4 (SD 2.8)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS average intensity of pain in the groin when walking	Preop	Entire study: 12.4 (SD19.6)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS average intensity of pain in the groin when walking	1 year post-op	Entire study: 2.3 (SD 9.1)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS maximal intensity of pain in the groin when getting up	Pre-op	Entire study: 16.7 (SD 14.2)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS maximal intensity of pain in the groin when climbing stairs	Preop	Entire study: 30.3 (SD 19.9)			

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS maximal intensity of pain in the groin when getting up	1 year post-op	Ultrapro (LW) 16.3 (SD 7.5)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS maximal intensity of pain in the groin when climbing stairs	1 year post-op	Premilene (MW) 45 (SD 12.9)			
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	VAS maximal pain intensity when climbing stairs, getting up, or walking	4 weeks post-op	Prolene (HW): 39.5 (SD 27.8) to 47.9 (SD 32.6)	All other three groups: 15.7 (SD14.6) to 21.9 (SD16.5)	P<0.0384 when climbing stairs; p=0.0295) when getting up; p<0.0402 when walking	
	Premilene vs. Prolene, Ultrapro, and TiMesh	Pain	Pain when climbing stairs or walking	6 months			P<0.0492 (climbing stairs); p<0.008 (walking)	
	Prolene, Premilene, Ultrapro, and TiMesh	Pain	Average intensity of pain in the testis	1 year	Entire study: 0 to 0.7 (SD 4.2) for walking			
	Prolene, Premilene, Ultrapro, TiMesh	Pain	Necessity for pain killers	Early post-op	Entire study: 26% of patients (156/600)			
	Prolene vs. Premilene	Pain	Necessity for pain medication	1 year	0.7% (1/150)	0.7% (1/150)		
	Prolene vs. Ultrapro	Pain	Necessity for pain medication	1 year	0.7% (1/150)	0% (0/150)		
	Prolene vs. TiMesh	Pain	Necessity for pain medication	1 year	0.7% (1/150)	0% (0/150)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Premilene vs. Ultrapro	Pain	Necessity for pain medication	1 year	0.7% (1/150)	0% (0/150)		
	Premilene vs. TiMesh	Pain	Necessity for pain medication	1 year	0.7% (1/150)	0% (0/150)		
	Ultrapro vs. TiMesh	Pain	Necessity for pain medication	1 year	0% (0/150)	0% (0/150)		
	Prolene, Premilene, Ultrapro, TiMesh	ADV	Frequency feeling of foreign body	1 year	Entire study: 0.8%			
	Prolene vs. Premilene	Pain	Feeling of foreign body with low intensity of pain (VAS)	1 year	0.4 (SD 3.5)	0		
	Prolene vs. Ultrapro	Pain	Feeling of foreign body with low intensity of pain (VAS)	1 year	0.4 (SD 3.5)	0.1 (SD 1.2)		
	Prolene vs. TiMesh	Pain	Feeling of foreign body with low intensity of pain (VAS)	1 year	0.4 (SD 3.5)	0		
	Premilene vs. Ultrapro	Pain	Feeling of foreign body with low intensity of pain (VAS)	1 year	0	0.1 (SD 1.2)		
	Premilene vs. TiMesh	Pain	Feeling of foreign body with low intensity of pain (VAS)	1 year	0	0		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Ultrapro vs. TiMesh	Pain	Feeling of foreign body with low intensity of pain (VAS)	1 year	0.1 (SD 1.2)	0		
	Prolene, Premilene, Ultrapro, and TiMesh	RTDA	Frequency of impairment of physical activity	Post op			Entire study: p<0.001 for all groups (significant improvement)	
	Premilene, Ultrapro, and TiMesh	RTDA	Frequency of impairment of physical activity	4 weeks post-op			These three groups: p<0.0437 (significant advantage in favour of these three groups)	
	Prolene, Premilene, Ultrapro, and TiMesh	RTDA	Frequency of impairment of physical activity	1 year post-op			No significant difference reported between these groups	
	Prolene vs. Premilene	Pain	Severity of impairment of physical activites (VAS)	Preop	15.2 (SD 23.7)	15.6 (SD 23.5)		
	Prolene vs. Ultrapro	Pain	Severity of impairment of physical activites (VAS)	Preop	15.2 (SD 23.7)	16.9 (SD 22.6)		
	Prolene vs. TiMesh	Pain	Severity of impairment of physical activites (VAS)	Preop	15.2 (SD 23.7)	11.9 (SD 19.1)		
	Premilene vs. Ultrapro	Pain	Severity of impairment of physical activites (VAS)	Preop	15.6 (SD 23.5)	16.9 (SD 22.6)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Premilene vs. TiMesh	Pain	Severity of impairment of physical activites (VAS)	Preop	15.6 (SD 23.5)	11.9 (SD 19.1)		
	Ultrapro vs. TiMesh	Pain	Severity of impairment of physical activites (VAS)	Preop	16.9 (SD 22.6)	11.9 (SD 19.1)		
	Prolene vs. Premilene	Pain	Severity of impairment of physical activites (VAS)	Post-op	0.5 (SD 5.7)	0.5 (SD 6.1)		
	Prolene vs. Ultrapro	Pain	Severity of impairment of physical activites (VAS)	Post-op	0.5 (SD 5.7)	0.4 (SD 4.2)		
	Prolene vs. TiMesh	Pain	Severity of impairment of physical activites (VAS)	Post-op	0.5 (SD 5.7)	0		
	Premilene vs. Ultrapro	Pain	Severity of impairment of physical activites (VAS)	Post-op	0.5 (SD 6.1)	0.4 (SD 4.2)		
	Premilene vs. TiMesh	Pain	Severity of impairment of physical activites (VAS)	Post-op	0.5 (SD 6.1)	0		
	Ultrapro vs. TiMesh		Severity of impairment of physical activites (VAS)	Post-op	0.4 (SD 4.2)	0		
	Prolene vs. Premilene, Ultrapro, and TiMesh	Pain	Severity of impairment of physical activites (VAS)	4 weeks post-op	3.6 (SD: NR)	Range of other three groups: 1.1-2.2 (SD: NR)	P<0.027	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Prolene vs, Premilene, Ultrapro, and TiMesh	Pain	Severity of impairment of physical activites (VAS)	1 year post-op			Study reports there was no longer any significant difference.	
	Prolene vs. Premilene	ADV	Seroma formation	Preop	16.7% (25/150)	26% (39/150)	Study reports no significant difference in detectable seroma formation was found between the four groups pre-op or post-op.	
	Prolene vs. Ultrapro	ADV	Seroma formation	Preop	16.7% (25/150)	22.7% (34/150)	Study reports no significant difference in detectable seroma formation was found between the four groups pre-op or post-op.	
	Prolene vs. TiMesh	ADV	Seroma formation	Preop	16.7% (25/150)	16% (24/150)	Study reports no significant difference in detectable seroma formation was found between the four groups pre-op or post-op.	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bittner et al., 2011[636,637] (continued)	Premilene vs. Ultrapro	ADV	Seroma formation	Preop	26% (39/150)	22.7% (34/150)	Study reports no significant difference in detectable seroma formation was found between the four groups pre-op or post-op.	
	Premilene vs. TiMesh	ADV	Seroma formation	Preop	26% (39/150)	16% (24/150)	Study reports no significant difference in detectable seroma formation was found between the four groups pre-op or post-op.	
	Ultrapro vs. TiMesh	ADV	Seroma formation	Preop	22.7% (34/150)	16% (24/150)	Study reports no significant difference in detectable seroma formation was found between the four groups pre-op or post-op.	
Agarwal et al. 2009[623]	Heavyweight mesh vs. Lightweight mesh	RC	Hernia recurrence	Mean: 16 months (6-25)	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	25 patients; each patient had one of each mesh implanted on opposite sides
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores (avg)	Day 3 post op	5.08 (1 to 8) (N=25)	3.88 (Range: 1 to 8) (N=25)	p=0.032; t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Agarwal et al. 2009[623] (continued)	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores (avg)	Day 7 post op	5.08 (Range: 2 to 7) (N=25)	3.24 (Range: 1 to 7) (N=25)	p=0.0005; t-test	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores (avg)	Week 3 post op	3.48 (Range: 2 to 6) (N=25)	2.04 (Range: 1 to 6) (N=25)	p=0.0003; t-test	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores (avg)	Month 3 post op	1.44 (Range: 0 to 5) (N=25)	0.52 (Range: 0 to 4) (N=25)	p=0.0038; t-test	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores (avg)	Year 1	0.16 (Range: 0 to 3) (N=25)	0.04 (Range: 0 to 1) (N=25)	p=0.3677; t-test	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain with ejaculation	NA	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Heavyweight mesh vs. Lightweight mesh	ADV	Discomfort during sexual activity	3 months	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Heavyweight mesh vs. Lightweight mesh	ADV	Discomfort during sexual activity	NA	28% (7/25)	28% (7/25)	NS based on OR=1 (95% CI: 0.29 to 3.44)[@]	Only 7 of 25 patients replied to outcomes related to sexual activity
	Heavyweight mesh vs. Lightweight mesh	ADV	Incidence of infection	NA	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
Ansaloni et al., 2009[627,628]	Standard mesh vs. SIHM	RC	Hernia recurrence	3 year post surgical follow-up	3% (1/35)	0% (0/35)	NS based on OR=3.09 (95% CI: 0.12 to 78.41)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	SFN	Patient satisfaction with analgesia provided (excellent) (higher % is better)	12 to 24 hours post op	26% (9/35)	26% (9/35)	NS based on OR=1 (95% CI: 0.34 to 2.92)[@]	
	Standard mesh vs. SIHM	SFN	Patient satisfaction with analgesia provided (good) (higher % is better)	12 to 24 hours post op	26% (9/35)	29% (10/35)	NS based on OR=0.87 (95% CI: 0.3 to 2.48)[@]	
	Standard mesh vs. SIHM	SFN	Patient satisfaction with analgesia provided (satisfactory)	12 to 24 hours post op	40% (14/35)	26% (9/35)	NS based on OR=1.93 (95% CI: 0.7 to 5.32)[@]	
	Standard mesh vs. SIHM	SFN	Patient satisfaction with analgesia provided (poor)	12 to 24 hours post op	9% (3/35)	20% (7/35)	NS based on OR=0.38 (95% CI 0.09 to 1.59)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (mild) (higher % is better)	12 to 24 hours post op	31% (11/35)	37% (13/35)	NS based on OR=0.78 (95% CI: 0.29 to 2.09)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (moderate)	12 to 24 hours post op	31% (11/35)	14% (5/35)	NS based on OR=2.75 (95% CI: 0.84 to 9)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	12 to 24 hours post op	6% (2/35)	14% (5/35)	NS based on OR=0.36 (95% CI: 0.07 to 2.02)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (severe)	12 to 24 hours post op	31% (11/35)	34% (12/35)	NS based on OR=0.88 (95% CI: 0.32 to 2.38)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild)	12 to 24 hours post op	14% (5/35)	26% (9/35)	NS based on OR=0.48 (95% CI: 0.14 to 1.62)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	12 to 24 hours post op	34% (12/35)	31% (11/35)	NS based on OR=1.14 (95% CI: 0.42 to 3.09)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (severe)	12 to 24 hours post op	51% (18/35)	43% (15/35)	NS based on OR=1.41 (95% CI: 0.55 to 3.62)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	12 to 24 hours post op	23% (8/35)	29% (10/35)	NS based on OR=0.74 (95% CI: 0.25 to 2.18)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (moderate)	12 to 24 hours post op	31% (11/35)	37% (13/35)	NS based on OR=0.78 (95% CI: 0.29 to 2.09)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	12 to 24 hours post op	0% (0/35)	6% (2/35)	NS based on OR=0.19 (95% CI: 0.01 to 4.08)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (severe)	12 to 24 hours post op	46% (16/35)	29% (10/35)	NS based on OR=2.11 (95% CI: 0.78 to 5.67)[@]	
	Standard mesh vs. SIHM	Pain	VAS score pain at rest	12-24 hours	33.9 (SD: NR) (N=35)	30.1 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	12-24 hours	45 (SD: NR) (N=35)	44.8 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	12-24 hours	39.9 (SD: NR) (N=35)	35.3 (SD: NR) (N=35)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain (moderate)	1 week post op	17% (6/35)	11% (4/35)	NS based on OR=1.6 (95% CI: 0.41 to 6.26)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (mild) (higher % is better)	1 week post op	69% (24/35)	51% (18/35)	NS based on OR=2.06 (95% CI: 0.78 to 5.46)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	1 week post op	14% (5/35)	37% (13/35)	p<0.05 based on OR=0.28 (95% CI: 0.09 to 0.91)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	1 week post op	31% (11/35)	46% (16/35)	NS based on OR=0.54 (95% CI: 0.21 to 1.44)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	1 week post op	46% (16/35)	43% (15/35)	NS based on OR=1.12 (95% CI: 0.44 to 2.88)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none)	1 week post op	6% (2/35)	6% (2/35)	NS based on OR=1 (95% CI: 0.13 to 7.53)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (severe)	1 week post op	17% (6/35)	6% (2/35)	NS based on OR=3.41 (95% CI: 0.64 to 18.25)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	1 week post op	80% (28/35)	86% (30/35)	NS based on OR=0.67 (95% CI: 0.19 to 2.35)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (moderate)	1 week post op	11% (4/35)	0% (0/35)	NS based on OR=10.14 (95% CI: 0.53 to 195.92)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	1 week post op	6% (2/35)	14% (5/35)	NS based on OR=0.36 (95% CI: 0.07 to 2.02)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (severe)	1 week post op	3% (1/35)	0% (0/35)	NS based on OR=3.09 (95% CI: 0.12 to 78.41)[@]	
	Standard mesh vs. SIHM	Pain	Frequecny of pain (never) (higher % is better)	1 week post op	6% (2/35)	3% (1/35)	NS based on OR=2.06 (95% CI: 0.18 to 23.83)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (always)	1 week post op	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	1 week post op	54% (19/35)	80% (28/35)	p<0.05 based on OR=0.3 (95% CI: 0.1 to 0.86)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	1 week post op	34% (12/35)	17% (6/35)	NS based on OR=2.52 (95% CI: 0.82 to 7.75)[@]	
	Standard mesh vs. SIHM	Pain	VAS score pain at rest	week 1	22.4 (SD: NR) (N=35)	15.6 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	Week 1	33.9 (SD: NR) (N=35)	27.1 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	Week 1	26.7 (SD: NR) (N=35)	21.5 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest	1 month	29% (10/35)	51% (18/35)	NS based on OR=0.38 (95% CI: 0.14 to 1.02)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain at rest (mild) (higher % is better)	1 month	51% (18/35)	49% (17/35)	NS based on OR=1.12 (95% CI: 0.44 to 2.86)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (moderate)	1 month	20% (7/35)	0% (0/35)	p<0.05 based on OR=18.68 (95% CI: 1.02 to 341.24)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	1 month	37% (13/35)	69% (24/35)	p<0.05 based on OR=0.27 (95% CI: 0.1 to 0.73)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	1 month	40% (14/35)	6% (2/35)	p<0.05 based on OR=11 (95% CI: 2.27 to 53.37)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none)	1 month	20% (7/35)	26% (9/35)	NS based on OR=0.72 (95% CI: 0.23 to 2.22)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (severe)	1 month	3% (1/35)	0% (0/35)	NS based on OR=3.09 (95% CI: 0.12 to 78.41)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	1 month	54% (19/35)	71% (25/35)	NS based on OR=0.48 (95% CI: 0.18 to 1.28)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (moderate)	1 month	26% (9/35)	0% (0/35)	p<0.05 based on OR=25.45 (95% CI: 1.42 to 457.08)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	1 month	20% (7/35)	29% (10/35)	NS based on OR=0.63 (95% CI: 0.21 to 1.89)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Frequency of pain (always)	1 month	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (never) (higher % is better)	1 month	20% (7/35)	26% (9/35)	NS based on OR=0.72 (95% CI: 0.23 to 2.22)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	1 month	46% (16/35)	57% (20/35)	NS based on OR=0.63 (95% CI: 0.25 to 1.62)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	1 month	29% (10/35)	17% (6/35)	NS based on OR=1.93 (95% CI: 0.62 to 6.07)[@]	
	Standard mesh vs. SIHM	Pain	VAS score pain at rest	1 month	16.5 (SD: NR) (N=35)	7.5 (SD: NR) (N=35)	P<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	1 month	22.8 (SD: NR) (N=35)	15.2 (SD: NR) (N=35)	P<0.05; t-test	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	1 month	19.1 (SD: NR) (N=35)	11.7 (SD: NR) (N=35)	P<0.05; t test	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (mild) (higher % is better)	3 months	43% (15/35)	6% (2/35)	p<0.05 based on OR=12.38 (95% CI: 2.56 to 59.87)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	3 months	57% (20/35)	94% (33/35)	p<0.05 based on OR=0.08 (95% CI: 0.02 to 0.39)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	3 months	46% (16/35)	54% (19/35)	NS based on OR=0.71 (95% CI: 0.28 to 1.82)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	3 months	20% (7/35)	0% (0/35)	p<0.05 based on OR=18.68 (95% CI: 1.02 to 341.24)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none) (higher % is better)	3 months	34% (12/35)	46% (16/35)	NS based on OR=0.62 (95% CI: 0.24 to 1.62)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	3 months	54% (19/35)	26% (9/35)	p<0.05 based on OR=3.43 (95% CI: 1.25 to 9.4)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (moderate)	3 months	3% (1/35)	0% (0/35)	NS based on OR=3.09 (95% CI: 0.12 to 78.41)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	3 months	43% (15/35)	74% (26/35)	p<0.05 based on OR=0.26 (95% CI: 0.09 to 0.71)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (never) (higher % is better)	3 months	34% (12/35)	46% (16/35)	NS based on OR=0.62 (95% CI: 0.24 to 1.62)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	3 months	46% (16/35)	49% (17/35)	NS based on OR=0.89 (95% CI: 0.35 to 2.28)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	3 months	20% (7/35)	6% (2/35)	NS based on OR=4.13 (95% CI: 0.79 to 21.48)[@]	
	Standard mesh vs. SIHM	Pain	VAS score discomfort at rest	3 months	2.9 (SD: NR) (N=35)	0.4 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on coughing	3 months	16.5 (SD: NR) (N=35)	1.7 (SD: NR) (N=35)	p<0.05; Mann Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	VAS score discomfort on movement	3 months	16.7 (SD: NR) (N=35)	3.2 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain at rest	3 months	6.3 (SD: NR) (N=35)	0.2 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	3 months	12.4 (SD: NR) (N=35)	7.3 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	3 months	8.8 (SD: NR) (N=35)	2.7 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (mild) (higher % is better)	6 months	17% (6/35)	0% (0/35)	NS based on OR=15.64 (95% CI: 0.85 to 289.38)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	6 months	83% (29/35)	100% (35/35)	NS based on OR=0.06 (95% CI: 0 to 1.18)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	6 months	17% (6/35)	11% (4/35)	NS based on OR=1.6 (95% CI: 0.41 to 6.26)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	6 months	14% (5/35)	0% (0/35)	NS based on OR=12.8 (95% CI: 0.68 to 241.04)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none)	6 months	69% (24/35)	89% (31/35)	p<0.05 based on OR=0.28 (95% CI: 0.08 to 0.99)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	6 months	23% (8/35)	3% (1/35)	p<0.05 based on OR=10.07 (95% CI: 1.19 to 85.57)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	6 months	77% (27/35)	97% (34/35)	p<0.05 based on OR=0.1 (95% CI: 0.01 to 0.84)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (never) (higher % is better)	6 months	69% (24/35)	89% (31/35)	p<0.05 based on OR=0.28 (95% CI: 0.08 to 0.99)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	6 months	23% (8/35)	11% (4/35)	NS based on OR=2.3 (95% CI: 0.62 to 8.48)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	6 months	9% (3/35)	0% (0/35)	NS based on OR=7.65 (95% CI: 0.38 to 153.76)[@]	
	Standard mesh vs. SIHM	Pain	VAS score discomfort at rest	6 months	2.8 (SD: NR) (N=35)	0.4 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on coughing	6 months	16.4 (SD: NR) (N=35)	1.7 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on movement	6 months	17 (SD: NR) (N=35)	3.1 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain at rest	6 months	2.1 (SD: NR) (N=35)	0 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	6 months	6.8 (SD: NR) (N=35)	1.7 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	6 months	4.5 (SD: NR) (N=35)	0.2 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (mild) (higher % is better)	1 year	3% (1/35)	0% (0/35)	NS based on OR=3.09 (95% CI: 0.12 to 78.41)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	1 year	97% (34/35)	100% (35/35)	NS based on OR=0.32 (95% CI: 0.01 to 8.23)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	1 year	17% (6/35)	9% (3/35)	NS based on OR=2.21 (95% CI: 0.51 to 9.64)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	1 year	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none)	1 year	77% (27/35)	91% (32/35)	NS based on OR=0.32 (95% CI: 0.08 to 1.31)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (never) (higher % is better)	1 year	77% (27/35)	91% (32/35)	NS based on OR=0.32 (95% CI: 0.08 to 1.31)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	1 year	14% (5/35)	9% (3/35)	NS based on OR=1.78 (95% CI: 0.39 to 8.09)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	1 year	9% (3/35)	0% (0/35)	NS based on OR=7.65 (95% CI: 0.38 to 153.76)[@]	
	Standard mesh vs. SIHM	Pain	VAS score discomfort at rest	1 year	1.5 (SD: NR) (N=35)	0.3 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on coughing	1 year	15 (SD: NR) (N=35)	0.9 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on movement	1 year	15.3 (SD: NR) (N=35)	1.8 (SD: NR) (N=35)	p<0.05; Mann Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	VAS score pain at rest	1 year	0.0 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	1 year	6 (SD: NR) (N=35)	1.3 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	1 year	3.8 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	2 years	97% (34/35)	100% (35/35)	NS based on OR=0.32 (95% CI: 0.01 to 8.23)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	2 years	11% (4/35)	3% (1/35)	NS based on OR=4.39 (95% CI: 0.46 to 41.41)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	2 years	6% (2/35)	3% (1/35)	NS based on OR=2.06 (95% CI: 0.18 to 23.83)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none)	2 years	80% (28/35)	94% (33/35)	NS based on OR=0.24 (95% CI: 0.05 to 1.26)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	2 years	17% (6/35)	0% (0/35)	NS based on OR=15.64 (95% CI: 0.85 to 289.38)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	2 years	80% (28/35)	100% (35/35)	p<0.05 based on OR=0.05 (95% CI: 0 to 0.98)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (never) (higher % is better)	2 years	80% (28/35)	94% (33/35)	NS based on OR=0.24 (95% CI: 0.05 to 1.26)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	2 years	6% (2/35)	6% (2/35)	NS based on OR=1 (95% CI: 0.13 to 7.53)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	2 years	11% (4/35)	0% (0/35)	NS based on OR=10.14 (95% CI: 0.53 to 195.92)[@]	
	Standard mesh vs. SIHM	Pain	VAS score discomfort at rest	2 years	1.3 (SD: NR) (N=35)	0.1 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on coughing	2 years	13.4 (SD: NR) (N=35)	0.5 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on movement	2 years	14.9 (SD: NR) (N=35)	1.4 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score pain at rest	2 years	0.0 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	2 years	4.4 (SD: NR) (N=35)	1.3 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	2 years	3.9 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	p<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	Degree of pain at rest (none)	3 years	94% (33/35)	97% (34/35)	NS based on OR=0.49 (95% CI: 0.04 to 5.61)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (mild) (higher % is better)	3 years	9% (3/35)	3% (1/35)	NS based on OR=3.19 (95% CI: 0.32 to 32.24)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (moderate)	3 years	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	Degree of pain on coughing (none)	3 years	80% (28/35)	94% (33/35)	NS based on OR=0.24 (95% CI: 0.05 to 1.26)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (mild) (higher % is better)	3 years	11% (4/35)	0% (0/35)	NS based on OR=10.14 (95% CI: 0.53 to 195.92)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (moderate)	3 years	3% (1/35)	0% (0/35)	NS based on OR=3.09 (95% CI: 0.12 to 78.41)[@]	
	Standard mesh vs. SIHM	Pain	Degree of pain on movement (none) (higher % is better)	3 years	80% (28/35)	97% (34/35)	NS based on OR=0.12 (95% CI: 0.01 to 1.01)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (never) (higher % is better)	3 years	80% (28/35)	94% (33/35)	NS based on OR=0.24 (95% CI: 0.05 to 1.26)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (rarely) (higher % is better)	3 years	3% (1/35)	3% (1/35)	NS based on OR=1 (95% CI: 0.06 to 16.65)[@]	
	Standard mesh vs. SIHM	Pain	Frequency of pain (sometimes)	3 years	11% (4/35)	0% (0/35)	NS based on OR=10.14 (95% CI: 0.53 to 195.92)[@]	
	Standard mesh vs. SIHM	Pain	VAS score discomfort at rest	3 years	1.3 (SD: NR) (N=35)	0.1 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on coughing	3 years	12.5 (SD: NR) (N=35)	0.5 (SD: NR) (N=35)	P<0.05; Mann Whitney	
	Standard mesh vs. SIHM	Pain	VAS score discomfort on movement	3 years	14.4 (SD: NR) (N=35)	1.4 (SD: NR) (N=35)	P<0.05; Mann Whitney	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	Pain	VAS score pain at rest	3 years	0.0 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on coughing	3 years	4.2 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	NR	
	Standard mesh vs. SIHM	Pain	VAS score pain on movement	3 years	3.9 (SD: NR) (N=35)	0.0 (SD: NR) (N=35)	P<0.05; Mann Whitney	
	Standard mesh vs. SIHM	ADV	Hematoma	12 to 24 hours post op	3% (1/35)	3% (1/35)	NS based on OR=1 (95% CI: 0.06 to 16.65)[@]	
	Standard mesh vs. SIHM	ADV	Hperpyrexia (temperature >38 degrees C)	12 to 24 hours post op	11% (4/35)	51% (18/35)	p<0.05 based on OR=0.12 (95% CI: 0.04 to 0.42)[@]	
	Standard mesh vs. SIHM	ADV	Self-subsidizing hyperpyrexia (temperature >38 degrees C)	24 hours post op	11% (4/35)	51% (18/35)	p<0.05 based on OR=0.12 (95% CI: 0.04 to 0.42)[@]	
	Standard mesh vs. SIHM	ADV	Hematoma	1 week post op	6% (2/35)	6% (2/35)	NS based on OR=1 (95% CI: 0.13 to 7.53)[@]	
	Standard mesh vs. SIHM	ADV	No complications (higher % is better)	1 week post op	89% (31/35)	77% (27/35)	NS based on OR=2.3 (95% CI: 0.62 to 8.48)[@]	
	Standard mesh vs. SIHM	ADV	Seroma	1 week post op	6% (2/35)	17% (6/35)	NS based on OR=0.29 (95% CI: 0.05 to 1.57)[@]	
	Standard mesh vs. SIHM	ADV	Complications (none)	1 month	97% (34/35)	94% (33/35)	NS based on OR=2.06 (95% CI: 0.18 to 23.83)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Hematoma	1 month	3% (1/35)	3% (1/35)	NS based on OR=1 (95% CI 0.06 to 16.65)[@]	
	Standard mesh vs. SIHM	ADV	Seroma	1 month	0% (0/35)	3% (1/35)	NS based on OR=0.32 (95% CI 0.01 to 8.23)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (mild)	3 months	14% (5/35)	3% (1/35)	NS based on OR=5.67 (95% CI 0.63 to 51.27)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (none)	3 months	86% (30/35)	97% (34/35)	NS based on OR=0.18 (95% CI 0.02 to 1.6)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (mild)	3 months	14% (5/35)	11% (4/35)	NS based on OR=1.29 (95% CI 0.32 to 5.28)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (moderate)	3 months	40% (14/35)	3% (1/35)	p<0.05 based on OR=22.67 (95% CI 2.77 to 185.18)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (none)	3 months	46% (16/35)	86% (30/35)	p<0.05 based on OR=0.14 (95% CI 0.04 to 0.45)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (mild)	3 months	17% (6/35)	9% (3/35)	NS based on OR=2.21 (95% CI 0.51 to 9.64)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (moderate)	3 months	34% (12/35)	0% (0/35)	p<0.05 based on OR=37.77 (95% CI 2.13 to 669.02)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (none)	3 months	49% (17/35)	91% (32/35)	p<0.05 based on OR=0.09 (95% CI: 0.02 to 0.34)[@]	
	Standard mesh vs. SIHM	ADV	frequecncy of discomfort (never)	3 months	46% (16/35)	86% (30/35)	p<0.05 based on OR=0.14 (95% CI: 0.04 to 0.45)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (always)	3 months	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (rarely)	3 months	23% (8/35)	11% (4/35)	NS based on OR=2.3 (95% CI: 0.62 to 8.48)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (sometimes)	3 months	26% (9/35)	3% (1/35)	p<0.05 based on OR=11.77 (95% CI: 1.4 to 98.86)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (mild)	6 months	14% (5/35)	3% (1/35)	NS based on OR=5.67 (95% CI: 0.63 to 51.27)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (none)	6 months	86% (30/35)	97% (34/35)	NS based on OR=0.18 (95% CI: 0.02 to 1.6)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (moderate)	6 months	40% (14/35)	3% (1/35)	p<0.05 based on OR=22.67 (95% CI: 2.77 to 185.18)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (mild)	6 months	17% (6/35)	9% (3/35)	NS based on OR=2.21 (95% CI: 0.51 to 9.64)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (moderate)	6 months	34% (12/35)	0% (0/35)	p<0.05 based on OR=37.77 (95% CI: 2.13 to 669.02)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (no)	6 months	49% (17/35)	91% (32/35)	p<0.05 based on OR=0.09 (95% CI: 0.02 to 0.34)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on ocughing (mild)	6 months	14% (5/35)	11% (4/35)	NS based on OR=1.29 (95% CI: 0.32 to 5.28)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on ocughing (none	6 months	46% (16/35)	86% (30/35)	p<0.05 based on OR=0.14 (95% CI: 0.04 to 0.45)[@]	
	Standard mesh vs. SIHM	ADV	Frequenc of discomfort (sometimes)	6 months	26% (9/35)	3% (1/35)	p<0.05 based on OR=11.77 (95% CI: 1.4 to 98.86)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (always)	6 months	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (never)	6 months	46% (16/35)	86% (30/35)	p<0.05 based on OR=0.14 (95% CI: 0.04 to 0.45)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (rarely)	6 months	23% (8/35)	11% (4/35)	NS based on OR=2.3 (95% CI: 0.62 to 8.48)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (mild)	1 year	9% (3/35)	3% (1/35)	NS based on OR=3.19 (95% CI: 0.32 to 32.24)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (none)	1 year	91% (32/35)	97% (34/35)	NS based on OR=0.31 (95% CI: 0.03 to 3.17)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (mild)	1 year	14% (5/35)	11% (4/35)	NS based on OR=1.29 (95% CI: 0.32 to 5.28)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (moderate)	1 year	37% (13/35)	0% (0/35)	p<0.05 based on OR=42.6 (95% CI: 2.41 to 752.62)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (none)	1 year	49% (17/35)	89% (31/35)	p<0.05 based on OR=0.12 (95% CI: 0.04 to 0.42)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (mild)	1 year	14% (5/35)	6% (2/35)	NS based on OR=2.75 (95% CI: 0.5 to 15.25)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (moderate)	1 year	34% (12/35)	0% (0/35)	p<0.05 based on OR=37.77 (95% CI: 2.13 to 669.02)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (none)	1 year	51% (18/35)	94% (33/35)	p<0.05 based on OR=0.06 (95% CI: 0.01 to 0.31)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (always)	1 year	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (never)	1 year	49% (17/35)	89% (31/35)	p<0.05 based on OR=0.12 (95% CI: 0.04 to 0.42)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Frequency of discomfort (rarely)	1 year	23% (8/35)	11% (4/35)	NS based on OR=2.3 (95% CI: 0.62 to 8.48)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (sometimes)	1 year	23% (8/35)	0% (0/35)	p<0.05 based on OR=21.95 (95% CI: 1.21 to 396.99)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (mild)	2 years	9% (3/35)	3% (1/35)	NS based on OR=3.19 (95% CI: 0.32 to 32.24)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (none)	2 years	89% (31/35)	97% (34/35)	NS based on OR=0.23 (95% CI: 0.02 to 2.15)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (mild)	2 years	17% (6/35)	11% (4/35)	NS based on OR=1.6 (95% CI: 0.41 to 6.26)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (none)	2 years	49% (17/35)	89% (31/35)	p<0.05 based on OR=0.12 (95% CI: 0.04 to 0.42)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughong (moderate	2 years	31% (11/35)	0% (0/35)	p<0.05 based on OR=33.33 (95% CI: 1.87 to 592.44)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (mild)	2 years	23% (8/35)	6% (2/35)	NS based on OR=4.89 (95% CI: 0.96 to 24.97)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (moderate)	2 years	23% (8/35)	0% (0/35)	p<0.05 based on OR=21.95 (95% CI: 1.21 to 396.99)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (none)	2 years	51% (18/35)	94% (33/35)	p<0.05 based on OR=0.06 (95% CI: 0.01 to 0.31)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (always)	2 years	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (never)	2 years	49% (17/35)	89% (31/35)	p<0.05 based on OR=0.12 (95% CI: 0.04 to 0.42)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (rarely)	2 years	20% (7/35)	11% (4/35)	NS based on OR=1.94 (95% CI: 0.51 to 7.33)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (sometimes)	2 years	23% (8/35)	0% (0/35)	p<0.05 based on OR=21.95 (95% CI: 1.21 to 396.99)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (mild)	3 years	9% (3/35)	3% (1/35)	NS based on OR=3.19 (95% CI: 0.32 to 32.24)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort at rest (none)	3 years	86% (30/35)	94% (33/35)	NS based on OR=0.36 (95% CI: 0.07 to 2.02)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (moderate)	3 years	29% (10/35)	0% (0/35)	p<0.05 based on OR=29.24 (95% CI: 1.64 to 522.03)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on coughing (none)	3 years	49% (17/35)	86% (30/35)	p<0.05 based on OR=0.16 (95% CI: 0.05 to 0.5)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Ansaloni et al., 2009[627,628] (continued)	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (moderate)	3 years	20% (7/35)	0% (0/35)	p<0.05 based on OR=18.68 (95% CI: 1.02 to 341.24)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (none)	3 years	23% (8/35)	6% (2/35)	NS based on OR=4.89 (95% CI: 0.96 to 24.97)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfort on movement (none)	3 years	51% (18/35)	91% (32/35)	p<0.05 based on OR=0.1 (95% CI: 0.03 to 0.39)[@]	
	Standard mesh vs. SIHM	ADV	Degree of discomfot on coughing (mild)	3 years	17% (6/35)	11% (4/35)	NS based on OR=1.6 (95% CI: 0.41 to 6.26)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (always)	3 years	6% (2/35)	0% (0/35)	NS based on OR=5.3 (95% CI: 0.25 to 114.47)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (never)	3 years	49% (17/35)	86% (30/35)	p<0.05 based on OR=0.16 (95% CI: 0.05 to 0.5)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (rarely)	3 years	17% (6/35)	11% (4/35)	NS based on OR=1.6 (95% CI: 0.41 to 6.26)[@]	
	Standard mesh vs. SIHM	ADV	Frequency of discomfort (sometimes)	3 years	23% (8/35)	0% (0/35)	p<0.05 based on OR=21.95 (95% CI: 1.21 to 396.99)[@]	
	Standard mesh vs. SIHM	ADV	Intraoperative complications	NA	0% (0/35)	0% (0/35)	NS based on OR=1 (95% CI: 0.02 to 51.81)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644]	Prolene mesh vs. Vypro mesh	RC	Hernia recurrence	1 year	2% (4/263)	2% (4/263)	NS based on OR=1 (95% CI: 0.25 to 4.04)[@]	
	Prolene mesh vs. Vypro mesh	RC	Recurrent hernia	3 year	4% (9/243)	4% (9/251)	NS based on OR=1.03 (95% CI: 0.4 to 2.65)[@]	
	Prolene mesh vs. Vypro mesh	HOSP	Have you been to your doctor during past six months because of problems after hernia operation	3 year	2% (5/243)	4% (9/251)	NS based on OR=0.56 (95% CI: 0.19 to 1.71)[@]	Events = number of patients with positive answers to the questionnaire
	Prolene mesh vs. Vypro mesh	HOSP	Hospital stay in admitted patients	NA	1 (Range: 1 to 4) (N=295)	1 (Range: 1 to 4) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	RTDA	Does pain impede daily activities	3 year	8% (20/243)	4% (11/251)	NS based on OR=1.96 (95% CI: 0.92 to 4.18)[@]	
	Prolene mesh vs. Vypro mesh	RTDA	Does pain impeded sports or exercise	3 year	10% (25/243)	8% (20/251)	NS based on OR=1.32 (95% CI: 0.72 to 2.45)[@]	
	Prolene mesh vs. Vypro mesh	RTDA	Time to return to normal daily activities	NA	21 (Range: 1 to 135) (N=295)	19 (Range: 0 to 106) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	RTW	Have you been on sick leave during past 6 months because of problems with hernia or groin	3 year	2% (6/243)	1% (3/251)	NS based on OR=2.09 (95% CI: 0.52 to 8.46)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	RTW	Time to return to work (days)	NA	16.5 (Range: 0 to 97) (N=295)	16 (Range: 0 to 66) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	QOL	SF-36 bodily pain (higher number is better)	1 year	Median: 100 (IQR: 75 to 100) (N=263)	Median: 100 (IQR: 85 to 100) (N=263)	NR	
	Prolene mesh vs. Vypro mesh	QOL	SF-36 general health (higher number is better)	1 year	Median: 78 (IQR: 68 to 97) (N=263)	Median: 78 (IQR: 68 to 90) (N=263)	NR	
	Prolene mesh vs. Vypro mesh	QOL	SF-36 mental health (higher number is better)	1 year	Median: 91 (IQR: 80 to 98) (N=263)	Median: 91 (IQR: 80 to 98) (N=263)	NR	
	Prolene mesh vs. Vypro mesh	QOL	SF-36 physical functioning (higher number is better)	1 year	Median: 97 (IQR: 88 to 100) (N=263)	Median: 97 (IQR: 91 to 100) (N=263)	NR	
	Prolene mesh vs. Vypro mesh	QOL	SF-36 social functioning (higher number is better)	1 year	Median: 100 (IQR: 90 to 100) (N=263)	Median: 100 (IQR: 90 to 100) (N=263)	NR	
	Prolene mesh vs. Vypro mesh	QOL	SF-36 vitality (higher number is better)	1 year	Median: 80 (IQR: 71 to 81) (N=263)	Median: 80 (IQR: 68 to 81) (N=263)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Day 1	Median: 19 (IQR: 7 to 31) (N=295)	Median: 17 (IQR: 6 to 29) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Day 1	Median: 57 (IQR: 20.5 to 82) (N=295)	Median: 57 (IQR: 25 to 77) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Day 1	Median: 29 (IQR: 10 to 55) (N=295)	Median: 25 (IQR: 8 to 48) (N=296)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Day 1	Median: 40 (IQR: 11 to 71) (N=295)	Median: 37 (IQR: 12 to 60) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 1	Median: 7 (IQR: 2 to 20) (N=295)	Median: 5 (IQR: 2 to 17) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 1	Median: 24 (IQR: 7 to 50) (N=295)	Median: 22 (IQR: 7 to 40) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 1	Median: 11 (IQR: 4 to 30) (N=295)	Median: 10 (IQR: 4 to 25) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 1	Median: 19 (IQR: 5 to 40) (N=295)	Median: 18 (IQR: 4 to 35) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 2	Median: 3 (IQR: 1 to 10) (N=295)	Median: 2 (IQR: 1 to 10) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 2	Median: 10 (IQR: 3 to 24) (N=295)	Median: 8 (IQR: 3 to 23) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 2	Median: 4 (IQR: 1 to 18) (N=295)	Median: 4 (IQR: 1 to 12) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 2	Median: 8 (IQR: 3 to 20.5) (N=295)	Median: 6 (IQR: 2 to 20) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 3	Median: 1 (IQR: 0 to 6) (N=295)	Median: 2 (IQR: 0 to 6) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 3	Median: 4 (IQR: 1 to 16) (N=295)	Median: 4 (IQR: 1 to 11) (N=296)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 3	Median: 2 (IQR: 0 to 8) (N=295)	Median: 3 (IQR: 1 to 9) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 3	Median: 3 (IQR: 1 to 17) (N=295)	Median: 3 (IQR: 1 to 12) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 4	Median: 0 (IQR: 0 to 5) (N=295)	Median: 0 (IQR: 0 to 4) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 4	Median: 2 (IQR: 0 to 10) (N=295)	Median: 2 (IQR: 0 to 8) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 4	Median: 1 (IQR: 0 to 7) (N=295)	Median: 1 (IQR: 0 to 5) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 4	Median: 0 (IQR: 0 to 9) (N=295)	Median: 1 (IQR: 0 to 6) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	Prolonged pain or neuralgia	Post <8 weeks	2% (7/295)	1% (2/296)	NS based on OR=3.57 (95% CI: 0.74 to 17.34)[@]	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 8	Median: 0 (IQR: 0 to 3) (N=295)	Median: 0 (IQR: 0 to 3) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 8	Median: 0 (IQR: 0 to 5) (N=295)	Median: 0 (IQR: 0 to 4) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 8	Median: 0 (IQR: 0 to 3) (N=295)	Median: 0 (IQR: 0 to 4) (N=296)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 8	Median: 0 (IQR: 0 to 4) (N=295)	Median: 0 (IQR: 0 to 3) (N=296)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	Pain	Groin pain	1 year	12% (32/263)	10% (27/263)	NS based on OR=1.21 (95% CI: 0.7 to 2.08)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Do you use analgesics because of pain from hernia repair	3 year	2% (5/243)	3% (7/251)	NS based on OR=0.73 (95% CI: 0.23 to 2.34)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Pain in groin at rest	3 year	7% (18/243)	6% (16/251)	NS based on OR=1.18 (95% CI: 0.58 to 2.36)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Pain in groin during physical activitiy	3 year	23% (56/243)	18% (45/251)	NS based on OR=1.37 (95% CI: 0.88 to 2.13)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Pain in groin on coughing	3 year	6% (14/243)	5% (12/251)	NS based on OR=1.22 (95% CI: 0.55 to 2.69)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Pain in groin when rising from lying to sitting	3 year	14% (33/243)	8% (19/251)	p<0.05 based on OR=1.92 (95% CI: 1.06 to 3.48)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Pain in groin right now	3 year	27% (66/243)	21% (52/251)	NS based on OR=1.43 (95% CI: 0.94 to 2.16)[@]	
	Prolene mesh vs. Vypro mesh	Pain	Pain on palpation	3 year	3% (8/243)	1% (2/251)	NS based on OR=4.24 (95% CI: 0.89 to 20.16)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Division of ileoinguinal nerve	Perioperative	0% (0/295)	1% (2/296)	NS based on OR=0.2 (95% CI: 0.01 to 4.17)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	ADV	Epigastric artery injury	Perioperative	0% (0/295)	1% (2/296)	NS based on OR=0.2 (95% CI: 0.01 to 4.17)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Partial division of spermatic cord	Perioperative	0% (1/295)	0% (0/296)	NS based on OR=3.02 (95% CI: 0.12 to 74.45)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Cardiac surgery	Post <8 weeks	0% (0/295)	0% (1/296)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Deep vein thrombosis	Post <8 weeks	0% (0/295)	0% (1/296)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Hematoma	Post <8 weeks	4% (11/295)	5% (14/296)	NS based on OR=0.78 (95% CI: 0.35 to 1.75)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Infection	Post <8 weeks	2% (6/295)	2% (5/296)	NS based on OR=1.21 (95% CI: 0.36 to 4)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Ischemic orchitis	Post <8 weeks	0% (0/295)	0% (1/296)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Sensory loss	Post <8 weeks	1% (2/295)	0% (1/296)	NS based on OR=2.01 (95% CI: 0.18 to 22.33)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Seroma	Post <8 weeks	1% (2/295)	1% (3/296)	NS based on OR=0.67 (95% CI: 0.11 to 4.02)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	ADV	Testis atrofia	Post <8 weeks	0% (1/295)	0% (0/296)	NS based on OR=3.02 (95% CI: 0.12 to 74.45)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Urinary retention	Post <8 weeks	0% (0/295)	0% (1/296)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Urinary tract infection	Post <8 weeks	0% (1/295)	0% (0/296)	NS based on OR=3.02 (95% CI: 0.12 to 74.45)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Bulge in groin	1 year	6% (16/263)	6% (17/263)	NS based on OR=0.94 (95% CI: 0.46 to 1.9)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Neuralgia	1 year	1% (3/263)	2% (4/263)	NS based on OR=0.75 (95% CI: 0.17 to 3.37)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Other	1 year	29% (77/263)	23% (61/263)	NS based on OR=1.37 (95% CI: 0.93 to 2.03)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Do you experience any other discomfort in the groin	3 year	16% (40/243)	13% (33/251)	NS based on OR=1.3 (95% CI: 0.79 to 2.14)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Do you feel that you have a mesh in the groin	3 year	23% (55/243)	15% (37/251)	p<0.05 based on OR=1.69 (95% CI: 1.07 to 2.68)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Do you have normal sensation in the groin	3 year	81% (198/243)	83% (209/251)	NS based on OR=0.88 (95% CI: 0.56 to 1.41)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2004[642-644] (continued)	Prolene mesh vs. Vypro mesh	ADV	Hypoaesthesia or hyperaesthesia	3 year	8% (19/243)	6% (15/251)	NS based on OR=1.33 (95% CI: 0.66 to 2.69)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Neuralgia	3 year	4% (9/243)	2% (6/251)	NS based on OR=1.57 (95% CI: 0.55 to 4.48)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Non-hernia-related problems	3 year	3% (8/243)	4% (11/251)	NS based on OR=0.74 (95% CI: 0.29 to 1.88)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Other problems	3 year	28% (69/243)	17% (42/251)	p<0.05 based on OR=1.97 (95% CI: 1.28 to 3.04)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Testicular atrophy	3 year	1% (3/243)	2% (4/251)	NS based on OR=0.77 (95% CI: 0.17 to 3.49)[@]	
Bringman et al., 2005[645]	Prolene vs. Vypro	RTDA	Time to return to normal daily activities	NA	19 (Range: 1 to 133) (N=70)	12.5 (Range: 0 to 237) (N=69)	NR	
	Prolene vs. Vypro	RTW	Time to return to work (days)	NA	11 (Range: 0 to 61) (N=70)	9 (Range: 1 to 31) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - resting in bed	Day 1 post op	Median: 7 (IQR: 2 to 28) (N=70)	Median: 10 (IQR: 5 to 34) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - rising from a horizontal to vertical position	Day 1	Median: 40 (IQR: 10 to 73) (N=70)	Median: 46 (IQR: 19 to 74) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Day 1	Median: 20.5 (IQR: 8 to 40) (N=70)	Median: 20 (IQR: 9 to 47) (N=69)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2005[645] (continued)	Prolene vs. Vypro	Pain	VAS for pain - walking	Day 1	Median: 50 (IQR: 8 to 51) (N=70)	Median: 56 (IQR: 13 to 55) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - resting in bed	Week 1	Median: 4 (IQR: 1 to 15) (N=70)	Median: 5 (IQR: 0 to 19.5) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - rising from a horizontal to vertical position	Week 1	Median: 10 (IQR: 4 to 30) (N=70)	Median: 23 (IQR: 4 to 42) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Week 1	Median: 3 (IQR: 2 to 17) (N=70)	Median: 7 (IQR: 7 to 23) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - walking	Week 1	Median: 10 (IQR: 4 to 21) (N=70)	Median: 11 (IQR: 3 to 30) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - resting in bed	Week 2	Median: 0 (IQR: 0 to 8) (N=70)	Median: 0 (IQR: 0 to 7) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - rising from a horizontal to vertical position	Week 2	Median: 1 (IQR: 1 to 16) (N=70)	Median: 9 (IQR: 2 to 20) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Week 2	Median: 1 (IQR: 0 to 8) (N=70)	Median: 1 (IQR: 0 to 9) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Week 2	Median: 4 (IQR: 1 to 17) (N=70)	Median: 5 (IQR: 0 to 17) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - resting in bed	Week 3	Median: 0 (IQR: 0 to 5) (N=70)	Median: 0 (IQR: 0 to 4) (N=69)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2005[645] (continued)	Prolene vs. Vypro	Pain	VAS for pain - rising from a horizontal to vertical position	Week 3	Median: 1 (IQR: 0 to 7) (N=70)	Median: 3 (IQR: 0 to 8) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Week 3	Median: 0 (IQR: 0 to 7) (N=70)	Median: 0 (IQR: 0 to 5) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - walking	Week 3	Median: 0 (IQR: 0 to 10) (N=70)	Median: 0 (IQR: 0 to 10) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - resting in bed	Week 4	Median: 0 (IQR: 0 to 2) (N=70)	Median: 0 (IQR: 0 to 3) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - rising from a horizontal to vertical position	Week 4	Median: 0 (IQR: 0 to 5) (N=70)	Median: 0 (IQR: 0 to 10) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Week 4	Median: 0 (IQR: 0 to 3) (N=70)	Median: 0 (IQR: 0 to 4) (N=69)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - walking	Week 4	Median: 1 (IQR: 0 to 6) (N=70)	Median: 0 (IQR: 0 to 7) (N=69)	NR	
	Prolene vs. Vypro	Pain	Pain	Post op within 8 weeks	1% (1/70)	0% (0/69)	NS based on OR=3 (95% CI: 0.12 to 74.93)[@]	
	Prolene vs. Vypro	Pain	VAS for pain - resting in bed	Week 8	Median: 0 (IQR: 0 to 2) (N=67)	Median: 0 (IQR: 0 to 2) (N=63)	NR	Follow-up was complete in 94% of patients; group A 3 not returning diary; group B 6 not returning diary

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2005[645] (continued)	Prolene vs. Vypro	Pain	VAS for pain - rising from a horizontal to vertical position	Week 8	Median: 0 (IQR: 0 to 3) (N=67)	Median: 0 (IQR: 0 to 4) (N=63)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - standing	Week 8	Median: 0 (IQR: 0 to 3) (N=67)	Median: 0 (IQR: 0 to 3) (N=63)	NR	
	Prolene vs. Vypro	Pain	VAS for pain - walking	Week 8	Median: 0 (IQR: 0 to 4) (N=67)	Median: 0 (IQR: 0 to 3) (N=63)	NR	
	Prolene vs. Vypro	ADV	Hydrocele	Post op within 8 weeks	0% (0/70)	1% (1/69)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene vs. Vypro	ADV	Seroma	Post op within 8 weeks	0% (0/70)	1% (1/69)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene vs. Vypro	ADV	Some abdominal discomfort in physical activity	Post op within 8 weeks	4% (3/70)	1% (1/69)	NS based on OR=3.04 (95% CI: 0.31 to 30.01)[@]	
	Prolene vs. Vypro	ADV	Transient sensory loss	Post op within 8 weeks	0% (0/70)	1% (1/69)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene vs. Vypro	ADV	Urinary tract infection	Post op within 8 weeks	1% (1/70)	0% (0/69)	NS based on OR=3 (95% CI: 0.12 to 74.93)[@]	
	Prolene vs. Vypro	ADV	Minor bleeding	NA	1% (1/70)	1% (1/69)	NS based on OR=0.99 (95% CI: 0.06 to 16.08)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Bringman et al., 2005[645] (continued)	Prolene vs. Vypro	ADV	Peritoneal tear	NA	17% (12/70)	4% (3/69)	p<0.05 based on OR=4.55 (95% CI: 1.22 to 16.93)[@]	
Champault et al., 2007[88,655,656]	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	RC	Hernia recurrence	2 years	3% (8/245)	2% (2/104)	NS based on OR=1.72 (95% CI: 0.36 to 8.25)[@]	
	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	Pain	Incidence of chronic pain (Lichten)	2 years	26% (46/179)	4% (2/53)	p=0.02; test not specified	
	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	Pain	Incidence of chronic pain (TEP)	2 years	27% (18/66)	6% (3/51)	p=0.02; test not specified	
	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	Pain	Incidence of severe pain (VAS>5) (Lichten)	2 years	4% (7/179)	0% (0/53)	p=0.02; test not specified	
	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	Pain	Incidence of severe pain (VAS>5) (TEP)	2 years	5% (3/66)	2% (1/51)	p=0.27; test not specified	
	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	Pain	Pain location groin	2 years	77% (189/245)	67% (70/104)	NS based on OR=1.64 (95% CI: 0.99 to 2.72)[@]	
	Lichtenstein with p.p. mesh vs. Lichtenstein with Glucamesh	Pain	Pain location testicle	2 years	34% (83/245)	50% (52/104)	p<0.05 based on OR=0.51 (95% CI: 0.32 to 0.82)[@]	
Chauhan et al., 2007[658]	Indiginous mesh vs. PHS	RC	Hernia recurrence	12 months	0% (0/40)	0% (0/44)	NS based on OR=1.1 (95% CI: 0.02 to 56.67)[@]	Mean follow-up group 1 (13.73 months, SD: 3.047); group 2 (13 months, SD: 3.570)
	Indiginous mesh vs. PHS	Pain	Mean VAS	Day 1 post op	5.53 (SD: NR) (N=40)	5.32 (SD: NR) (N=44)	p=0.396 t test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Chauhan et al., 2007[658] (continued)	Indiginous mesh vs. PHS	Pain	Mean VAS	Day 7 post op	2.25 (SD: NR) (N=40)	2.27 (SD: NR) (N=44)	p=0.975 t test	
	Indiginous mesh vs. PHS	ADV	Hematoma	NA	3% (1/40)	2% (1/44)	NS based on OR=1.1 (95% CI: 0.07 to 18.23)[@]	
	Indiginous mesh vs. PHS	ADV	Infection	NA	3% (1/40)	5% (2/44)	NS based on OR=0.54 (95% CI: 0.05 to 6.18)[@]	
	Indiginous mesh vs. PHS	ADV	Post op neuralgia	NA	3% (1/40)	2% (1/44)	NS based on OR=1.1 (95% CI: 0.07 to 18.23)[@]	
	Indiginous mesh vs. PHS	ADV	Total complications	NA	8% (3/40)	9% (4/44)	NS based on OR=0.81 (95% CI: 0.17 to 3.87)[@]	
Chowbey et al., 2010[660]	Prolene vs. Ultrapro	RC	Hernia recurrence	NR	3% (5/191)	0% (1/211)	p=0.078; test not specified	39 patients (22 group 1; 17 group 2) were lost to follow-up and excluded from study; no conversion to open or transabdominal)
	Prolene vs. Ultrapro	RTDA	Return to normal daily activities (days)	NA	1.82 (Range: 1 to 3) (N=191)	2.09 (Range: 1 to 7) (N=211)	p=0.00; either t-test or Mann Whitney (not reported which)	
	Prolene vs. Ultrapro	RTW	Return to work (days)	NA	4% (7.20/191)	4% (7.52/211)	p=0.604; either t-test or Mann Whitney (not reported which)	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Chowbey et al., 2010[660] (continued)	Prolene vs. Ultrapro	Pain	Pain	Day 0; post op	4.40 (Range: 3 to 7) (N=191)	4.45 (Range: 3 to 7) (N=211)	p=0.581; either t-test or Mann Whitney (not reported which)	
	Prolene vs. Ultrapro	Pain	Pain	Day 1 post op	2.39 (Range: 1 to 4) (N=191)	2.48 (Range: 1 to 4) (N=211)	p=0.289; either t-test or Mann Whitney (not reported which)	
	Prolene vs. Ultrapro	Pain	Pain	Day 7 post op	1.07 (Range: 0 to 2) (N=191)	1.31 (Range: 0 to 2) (N=211)	p=0.00; either t-test or Mann Whitney (not reported which)	
	Prolene vs. Ultrapro	Pain	Chronic pain - mild	3 months	2% (3/191)	5% (11/211)	NS based on OR=0.29 (95% CI: 0.08 to 1.06)[@]	
	Prolene vs. Ultrapro	Pain	Chronic pain - moderate	3 months	2% (4/191)	1% (3/211)	NS based on OR=1.48 (95% CI: 0.33 to 6.71)[@]	
	Prolene vs. Ultrapro	Pain	Chronic pain - Overall	3 months	4% (7/191)	7% (15/211)	p=0.164; test not specified	
	Prolene vs. Ultrapro	Pain	Chronic pain - severe	3 months	0% (0/191)	0% (1/211)	NS based on OR=0.37 (95% CI: 0.01 to 9.05)[@]	
	Prolene vs. Ultrapro	Pain	Chronic pain - mild	1 year	2% (3/191)	4% (9/211)	NS based on OR=0.36 (95% CI: 0.1 to 1.34)[@]	
	Prolene vs. Ultrapro	Pain	Chronic pain - moderate	1 year	0% (0/191)	0% (1/211)	NS based on OR=0.37 (95% CI: 0.01 to 9.05)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Chowbey et al., 2010[660] (continued)	Prolene vs. Ultrapro	Pain	Chronic pain - Overall	1 year	2% (3/191)	5% (10/211)	NS based on OR=0.32 (95% CI: 0.09 to 1.18)[@]	
	Prolene vs. Ultrapro	Pain	Chronic pain - severe	1 year	0% (0/191)	0% (0/211)	NS based on OR=1.1 (95% CI: 0.02 to 55.94)[@]	
	Prolene vs. Ultrapro	Pain	Testicular pain (mean)	NA	10 (SD: 5.2) (N=191)	12 (SD: 5.7) (N=211)	p=0.842; test not specified	
	Prolene vs. Ultrapro	ADV	Seroma (mean)	NA	32 (SD: 8.4) (N=191)	39 (SD: 9.2) (N=211)	p=0.666; test not specified	
Chui et al., 2010[661]	Lightweight mesh vs. heavyweight mesh	Pain	VAS	1 month	0.31 (Range: 1 to 5) (N=50)	0.34 (Range: 1 to 5) (N=50)	Within groups p=0.85, test not specified	All 50 patients had bilateral TEP repair with two different meshes
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	3 months	0.19 (Range: 1 to 4) (N=50)	0.35 (Range: 2 to 4) (N=50)	Within groups p=0.24, test not specified	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	6 months	0.12 (Range: 1 to 3) (N=50)	0.21 (Range: 2 to 4) (N=50)	Within groups p=0.14, test not specified	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	1 year	0.08 (Range: 1 to 3) (N=50)	0.16 (Range: 2 to 4) (N=50)	Within groups p=0.108, test not specified	
	Lightweight mesh vs. heavyweight mesh	ADV	Foregin body sensation post op	3 months	8% (4/50)	24% (12/50)	p<0.05 based on OR=0.28 (95% CI: 0.08 to 0.92)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Foreign body sensation post op	6 months	6% (3/50)	18% (9/50)	NS based on OR=0.29 (95% CI: 0.07 to 1.15)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Chui et al., 2010[661] (continued)	Lightweight mesh vs. heavyweight mesh	ADV	Foregin body sensation post op	1 year	2% (1/50)	12% (6/50)	NS based on OR=0.15 (95% CI: 0.02 to 1.29)[@]	
Collaborative group, 2008[663]	Lightweight mesh vs. heavyweight mesh	RC	Recurrence	After 12 months	2% (4/215)	1% (1/177)	NS based on OR=3.34 (95% CI: 0.37 to 30.13)[@]	Recurrence occurred in men only
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 bodily pain (higher number is better)	6 months	92.5 (95% CI: 89.7 to 95.4) (N=215)	91.3 (95% CI: 87.4 to 95.2) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 general health (higher number is better)	6 months	61.3 (95% CI: 58.5 to 64.2) (N=215)	63.9 (95% CI: 60.0 to 67.8) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 mental health (higher number is better)	6 months	65.3 (95% CI: 63.6 to 67.0) (N=215)	69.0 (95% CI: 66.7 to 71.3) (N=177)	p=0.820, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 physical functioning (higher number is better)	6 months	88.7 (95% CI: 86.3 to 91.2) (N=215)	90.1 (95% CI: 86.7 to 93.6) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 role emotional (higher number is better)	6 months	86.4 (95% CI: 81.7 to 91) (N=215)	85.7 (95% CI: 79.3 to 92.1) (N=177)	p=1.000, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 role physical (higher number is better)	6 months	85.8 (95% CI: 81.2 to 90.3) (N=215)	81.0 (95% CI: 74.5 to 87.4) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 social functioning (higher number is better)	6 months	86.9 (95% CI: 83.7 to 90.1) (N=215)	87.0 (95% CI: 82.6 to 91.4) (N=177)	p=1.000, ANOVA	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Collaborative group, 2008[663] (continued)	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 vitality (higher number is better)	6 months	62.1 (95% CI: 60.1 to 64) (N=215)	66.8 (95% CI: 64.1 to 69.5) (N=177)	p=1.000, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 bodily pain (higher number is better)	12 months	93.9 (95% CI: 91.2 to 96.7) (N=215)	93.5 (95% CI: 89.7 to 97.2) (N=177)	p=1.000, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 general health (higher number is better)	12 months	57.0 (95% CI: 54.5 to 59.6) (N=215)	60.6 (95% CI: 57.1 to 64.1) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 mental health (higher number is better)	12 months	63.8 (95% CI: 62.0 to 65.6) (N=215)	66.3 (95% CI: 63.9 to 68.8) (N=177)	p=0.970, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 physical functioning (higher number is better)	12 months	88.7 (95% CI: 86.3 to 91.0) (N=215)	88.5 (95% CI: 85.2 to 91.9) (N=177)	p=1.000, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 role emotional (higher number is better)	12 months	83.0 (95% CI: 78.1 to 87.9) (N=215)	85.7 (95% CI: 78.9 to 92.5) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 role physical (higher number is better)	12 months	84.1 (95% CI: 79.9 to 88.3) (N=215)	87.7 (95% CI: 81.8 to 93.5) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 social functioning (higher number is better)	12 months	85.1 (95% CI: 82.2 to 87.9) (N=215)	87.3 (95% CI: 83.4 to 91.3) (N=177)	p=0.990, ANOVA	
	Lightweight mesh vs. heavyweight mesh	QOL	SF-36 vitality (higher number is better)	12 months	61.0 (95% CI: 59.1 to 62.9) (N=215)	63.9 (95% CI: 61.3 to 66.5) (N=177)	p=0.990, ANOVA	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Collaborative group, 2008[663] (continued)	Lightweight mesh vs. heavyweight mesh	Pain	Analgesic consumption	Day 1	70% (151/ 215)	75% (133/177)	NS based on OR=0.78 (95% CI: 0.5 to 1.22)[@]	Data on pain intensity was collected for whole group not only those with pain; at 3, 6, and 12 months follow-up, the number of patients lost to follow-up were none, four and 12 respectively (?)
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	Day 1	Median: 3.4 (95% CI: 3.1 to 3.7) (N=215)	Median: 3.3 (95% CI: 3 to 3.72) (N=177)	NR	
	Lightweight mesh vs. heavyweight mesh	Pain	Pain	7 days	35% (75/215)	54% (95/177)	p<0.05 based on OR=0.46 (95% CI: 0.31 to 0.69)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	Day 7	Median: 1.1 (95% CI: 0.8 to 1.4) (N=215)	Median: 1.7 (95% CI: 1.35 to 2) (N=177)	p<0.001	
	Lightweight mesh vs. heavyweight mesh	Pain	Pain	3 months	10% (21/215)	17% (30/177)	p<0.05 based on OR=0.53 (95% CI: 0.29 to 0.96)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	3 months	Median: 0.2 (95% CI: 0.1 to 0.3) (N=215)	Median: 0.4 (95% CI: 0.25 to 0.5) (N=177)	P>0.500	
	Lightweight mesh vs. heavyweight mesh	Pain	Pain	6 months	11% (23/215)	10% (17/177)	NS based on OR=1.13 (95% CI: 0.58 to 2.18)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	6 months	Median: 0.1 (95% CI: 0 to 0.2) (N=215)	Median: 0.25 (95% CI: 0.15 to 0.41) (N=177)	P>0.500	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Collaborative group, 2008[663] (continued)	Lightweight mesh vs. heavyweight mesh	Pain	Pain	12 months	4% (8/215)	6% (11/177)	NS based on OR=0.58 (95% CI: 0.23 to 1.48)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS	12 months	Median: 0.1 (95% CI: 0 to 0.2) (N=215)	Median: 0.15 (95% CI: 0.11 to 0.3) (N=177)	P>0.500	
	Lightweight mesh vs. heavyweight mesh	ADV	Periioperative nerve injury	NA	1% (2/215)	1% (1/177)	NS based on OR=1.65 (95% CI: 0.15 to 18.38)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Need for urinary catheter placement	Post op	5% (10/215)	2% (3/177)	NS based on OR=2.83 (95% CI: 0.77 to 10.44)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Redness of wound or wound edema	Post op	7% (14/215)	7% (12/177)	NS based on OR=0.96 (95% CI: 0.43 to 2.13)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Superficial hematoma	Post op	1% (3/215)	4% (7/177)	NS based on OR=0.34 (95% CI: 0.09 to 1.35)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Urine retention	Post op	6% (12/215)	3% (5/177)	NS based on OR=2.03 (95% CI: 0.7 to 5.89)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Wound infection	Post op	0% (0/215)	0% (0/177)	NS based on OR=0.82 (95% CI: 0.02 to 41.72)[@]	
DeBord et al., 1999[668]	Standard mesh vs. impregnated mesh	Pain	Pain in left thigh and numbeness in left knee	5 days post op	5% (1/19)	0% (0/18)	NS based on OR=3 (95% CI: 0.11 to 78.53)[@]	
	Standard mesh vs. impregnated mesh	ADV	Prolonged ileus	12 days post op	0% (0/19)	6% (1/18)	NS based on OR=0.3 (95% CI: 0.01 to 7.83)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
DeBord et al., 1999[668]	Standard mesh vs. impregnated mesh	ADV	Infection	3 weeks post op	0% (0/19)	6% (1/18)	NS based on OR=0.3 (95% CI: 0.01 to 7.83)[@]	
	Standard mesh vs. impregnated mesh	ADV	Seroma	Post op	0% (0/19)	11% (2/18)	NS based on OR=0.17 (95% CI: 0.01 to 3.78)[@]	
Di Vita et al., 2010[670]	Prolene vs. Vypro II	RC	Hernia recurrence	Mean: 24 months (24-30)	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Vypro II	HOSP	Hospital stay (hours)	NA	23 (SD: 12) (N=15)	21 (SD: 14) (N=15)	NR	
Freudenberg et al., 2006[696]	Nylon vs. Ultrapro	QOL	Ability to walk - good (higher % is better)	Post op	89% (16/18)	100% (18/18)	NS based on OR=0.18 (95% CI: 0.01 to 3.99)[@]	Post op is 30 days after hernia repair; there were 2 dropouts in each group because patients did not appear for control examination (N=3) or violation of protocol (N=1)
	Nylon vs. Ultrapro	QOL	Ability to walk - restricted	Post op	11% (2/18)	0% (0/18)	NS based on OR=5.61 (95% CI: 0.25 to 125.46)[@]	
	Nylon vs. Ultrapro	QOL	Ability to walk - unable	Post op	0% (0/18)	0% (0/18)	NS based on OR=1 (95% CI: 0.02 to 53.12)[@]	
	Nylon vs. Ultrapro	QOL	Ability to work - good (higher % is better)	Post op	72% (13/18)	78% (14/18)	NS based on OR=0.74 (95% CI: 0.16 to 3.38)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Freudenberg et al., 2006[696] (continued)	Nylon vs. Ultrapro	QOL	Ability to work - restricted	Post op	17% (3/18)	11% (2/18)	NS based on OR=1.6 (95% CI: 0.23 to 10.95)[@]	
	Nylon vs. Ultrapro	QOL	Ability to work - unable	Post op	11% (2/18)	11% (2/18)	NS based on OR=1 (95% CI: 0.13 to 8)[@]	
	Nylon vs. Ultrapro	RTDA	Appetite - good (higher % is better)	Post op	100% (18/18)	100% (18/18)	NS based on OR=1 (95% CI: 0.02 to 53.12)[@]	
	Nylon vs. Ultrapro	RTDA	Appetite - restricted	Post op	0% (0/18)	0% (0/18)	NS based on OR=1 (95% CI: 0.02 to 53.12)[@]	
	Nylon vs. Ultrapro	RTDA	Bicycle riding - good (higher % is better)	Post op	67% (12/18)	78% (14/18)	NS based on OR=0.57 (95% CI: 0.13 to 2.51)[@]	
	Nylon vs. Ultrapro	RTDA	Bicycle riding - restricted	Post op	11% (2/18)	22% (4/18)	NS based on OR=0.44 (95% CI: 0.07 to 2.76)[@]	
	Nylon vs. Ultrapro	RTDA	Bicycle riding - unable	Post op	22% (4/18)	0% (0/18)	NS based on OR=11.48 (95% CI: 0.57 to 231)[@]	
	Nylon vs. Ultrapro	RTDA	Sexual function - good (higher % is better)	Post op	67% (12/18)	83% (15/18)	NS based on OR=0.4 (95% CI: 0.08 to 1.94)[@]	
	Nylon vs. Ultrapro	RTDA	Sexual function - restricted	Post op	17% (3/18)	17% (3/18)	NS based on OR=1 (95% CI: 0.17 to 5.77)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Freudenberg et al., 2006[696] (continued)	Nylon vs. Ultrapro	RTDA	Sexual function - unable	Post op	17% (3/18)	0% (0/18)	NS based on OR=8.35 (95% CI: 0.4 to 174.51)[@]	
	Nylon vs. Ultrapro	RTDA	Social activity - normal (higher % is better)	Post op	83% (15/18)	78% (14/18)	NS based on OR=1.43 (95% CI: 0.27 to 7.55)[@]	
	Nylon vs. Ultrapro	RTDA	Social activity - restricted	Post op	17% (3/18)	22% (4/18)	NS based on OR=0.7 (95% CI: 0.13 to 3.7)[@]	
	Nylon vs. Ultrapro	RTDA	Social activity - unable	Post op	0% (0/18)	0% (0/18)	NS based on OR=1 (95% CI: 0.02 to 53.12)[@]	
	Nylon vs. Ultrapro	RTDA	Time lost caused by health care - <10/ min day (higher % is better)	Post op	11% (2/18)	22% (4/18)	NS based on OR=0.44 (95% CI: 0.07 to 2.76)[@]	
	Nylon vs. Ultrapro	RTDA	Time lost caused by health care - >10/ min day	Post op	6% (1/18)	0% (0/18)	NS based on OR=3.17 (95% CI: 0.12 to 83.17)[@]	
	Nylon vs. Ultrapro	RTDA	Time lost caused by health care - none (higher % is better)	Post op	83% (15/18)	78% (14/18)	NS based on OR=1.43 (95% CI: 0.27 to 7.55)[@]	
	Nylon vs. Ultrapro	QOL	Ouagadougou Life Quality Index (0 is worst and 100 is best) (higher number is better)	NR	14.2 (SD: 20.4, Range: 10 to 65) (N=18)	16.0 (SD: 13.6, Range: 5 to 42.5) (N=18)	p=0.7566; t test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Freudenberg et al., 2006[696] (continued)	Nylon vs. Ultrapro	QOL	QoL index (higher number is better)	Post op (30 days)	86.8 (SD: 11.6, Range: 55.0 to 100) (N=18)	88.5 (SD: 9.3, Range: 72.5 to 100) (N=18)	p=0.6381; t test	
	Nylon vs. Ultrapro	SFN	Esthetic satisfaction - bad	Post op	6% (1/18)	0% (0/18)	NS based on OR=3.17 (95% CI: 0.12 to 83.17)[@]	
	Nylon vs. Ultrapro	SFN	Esthetic satisfaction - good (higher % is better)	Post op	83% (15/18)	78% (14/18)	NS based on OR=1.43 (95% CI: 0.27 to 7.55)[@]	
	Nylon vs. Ultrapro	SFN	Esthetic satisfaction - medium	Post op	11% (2/18)	22% (4/18)	NS based on OR=0.44 (95% CI: 0.07 to 2.76)[@]	
	Nylon vs. Ultrapro	SFN	General happiness - bad	Post op	0% (0/18)	0% (0/18)	NS based on OR=1 (95% CI: 0.02 to 53.12)[@]	
	Nylon vs. Ultrapro	SFN	General happiness - good (higher % is better)	Post op	22% (4/18)	17% (3/18)	NS based on OR=1.43 (95% CI: 0.27 to 7.55)[@]	
	Nylon vs. Ultrapro	SFN	General happiness - medium	Post op	11% (2/18)	22% (4/18)	NS based on OR=0.44 (95% CI: 0.07 to 2.76)[@]	
	Nylon vs. Ultrapro	SFN	General happiness - very good (higher % is better)	Post op	67% (12/18)	61% (11/18)	NS based on OR=1.27 (95% CI: 0.33 to 4.97)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Freudenberg et al., 2006[696] (continued)	Nylon vs. Ultrapro	Pain	Pain QoL	Post op	10 (Range: 5 to 10) (N=18)	10 (Range: 7 to 10) (N=18)	NR	max pain N=0; minimal pain N=10. Post op is 30 days after hernia repair; there were 2 dropouts in each group because patients did not appear for control examination (N=3) or violation of protocol (N=1)
	Nylon vs. Ultrapro	ADV	Foreign body sensation - no	Post op	72% (13/18)	72% (13/18)	NS based on OR=1 (95% CI: 0.23 to 4.3)[@]	
	Nylon vs. Ultrapro	ADV	Foreign body sensation - yes	Post op	28% (5/18)	28% (5/18)	NS based on OR=1 (95% CI: 0.23 to 4.3)[@]	
	Nylon vs. Ultrapro	ADV	Local comfort - normal	Post op	89% (16/18)	72% (13/18)	NS based on OR=3.08 (95% CI: 0.51 to 18.54)[@]	
	Nylon vs. Ultrapro	ADV	Local comfort - severe discomfort	Post op	6% (1/18)	0% (0/18)	NS based on OR=3.17 (95% CI: 0.12 to 83.17)[@]	
	Nylon vs. Ultrapro	ADV	Local comfort - some discomfort	Post op	6% (1/18)	28% (5/18)	NS based on OR=0.15 (95% CI: 0.02 to 1.47)[@]	
	Nylon vs. Ultrapro	ADV	Miction - good	Post op	94% (17/18)	100% (18/18)	NS based on OR=0.32 (95% CI: 0.01 to 8.27)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Freudenberg et al., 2006[696] (continued)	Nylon vs. Ultrapro	ADV	Miction - restricted	Post op	6% (1/18)	0% (0/18)	NS based on OR=3.17 (95% CI: 0.12 to 83.17)[@]	
	Nylon vs. Ultrapro	ADV	Sensitivity loss of skin - little	Post op	17% (3/18)	33% (6/18)	NS based on OR=0.4 (95% CI: 0.08 to 1.94)[@]	
	Nylon vs. Ultrapro	ADV	Sensitivity loss of skin - no	Post op	78% (14/18)	61% (11/18)	NS based on OR=2.23 (95% CI: 0.52 to 9.59)[@]	
	Nylon vs. Ultrapro	ADV	Sensitivity loss of skin - severe	Post op	6% (1/18)	6% (1/18)	NS based on OR=1 (95% CI: 0.06 to 17.33)[@]	
Heikkinen et al., 2006[709]	Prolene mesh vs. Vypro mesh	HOSP	Median hospital stay for admitted patients (days)	NA	Median: 1 (Range: 1 to 2) (N=23)	Median: 1 (Range: 1 to 3) (N=17)	NR	
	Prolene mesh vs. Vypro mesh	RTDA	Time to return to normal daily activities (days)	NA	13 (Range: 1 to 67) (N=69)	15 (Range: 2 to 74) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	RTW	Time to return to work (days)	NA	13 (Range: 3 to 32) (N=69)	12 (Range: 0 to 31) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Day 1	Median: 13 (IQR: 4 to 22) (N=69)	Median: 13 (IQR: 3 to 30) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Day 1	Median: 28 (IQR: 8 to 54) (N=69)	Median: 44 (IQR: 10 to 60) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Day 1	Median: 15 (IQR: 5 to 39) (N=69)	Median: 21 (IQR: 5 to 36) (N=68)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 2006[709] (continued)	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Day 1	Median: 19 (IQR: 5 to 39) (N=69)	Median: 27 (IQR: 6 to 47) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 1	Median: 0 (IQR: 0 to 11) (N=69)	Median: 4 (IQR: 1 to 11) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 1	Median: 9 (IQR: 2 to 21) (N=69)	Median: 14 (IQR: 3 to 30) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 1	Median: 4 (IQR: 1 to 11) (N=69)	Median: 6 (IQR: 3 to 20) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 1	Median: 5 (IQR: 1 to 20) (N=69)	Median: 10 (IQR: 4 to 27) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 2	Median: 1 (IQR: 0 to 11) (N=69)	Median: 3 (IQR: 0 to 5) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 2	Median: 3 (IQR: 1 to 17) (N=69)	Median: 5 (IQR: 1 to 17) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 2	Median: 3 (IQR: 1 to 9) (N=69)	Median: 5 (IQR: 1 to 10) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 2	Median: 2 (IQR: 1 to 10) (N=69)	Median: 4 (IQR: 1 to 10) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 3	Median: 0 (IQR: 0 to 5) (N=69)	Median: 1 (IQR: 0 to 5) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 3	Median: 3 (IQR: 0 to 10) (N=69)	Median: 3 (IQR: 1 to 10.5) (N=68)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 2006[709] (continued)	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 3	Median: 0 (IQR: 0 to 8) (N=69)	Median: 3 (IQR: 0 to 8) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 3	Median: 1 (IQR: 0 to 10) (N=69)	Median: 2 (IQR: 1 to 9.5) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 4	Median: 0 (IQR: 0 to 3) (N=69)	Median: 0 (IQR: 0 to 4) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 4	Median: 1 (IQR: 0 to 10) (N=69)	Median: 1 (IQR: 0 to 5) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 4	Median: 0 (IQR: 0 to 5) (N=69)	Median: 2 (IQR: 0 to 5) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 4	Median: 1 (IQR: 0 to 9) (N=69)	Median: 1 (IQR: 0 to 4) (N=68)	NR	
	Prolene mesh vs. Vypro mesh	Pain	Transient testicular pain	Post op ≤8 weeks	1% (1/69)	0% (0/68)	NS based on OR=3 (95% CI: 0.12 to 74.94)[@]	
	Prolene mesh vs. Vypro mesh	Pain	VAS resting in bed	Week 8	Median: 0 (IQR: 0 to 2) (N=59)	Median: 0 (IQR: 0 to 2) (N=62)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS rising from horizontal to vertical position	Week 8	Median: 0 (IQR: 0 to 5) (N=59)	Median: 0 (IQR: 0 to 3) (N=62)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS standing	Week 8	Median: 0 (IQR: 0 to 3) (N=59)	Median: 0 (IQR: 0 to 2) (N=62)	NR	
	Prolene mesh vs. Vypro mesh	Pain	VAS walking	Week 8	Median: 0 (IQR: 0 to 2) (N=59)	Median: 0 (IQR: 0 to 2) (N=62)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Heikkinen et al., 2006[709] (continued)	Prolene mesh vs. Vypro mesh	ADV	Acute myocardial (AMI) and coronary bypass	Post op ≤8 weeks	1% (1/69)	0% (0/68)	NS based on OR=3 (95% CI: 0.12 to 74.94)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Deep vein thrombosis	Post op ≤8 weeks	0% (0/69)	1% (1/68)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Inguinal discomfort	Post op ≤8 weeks	0% (0/69)	1% (1/68)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Ophthalmic embolism	Post op ≤8 weeks	0% (0/69)	1% (1/68)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Seroma	Post op ≤8 weeks	1% (1/69)	0% (0/68)	NS based on OR=3 (95% CI: 0.12 to 74.94)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Some abdominal discomfort	Post op ≤8 weeks	1% (1/69)	0% (0/68)	NS based on OR=3 (95% CI: 0.12 to 74.94)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Umbilical wound infection	Post op ≤8 weeks	0% (0/69)	1% (1/68)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	
	Prolene mesh vs. Vypro mesh	ADV	Urine retention and infection	Post op ≤8 weeks	0% (0/69)	1% (1/68)	NS based on OR=0.32 (95% CI: 0.01 to 8.09)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kapischke et al., 2010[716]	Progrip vs. Optilene	Pain	VAS pain score	6 months	3.8 (Range: 0 to 30) (N=24)	12.6 (Range: 0 to 80) (N=25)	NR	One patient in group B died due to a myocardial infarction 4 months after surgery
	Progrip vs. Optilene	Pain	VAS pain score	Post op	17.9 (Range: 0 to 40) (N=24)	32.3 (Range: 0 to 100) (N=26)	NR	
	Progrip vs. Optilene	ADV	Hematoma	NA	17% (4/24)	12% (3/25)	NS based on OR=1.47 (95% CI: 0.29 to 7.37)[@]	
	Progrip vs. Optilene	ADV	Mesh infection	NA	4% (1/24)	0% (0/25)	NS based on OR=3.26 (95% CI: 0.13 to 83.9)[@]	
Khan et al., 2010[717]	Lightweight mesh vs. heavyweight mesh	RC	Hernia recurrence	12 months	2% (2/111)	2% (3/138)	NS based on OR=0.83 (95% CI: 0.14 to 5.03)[@]	Due to violation of follow-up protocol or death, 39 patients from Group 1 were lost whereas 12 patients from group 2 were lost. Therefore 111 were in Group 1; 138 in Group 2
	Lightweight mesh vs. heavyweight mesh	Pain	VAS pain	7 days post op	50% (56/111)	46% (64/138)	NS based on OR=1.18 (95% CI: 0.71 to 1.94)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS pain	3 months post op	7% (8/111)	7% (9/138)	NS based on OR=1.11 (95% CI: 0.41 to 2.99)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Khan et al., 2010[717] (continued)	Lightweight mesh vs. heavyweight mesh	Pain	VAS pain	6 months post op	3% (3/111)	4% (5/138)	NS based on OR=0.74 (95% CI: 0.17 to 3.16)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS pain	12 months post op	2% (2/111)	1% (2/138)	NS based on OR=1.25 (95% CI: 0.17 to 9)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Hematoma formation	NA	4% (4/111)	4% (6/138)	NS based on OR=0.82 (95% CI: 0.23 to 2.99)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Ilioinguinal nerve injury	NA	5% (5/111)	3% (4/138)	NS based on OR=1.58 (95% CI: 0.41 to 6.03)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Seroma formation	NA	4% (4/111)	4% (5/138)	NS based on OR=0.99 (95% CI: 0.26 to 3.79)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Urinary retention	NA	5% (6/111)	3% (4/138)	NS based on OR=1.91 (95% CI: 0.53 to 6.96)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Wound infection	NA	2% (2/111)	3% (4/138)	NS based on OR=0.61 (95% CI: 0.11 to 3.42)[@]	
Koch et al., 2008[724]	Lightweight mesh vs. standard weight mesh	RC	Hernia recurrence	12 months	2% (3/161)	1% (2/156)	NS based on OR=1.46 (95% CI: 0.24 to 8.87)[@]	
	Lightweight mesh vs. standard weight mesh	RTDA	Return to normal activity (all groups) (days)	NA	Median: 10 (Range: 0 to 91) (N=161)	Median: 7 (Range: 1 to 90) (N=156)	p=0.005, Mann Whitney U	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koch et al., 2008[724] (continued)	Lightweight mesh vs. standard weight mesh	RTDA	Return to normal activity (heavy physical work)(days)	NA	Median: 14 (Range: 0 to 91) (N=161)	Median: 12 (Range: 1 to 90) (N=156)	p=0.086, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTDA	Return to normal activity (light physical work) (days)	NA	Median: 7 (Range: 1 to 50) (N=161)	Median: 4 (Range: 1 to 63) (N=156)	p=0.006, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTDA	Return to normal activity (medium physical work) (days)	NA	Median: 11.5 (Range: 1 to 34) (N=161)	Median: 7 (Range: 1 to 60) (N=156)	p=0.856, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTDA	Return to normal activity (retired) (days)	NA	Median: 10 (Range: 0 to 49) (N=161)	Median: 7 (Range: 1 to 36) (N=156)	p=0.267, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTW	Return to heavy physical work (days)	NA	Median: 14 (Range: 0 to 90) (N=161)	Median: 8 (Range: 0 to 21) (N=156)	p=0.069, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTW	Return to light physical work (days)	NA	Median: 4 (Range: 0 to 36) (N=161)	Median: 0 (Range: 0 to 28) (N=156)	p=0.004, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTW	Return to medium physical work (days)	NA	Median: 6 (Range: 0 to 18) (N=161)	Median: 6 (Range: 0 to 24) (N=156)	p=0.871, Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	RTW	Return to work general (days)	NA	Median: 6.5 (Range: 0 to 90) (N=161)	Median: 4 (Range: 0 to 28) (N=156)	p=0.040; Mann Whitney U	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain at rest	day 1	Median: 31 (IQR: 20.5 to 50) (N=161)	Median: 29 (IQR: 18 to 50) (N=156)	NR	VAS (mm)
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain with activity	day 1	Median: 63 (IQR: 36 to 76) (N=161)	Median: 53 (IQR: 32 to 76) (N=156)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koch et al., 2008[724] (continued)	Lightweight mesh vs. standard weight mesh	Pain	VAS pain at rest	Week 1	Median: 14 (IQR: 7 to 23) (N=161)	Median: 14 (IQR: 6 to 26) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain with activity	Week 1	Median: 26 (IQR: 13 to 44) (N=161)	Median: 26 (IQR: 12 to 45) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain at rest	Week 2	Median: 7 (IQR: 2 to 13.5) (N=161)	Median: 5 (IQR: 0 to 14) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain with activity	Week 2	Median: 7 (IQR: 4 to 18) (N=161)	Median: 11 (IQR: 4 to 20) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain at rest	Week 3	Median: 1 (IQR: 0 to 5) (N=161)	Median: 1 (IQR: 0 to 7) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain with activity	Week 3	Median: 1 (IQR: 0 to 8) (N=161)	Median: 2 (IQR: 0 to 9) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain at rest	Week 4	Median: 0 (IQR: 0 to 3) (N=161)	Median: 0 (IQR: 0 to 3) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain with activity	Week 4	Median: 0 (IQR: 0 to 5) (N=161)	Median: 0 (IQR: 0 to 4) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain at rest	Week 8	Median: 0 (IQR: 0 to 0) (N=161)	Median: 0 (IQR: 0 to 0) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	VAS pain with activity	Week 8	Median: 0 (IQR: 0 to 1) (N=161)	Median: 0 (IQR: 0 to 1) (N=156)	NR	
	Lightweight mesh vs. standard weight mesh	Pain	Pain with normal activity	12 months	1% (2/161)	1% (1/156)	NS based on OR=1.95 (95% CI: 0.17 to 21.72)[@]	
	Lightweight mesh vs. standard weight mesh	Pain	Pain with strenuous activity	12 months	2% (4/161)	0% (0/156)	NS based on OR=8.94 (95% CI: 0.48 to 167.51)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koch et al., 2008[724] (continued)	Lightweight mesh vs. standard weight mesh	Pain	Unspecified pain	12 months	2% (3/161)	3% (4/156)	NS based on OR=0.72 (95% CI: 0.16 to 3.28)[@]	
	Lightweight mesh vs. standard weight mesh	ADV	Discomfort	12 months	11% (17/161)	10% (16/156)	NS based on OR=1.03 (95% CI: 0.5 to 2.12)[@]	
	Lightweight mesh vs. standard weight mesh	ADV	Neuralgia (genitofemoral)	12 months	1% (2/161)	1% (1/156)	NS based on OR=1.95 (95% CI: 0.17 to 21.72)[@]	
	Lightweight mesh vs. standard weight mesh	ADV	Testicular atrophy	12 months	0% (0/151)	0% (0/149)	NS based on OR=0.99 (95% CI: 0.02 to 50.06)[@]	N=number of patients with clinical follow-up at 1 year; in group A 7 patients were followed up with written form and 3 with phone (total N=161). In group B 4 patients followed up with written form and 3 with phone (total N=156)
	Lightweight mesh vs. standard weight mesh	ADV	Hematoma	NA	0% (0/161)	2% (3/156)	NS based on OR=0.14 (95% CI: 0.01 to 2.65)[@]	
	Lightweight mesh vs. standard weight mesh	ADV	Infection	NA	1% (1/161)	1% (1/156)	NS based on OR=0.97 (95% CI: 0.06 to 15.63)[@]	
	Lightweight mesh vs. standard weight mesh	ADV	Seroma	NA	1% (1/161)	1% (1/156)	NS based on OR=0.97 (95% CI: 0.06 to 15.63)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koch et al., 2008[724] (continued)	Lightweight mesh vs. standard weight mesh	ADV	Neuralgia	Post op	1% (1/161)	0% (0/156)	NS based on OR=2.93 (95% CI: 0.12 to 72.36)[@]	
Langenbach et al., 2003[733]	Rigid mesh vs. smooth mesh	HOSP	Hospital stay (days)	NA	19% (3.8/20)	20% (3.9/20)	NS based on OR=0.97 (95% CI: 0.2 to 4.66)[@]	
	Rigid mesh vs. smooth mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 1 post op	4.2 (SD: 2.33) (N=20)	2.3 (SD: 2.0) (N=20)	NR	
	Rigid mesh vs. smooth mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 2 post op	3.0 (SD: 1.47) (N=20)	1.4 (SD: 0.94) (N=20)	NR	
	Rigid mesh vs. smooth mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 4 post op	2.1 (SD: 1.25) (N=20)	0.6 (SD: 0.51) (N=20)	NR	
	Rigid mesh vs. smooth mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 8 post op	1.6 (SD: 1.19) (N=20)	0.1 (SD: 0.22) (N=20)	NR	
	Rigid mesh vs. smooth mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 12 post op	1.1 (SD: 0.83) (N=20)	0.1 (SD: 0.31) (N=20)	NR	
	Rigid mesh vs. smooth mesh	RTW	Average inability to work (days)	NA	40.1 (SD: NR) (N=20)	33.8 (SD: NR) (N=20)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2003[733] (continued)	Rigid mesh vs. smooth mesh	Pain	Testicular contact pain	Day 1 post op	10% (2/20)	10% (2/20)	NS based on OR=1 (95% CI: 0.13 to 7.89)[@]	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Day 1 post op	3.7 (SD: 1.14) (N=20)	2.6 (SD: 1.10) (N=20)	NR	
	Rigid mesh vs. smooth mesh	Pain	Testicular contact pain	Day 2 post op	20% (4/20)	20% (4/20)	NS based on OR=1 (95% CI: 0.21 to 4.71)[@]	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Day 3 post op	2.7 (SD: 0.93) (N=20)	1.5 (SD: 0.76) (N=20)	NR	
	Rigid mesh vs. smooth mesh	Pain	Pain with ejaculation	Week 1 post op	15% (3/20)	5% (1/20)	NS based on OR=3.35 (95% CI: 0.32 to 35.37)[@]	
	Rigid mesh vs. smooth mesh	Pain	Testicular contact pain	Week 1 post op	25% (5/20)	15% (3/20)	NS based on OR=1.89 (95% CI: 0.38 to 9.27)[@]	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Week 1 post op	1.6 (SD: 0.75) (N=20)	1.1 (SD: 0.60) (N=20)	NR	
	Rigid mesh vs. smooth mesh	Pain	Pain with ejaculation	Week 2 post op	25% (5/20)	10% (2/20)	NS based on OR=3 (95% CI: 0.51 to 17.74)[@]	
	Rigid mesh vs. smooth mesh	Pain	Testicular contact pain	Week 2 post op	25% (5/20)	10% (2/20)	NS based on OR=3 (95% CI: 0.51 to 17.74)[@]	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Week 2 post op	0.9 (SD: 0.32) (N=20)	0.3 (SD: 0.31) (N=20)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2003[733] (continued)	Rigid mesh vs. smooth mesh	Pain	Pain with ejaculation	Week 4 post op	25% (5/20)	10% (2/20)	NS based on OR=3 (95% CI: 0.51 to 17.74)[@]	
	Rigid mesh vs. smooth mesh	Pain	Testicular contact pain	Week 4 post op	30% (6/20)	10% (2/20)	NS based on OR=3.86 (95% CI: 0.67 to 22.11)[@]	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Week 4 post op	0.7 (SD: 0.49) (N=20)	0.1 (SD: 0.31) (N=20)	NR	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Week 8 post op	0.5 (SD: 0.51) (N=20)	NR (NR) (N=20)	NR	
	Rigid mesh vs. smooth mesh	Pain	Pain with ejaculation	Week 12 post op	20% (4/20)	5% (1/20)	NS based on OR=4.75 (95% CI: 0.48 to 46.91)[@]	
	Rigid mesh vs. smooth mesh	Pain	Testicular contact pain	Week 12 post op	20% (4/20)	5% (1/20)	NS based on OR=4.75 (95% CI: 0.48 to 46.91)[@]	
	Rigid mesh vs. smooth mesh	Pain	VAS pain development	Week 12 post op	0.1 (SD: 0.31) (N=20)	NR (NR) (N=20)	NR	
	Rigid mesh vs. smooth mesh	QOL	Abdominal wall seroma	Day 1 post op	20% (4/20)	20% (4/20)	NS based on OR=1 (95% CI: 0.21 to 4.71)[@]	
	Rigid mesh vs. smooth mesh	ADV	Scrotal hematoma	Day 1 post op	5% (1/20)	5% (1/20)	NS based on OR=1 (95% CI: 0.06 to 17.18)[@]	
	Rigid mesh vs. smooth mesh	QOL	Abdominal wall seroma	Day 2 post op	20% (4/20)	25% (5/20)	NS based on OR=0.75 (95% CI: 0.17 to 3.33)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2003[733] (continued)	Rigid mesh vs. smooth mesh	ADV	Scrotal hematoma	Day 2 post op	20% (4/20)	15% (3/20)	NS based on OR=1.42 (95% CI: 0.27 to 7.34)[@]	
	Rigid mesh vs. smooth mesh	QOL	Abdominal wall seroma	Week 1 post op	20% (4/20)	25% (5/20)	NS based on OR=0.75 (95% CI: 0.17 to 3.33)[@]	
	Rigid mesh vs. smooth mesh	ADV	Discomfort with urination	Week 1 post op	30% (6/20)	10% (2/20)	NS based on OR=3.86 (95% CI: 0.67 to 22.11)[@]	
	Rigid mesh vs. smooth mesh	ADV	Scrotal hematoma	Week 1 post op	20% (4/20)	20% (4/20)	NS based on OR=1 (95% CI: 0.21 to 4.71)[@]	
	Rigid mesh vs. smooth mesh	QOL	Abdominal wall seroma	Week 2 post op	15% (3/20)	20% (4/20)	NS based on OR=0.71 (95% CI: 0.14 to 3.66)[@]	
	Rigid mesh vs. smooth mesh	ADV	Discomfort with urination	Week 2 post op	25% (5/20)	10% (2/20)	NS based on OR=3 (95% CI: 0.51 to 17.74)[@]	
	Rigid mesh vs. smooth mesh	ADV	Scrotal hematoma	Week 2 post op	20% (4/20)	20% (4/20)	NS based on OR=1 (95% CI: 0.21 to 4.71)[@]	
	Rigid mesh vs. smooth mesh	QOL	Abdominal wall seroma	Week 4 post op	10% (2/20)	5% (1/20)	NS based on OR=2.11 (95% CI: 0.18 to 25.35)[@]	
	Rigid mesh vs. smooth mesh	ADV	Discomfort with urination	Week 4 post op	25% (5/20)	10% (2/20)	NS based on OR=3 (95% CI: 0.51 to 17.74)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2003[733] (continued)	Rigid mesh vs. smooth mesh	ADV	Scrotal hematoma	Week 4 post op	10% (2/20)	10% (2/20)	NS based on OR=1 (95% CI: 0.13 to 7.89)[@]	
	Rigid mesh vs. smooth mesh	ADV	Discomfort with urination	Week 12 post op	10% (2/20)	0% (0/20)	NS based on OR=5.54 (95% CI: 0.25 to 123.09)[@]	
	Rigid mesh vs. smooth mesh	ADV	Testicular atrophy	Post op	0% (0/20)	0% (0/20)	NS based on OR=1 (95% CI: 0.02 to 52.85)[@]	
Langenbach et al., 2006[734]	Smooth p.p. mesh vs. Compound mesh	HOSP	Hospital stay (days)	NA	13% (3.9/30)	13% (3.8/30)	NS based on OR=1.03 (95% CI: 0.23 to 4.68)[@]	
	Smooth p.p. mesh vs. Compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 1 post op	2.3 (SD: NR) (NS NR)	2 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 2 post op	1.4 (SD: NR) (NS NR)	1.1 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 4 post op	0.6 (SD: NR) (NS NR)	0.4 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 8 post op	0.1 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Smooth p.p. mesh vs. Compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 12 post op	0.1 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	RTW	Average inability to work (days)	NA	32.6 (SD: NR) (N=30)	33.5 (SD: NR) (N=30)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	Testicular contact pain	Day 1 post op	7% (2/30)	10% (3/30)	NS based on OR=0.64 (95% CI: 0.1 to 4.15)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Day 1 post op	2.6 (SD: NR) (NS NR)	2.7 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	Testicular contact pain	Day 2 post op	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Day 3 post op	1.5 (SD: NR) (NS NR)	1.4 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	Pain with ejaculation	First post op week	3% (1/30)	3% (1/30)	NS based on OR=1 (95% CI: 0.06 to 16.76)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	Testicular contact pain	First post op week	10% (3/30)	10% (3/30)	NS based on OR=1 (95% CI: 0.19 to 5.4)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Week 1 post op	1.1 (SD: NR) (NS NR)	0.9 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	Testicular contact pain	Second post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Week 2 post op	0.3 (SD: NR) (NS NR)	0.5 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	Pain with ejaculation	Fourth post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	Testicular contact pain	Fourth post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Week 4 post op	0.1 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Week 8 post op	0 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	Pain	Pain with ejaculation	Week 12 post op	3% (1/30)	0% (0/30)	NS based on OR=3.1 (95% CI: 0.12 to 79.23)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	Testicular contact pain	Week 12 post op	3% (1/30)	3% (1/30)	NS based on OR=1 (95% CI: 0.06 to 16.76)[@]	
	Smooth p.p. mesh vs. Compound mesh	Pain	VAS pain development	Week 12 post op	0 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Smooth p.p. mesh vs. Compound mesh	QOL	Abdominal wall seroma	Day 1 post op	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	Scrotal hematoma	Day 1 post op	3% (1/30)	3% (1/30)	NS based on OR=1 (95% CI: 0.06 to 16.76)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Smooth p.p. mesh vs. Compound mesh	QOL	Abdominal wall seroma	Day 2 post op	17% (5/30)	13% (4/30)	NS based on OR=1.3 (95% CI: 0.31 to 5.4)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	Scrotal hematoma	Day 2 post op	10% (3/30)	10% (3/30)	NS based on OR=1 (95% CI: 0.19 to 5.4)[@]	
	Smooth p.p. mesh vs. Compound mesh	QOL	Abdominal wall seroma	First post op week	17% (5/30)	13% (4/30)	NS based on OR=1.3 (95% CI: 0.31 to 5.4)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	discomfort with urination	First post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	Scrotal hematoma	First post op week	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Smooth p.p. mesh vs. Compound mesh	QOL	Abdominal wall seroma	Second post op week	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	Scrotal hematoma	Second post op week	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Smooth p.p. mesh vs. Compound mesh	QOL	Abdominal wall seroma	Fourth post op week	3% (1/30)	3% (1/30)	NS based on OR=1 (95% CI: 0.06 to 16.76)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	discomfort with urination	Fourth post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Smooth p.p. mesh vs. Compound mesh	ADV	Scrotal hematoma	Fourth post op week	7% (2/30)	7% (2/30)	NS based on OR=1 (95% CI: 0.13 to 7.6)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	Discomfort with urination	Week 12 post op	0% (0/30)	0% (0/30)	NS based on OR=1 (95% CI: 0.02 to 52.04)[@]	
	Smooth p.p. mesh vs. Compound mesh	ADV	Testicular atrophy	Post op	0% (0/30)	0% (0/30)	NS based on OR=1 (95% CI: 0.02 to 52.04)[@]	
	Standard p.p. mesh vs. compound mesh	HOSP	Hospital stay (days)	NA	12% (3.7/30)	13% (3.8/30)	NS based on OR=0.97 (95% CI: 0.21 to 4.48)[@]	
	Standard p.p. mesh vs. compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 1 post op	4.2 (SD: NR) (NS NR)	2 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 2 post op	3 (SD: NR) (NS NR)	1.1 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 4 post op	2.1 (SD: NR) (NS NR)	0.4 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 8 post op	1.6 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. compound mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 12 post op	1.1 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	RTW	Average inability to work (days)	NA	38.1 (SD: NR) (N=30)	33.5 (SD: NR) (N=30)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	Testicular contact pain	Day 1 post op	7% (2/30)	10% (3/30)	NS based on OR=0.64 (95% CI: 0.1 to 4.15)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Day 1 post op	3.7 (SD: NR) (NS NR)	2.7 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	Testicular contact pain	Day 2 post op	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Day 3 post op	2.7 (SD: NR) (NS NR)	1.4 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	Pain with ejaculation	First post op week	10% (3/30)	3% (1/30)	NS based on OR=3.22 (95% CI: 0.32 to 32.89)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	Testicular contact pain	First post op week	17% (5/30)	10% (3/30)	NS based on OR=1.8 (95% CI: 0.39 to 8.32)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Week 1 post op	1.6 (SD: NR) (NS NR)	0.9 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	Testicular contact pain	Second post op week	17% (5/30)	3% (1/30)	NS based on OR=5.8 (95% CI: 0.63 to 53.01)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Week 2 post op	0.9 (SD: NR) (NS NR)	0.5 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	Pain with ejaculation	Fourth post op week	20% (6/30)	3% (1/30)	NS based on OR=7.25 (95% CI: 0.82 to 64.46)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	Testicular contact pain	Fourth post op week	20% (6/30)	3% (1/30)	NS based on OR=7.25 (95% CI: 0.82 to 64.46)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Week 4 post op	0.7 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Week 8 post op	0.5 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	Pain	Pain with ejaculation	Week 12 post op	13% (4/30)	0% (0/30)	NS based on OR=10.36 (95% CI: 0.53 to 201.46)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	Testicular contact pain	Week 12 post op	13% (4/30)	3% (1/30)	NS based on OR=4.46 (95% CI: 0.47 to 42.52)[@]	
	Standard p.p. mesh vs. compound mesh	Pain	VAS pain development	Week 12 post op	0.1 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. compound mesh	QOL	Abdominal wall seroma	Day 1 post op	17% (5/30)	10% (3/30)	NS based on OR=1.8 (95% CI: 0.39 to 8.32)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Scrotal hematoma	Day 1 post op	3% (1/30)	3% (1/30)	NS based on OR=1 (95% CI: 0.06 to 16.76)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. compound mesh	QOL	Abdominal wall seroma	Day 2 post op	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Scrotal hematoma	Day 2 post op	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Standard p.p. mesh vs. compound mesh	QOL	Abdominal wall seroma	First post op week	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Discomfort with urination	First post op week	20% (6/30)	3% (1/30)	NS based on OR=7.25 (95% CI: 0.82 to 64.46)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Scrotal hematoma	First post op week	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Standard p.p. mesh vs. compound mesh	QOL	Abdominal wall seroma	Second post op week	20% (6/30)	10% (3/30)	NS based on OR=2.25 (95% CI: 0.51 to 9.99)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Scrotal hematoma	Second post op week	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Standard p.p. mesh vs. compound mesh	QOL	Abdominal wall seroma	Fourth post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Discomfort with urination	Fourth post op week	20% (6/30)	3% (1/30)	NS based on OR=7.25 (95% CI: 0.82 to 64.46)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. compound mesh	ADV	Scrotal hematoma	Fourth post op week	7% (2/30)	7% (2/30)	NS based on OR=1 (95% CI: 0.13 to 7.6)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Discomfort with urination	Week 12 post op	7% (2/30)	0% (0/30)	NS based on OR=5.35 (95% CI: 0.25 to 116.32)[@]	
	Standard p.p. mesh vs. compound mesh	ADV	Testicular atrophy	Post op	0% (0/30)	0% (0/30)	NS based on OR=1 (95% CI: 0.02 to 52.04)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	HOSP	Hospital stay (days)	NA	12% (3.7/30)	13% (3.9/30)	NS based on OR=0.94 (95% CI: 0.21 to 4.31)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 1 post op	4.2 (SD: NR) (NS NR)	2.3 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 2 post op	3 (SD: NR) (NS NR)	1.4 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 4 post op	2.1 (SD: NR) (NS NR)	0.6 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 8 post op	1.6 (SD: NR) (NS NR)	0.1 (SD: NR) (NS NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. smooth p.p. mesh	RTDA	VAS impairment of sexual life (lower scores better)	Week 12 post op	1.1 (SD: NR) (NS NR)	0.1 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	RTW	Average inability to work (days)	NA	38.1 (SD: NR) (N=30)	32.6 (SD: NR) (N=30)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Testicular contact pain	Day 1 post op	7% (2/30)	7% (2/30)	NS based on OR=1 (95% CI: 0.13 to 7.6)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Day 1 post op	3.7 (SD: NR) (NS NR)	2.6 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Testicular contact pain	Day 2 post op	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Day 3 post op	2.7 (SD: NR) (NS NR)	1.5 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Pain with ejaculation	First post op week	10% (3/30)	3% (1/30)	NS based on OR=3.22 (95% CI: 0.32 to 32.89)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Testicular contact pain	First post op week	17% (5/30)	10% (3/30)	NS based on OR=1.8 (95% CI: 0.39 to 8.32)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Week 1 post op	1.6 (SD: NR) (NS NR)	1.1 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Testicular contact pain	Second post op week	17% (5/30)	7% (2/30)	NS based on OR=2.8 (95% CI: 0.5 to 15.73)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Week 2 post op	0.9 (SD: NR) (NS NR)	0.3 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Pain with ejaculation	Fourth post op week	20% (6/30)	7% (2/30)	NS based on OR=3.5 (95% CI: 0.65 to 18.98)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Testicular contact pain	Fourth post op week	20% (6/30)	7% (2/30)	NS based on OR=3.5 (95% CI: 0.65 to 18.98)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Week 4 post op	0.7 (SD: NR) (NS NR)	0.1 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Week 8 post op	0.5 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Pain with ejaculation	Week 12 post op	13% (4/30)	3% (1/30)	NS based on OR=4.46 (95% CI: 0.47 to 42.52)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	Testicular contact pain	Week 12 post op	13% (4/30)	3% (1/30)	NS based on OR=4.46 (95% CI: 0.47 to 42.52)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	Pain	VAS pain development	Week 12 post op	0.1 (SD: NR) (NS NR)	0 (SD: NR) (NS NR)	NR	
	Standard p.p. mesh vs. smooth p.p. mesh	QOL	Abdominal wall seroma	Day 1 post op	17% (5/30)	13% (4/30)	NS based on OR=1.3 (95% CI: 0.31 to 5.4)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Scrotal hematoma	Day 1 post op	3% (1/30)	3% (1/30)	NS based on OR=1 (95% CI: 0.06 to 16.76)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. smooth p.p. mesh	QOL	Abdominal wall seroma	Day 2 post op	13% (4/30)	17% (5/30)	NS based on OR=0.77 (95% CI: 0.19 to 3.2)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Scrotal hematoma	Day 2 post op	13% (4/30)	10% (3/30)	NS based on OR=1.38 (95% CI: 0.28 to 6.8)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	QOL	Abdominal wall seroma	First post op week	13% (4/30)	17% (5/30)	NS based on OR=0.77 (95% CI: 0.19 to 3.2)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Discomfort with urination	First post op week	20% (6/30)	7% (2/30)	NS based on OR=3.5 (95% CI: 0.65 to 18.98)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Scrotal hematoma	First post op week	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	QOL	Abdominal wall seroma	Second post op week	20% (6/30)	13% (4/30)	NS based on OR=1.63 (95% CI: 0.41 to 6.47)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Scrotal hematoma	Second post op week	13% (4/30)	13% (4/30)	NS based on OR=1 (95% CI: 0.23 to 4.43)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	QOL	Abdominal wall seroma	Fourth post op week	7% (2/30)	3% (1/30)	NS based on OR=2.07 (95% CI: 0.18 to 24.15)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Discomfort with urination	Fourth post op week	20% (6/30)	7% (2/30)	NS based on OR=3.5 (95% CI: 0.65 to 18.98)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2006[734] (continued)	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Scrotal hematoma	Fourth post op week	7% (2/30)	7% (2/30)	NS based on OR=1 (95% CI: 0.13 to 7.6)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Discomfort with urination	Week 12 post op	7% (2/30)	0% (0/30)	NS based on OR=5.35 (95% CI: 0.25 to 116.32)[@]	
	Standard p.p. mesh vs. smooth p.p. mesh	ADV	Testicular atrophy	Post op	0% (0/30)	0% (0/30)	NS based on OR=1 (95% CI: 0.02 to 52.04)[@]	
Langenbach et al., 2008[735]	Prolene vs. Serapen	RC	Recurrence rate	Post op 24 months	2% (1/58)	0% (0/59)	NS based on OR=3.1 (95% CI: 0.12 to 77.78)[@]	
	Prolene vs. Serapen	RC	Recurrence rate	Post op 60 months	2% (1/58)	2% (1/59)	NS based on OR=1.02 (95% CI: 0.06 to 16.66)[@]	
	Prolene vs. Serapen	HOSP	Hospital stay (days)	NA	6% (3.7/58)	7% (3.9/59)	NS based on OR=0.96 (95% CI: 0.22 to 4.19)[@]	
	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 1	Median: 4.3 (SD: NR) (N=58)	Median: 2.3 (SD: NR) (N=59)	NR	Data-analysis were done on intent to treat basis: Group A total N=58 (2 lost to follow-up – 1 died, 1 moved); Group B total N=59 (lost 1 to follow-up - died); Group C total N=58 (1 lost to follow-up - died)

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 2	Median: 3 (SD: NR) (N=58)	Median: 1.45 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 4	Median: 2.05 (SD: NR) (N=58)	Median: 0.55 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 8	Median: 1.6 (SD: NR) (N=58)	Median: 0.1 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 12	Median: 1 (SD: NR) (N=58)	Median: 0.1 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op 24 months	Median: 0 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op 60 months	Median: 0 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	RTW	Average duration of incapacity for work (days)	NA	39.1 (SD: NR) (N=58)	32.4 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	QOL	SF-36 development of pain after TAPP (higher number is better)	24 months	Median: 68 (SD: NR) (N=58)	Median: 78 (SD: NR) (N=59)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Serapen	QOL	SF-36 physical function after TAPP (higher number is better)	24 months	Median: 88.5 (SD: NR) (N=58)	Median: 90.2 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	QOL	SF-36 development of pain after TAPP (higher number is better)	60 months	Median: 68.2 (SD: NR) (N=58)	Median: 78 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	QOL	SF-36 physical function after TAPP (higher number is better)	60 months	Median: 88.5 (SD: NR) (N=58)	Median: 90 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Testicular contact pain	Post op day 1	5% (3/58)	7% (4/59)	NS based on OR=0.75 (95% CI: 0.16 to 3.51)[@]	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op day 1	Median: 3.7 (SD: NR) (N=58)	Median: 2.6 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Testicular contact pain	Post op day 2	14% (8/58)	10% (6/59)	NS based on OR=1.41 (95% CI: 0.46 to 4.36)[@]	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op day 3	Median: 2.7 (SD: NR) (N=58)	Median: 1.5 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Pain with ejaculation	Post op week 1	9% (5/58)	10% (6/59)	NS based on OR=0.83 (95% CI: 0.24 to 2.9)[@]	
	Prolene vs. Serapen	Pain	Testicular contact pain	Post op week 1	7% (4/58)	7% (4/59)	NS based on OR=1.02 (95% CI: 0.24 to 4.28)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op week 1	Median: 1.6 (SD: NR) (N=58)	Median: 1.1 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Pain with ejaculation	Post op week 2	17% (10/58)	10% (6/59)	NS based on OR=1.84 (95% CI: 0.62 to 5.45)[@]	
	Prolene vs. Serapen	Pain	Testicular contact pain	Post op week 2	12% (7/58)	5% (3/59)	NS based on OR=2.56 (95% CI: 0.63 to 10.44)[@]	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op week 2	Median: 0.95 (SD: NR) (N=58)	Median: 0.3 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Pain with ejaculation	Post op week 4	21% (12/58)	7% (4/59)	p<0.05 based on OR=3.59 (95% CI: 1.08 to 11.88)[@]	
	Prolene vs. Serapen	Pain	Testicular contact pain	Post op week 4	12% (7/58)	3% (2/59)	NS based on OR=3.91 (95% CI: 0.78 to 19.69)[@]	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op week 4	Median: 0.7 (SD: NR) (N=58)	Median: 0.1 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op week 8	Median: 0.5 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Pain with ejaculation	Post op week 12	21% (12/58)	3% (2/59)	p<0.05 based on OR=7.43 (95% CI: 1.58 to 34.91)[@]	
	Prolene vs. Serapen	Pain	Testicular contact pain	Post op week 12	14% (8/58)	2% (1/59)	p<0.05 based on OR=9.28 (95% CI: 1.12 to 76.78)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op week 12	Median: 0.2 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Pain with ejaculation	Post op 24 months	3% (2/58)	0% (0/59)	NS based on OR=5.27 (95% CI: 0.25 to 112.09)[@]	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op 24 months	Median: 0.1 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	Pain	Pain with ejaculation	Post op 60 months	2% (1/58)	0% (0/59)	NS based on OR=3.1 (95% CI: 0.12 to 77.78)[@]	
	Prolene vs. Serapen	Pain	VAS pain development after TAPP	Post op 60 months	Median: 0.1 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=59)	NR	
	Prolene vs. Serapen	QOL	Abdominal wall seroma	Post op day 1	14% (8/58)	10% (6/59)	NS based on OR=1.41 (95% CI: 0.46 to 4.36)[@]	
	Prolene vs. Serapen	ADV	Scrotal hematoma	Post day 1	5% (3/58)	3% (2/59)	NS based on OR=1.55 (95% CI: 0.25 to 9.66)[@]	
	Prolene vs. Serapen	QOL	Abdominal wall seroma	Post op day 2	17% (10/58)	14% (8/59)	NS based on OR=1.33 (95% CI: 0.48 to 3.65)[@]	
	Prolene vs. Serapen	ADV	Scrotal hematoma	Post op day 2	21% (12/58)	17% (10/59)	NS based on OR=1.28 (95% CI: 0.5 to 3.24)[@]	
	Prolene vs. Serapen	QOL	Abdominal wall seroma	Post op week 1	14% (8/58)	12% (7/59)	NS based on OR=1.19 (95% CI: 0.4 to 3.52)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Serapen	ADV	Discomfort with urination	Post op week 1	14% (8/58)	8% (5/59)	NS based on OR=1.73 (95% CI: 0.53 to 5.63)[@]	
	Prolene vs. Serapen	ADV	Scrotal hematoma	Post op week 1	21% (12/58)	17% (10/59)	NS based on OR=1.28 (95% CI: 0.5 to 3.24)[@]	
	Prolene vs. Serapen	QOL	Abdominal wall seroma	Post op week 2	14% (8/58)	10% (6/59)	NS based on OR=1.41 (95% CI: 0.46 to 4.36)[@]	
	Prolene vs. Serapen	ADV	Discomfort with urination	Post op week 2	12% (7/58)	5% (3/59)	NS based on OR=2.56 (95% CI: 0.63 to 10.44)[@]	
	Prolene vs. Serapen	ADV	Scrotal hematoma	Post op week 2	21% (12/58)	17% (10/59)	NS based on OR=1.28 (95% CI: 0.5 to 3.24)[@]	
	Prolene vs. Serapen	QOL	Abdominal wall seroma	Post op week 4	10% (6/58)	7% (4/59)	NS based on OR=1.59 (95% CI: 0.42 to 5.94)[@]	
	Prolene vs. Serapen	ADV	Discomfort with urination	Post op week 4	12% (7/58)	3% (2/59)	NS based on OR=3.91 (95% CI: 0.78 to 19.69)[@]	
	Prolene vs. Serapen	ADV	Scrotal hematoma	Post op week 4	14% (8/58)	10% (6/59)	NS based on OR=1.41 (95% CI: 0.46 to 4.36)[@]	
	Prolene vs. Serapen	ADV	Discomfort with urination	Post op week 12	12% (7/58)	2% (1/59)	NS based on OR=7.96 (95% CI: 0.95 to 66.91)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Serapen	ADV	Discomfort with urination	Post op 24 months	3% (2/58)	2% (1/59)	NS based on OR=2.07 (95% CI: 0.18 to 23.49)[@]	
	Prolene vs. Serapen	ADV	Discomfort with urination	Post op 60 months	2% (1/58)	0% (0/59)	NS based on OR=3.1 (95% CI: 0.12 to 77.78)[@]	
	Prolene vs. Vypro II	RC	Recurrence rate	Post op 24 months	2% (1/58)	2% (1/58)	NS based on OR=1 (95% CI: 0.06 to 16.38)[@]	
	Prolene vs. Vypro II	RC	Recurrence rate	Post op 60 months	2% (1/58)	2% (1/58)	NS based on OR=1 (95% CI: 0.06 to 16.38)[@]	
	Prolene vs. Vypro II	HOSP	Hospital stay (days)	NA	6% (3.7/58)	7% (3.8/58)	NS based on OR=0.97 (95% CI: 0.22 to 4.27)[@]	
	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 1	Median: 4.3 (SD: NR) (N=58)	Median: 2 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 2	Median: 3 (SD: NR) (N=58)	Median: 1.1 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 4	Median: 2.05 (SD: NR) (N=58)	Median: 0.4 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 8	Median: 1.6 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 12	Median: 1 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op 24 months	Median: 0 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op 60 months	Median: 0 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	RTW	Average duration of incapacity for work (days)	NA	39.1 (SD: NR) (N=58)	33.3 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	QOL	SF-36 development of pain after TAPP (higher number is better)	24 months	Median: 68 (SD: NR) (N=58)	Median: 79 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	QOL	SF-36 physical function after TAPP (higher number is better)	24 months	Median: 88.5 (SD: NR) (N=58)	Median: 90 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Vypro II	QOL	SF-36 development of pain after TAPP (higher number is better)	60 months	Median: 68.2 (SD: NR) (N=58)	Median: 79 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	QOL	SF-36 physical function after TAPP (higher number is better)	60 months	Median: 88.5 (SD: NR) (N=58)	Median: 90 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	Testicular contact pain	Post op day 1	5% (3/58)	7% (4/58)	NS based on OR=0.74 (95% CI: 0.16 to 3.45)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op day 1	Median: 3.7 (SD: NR) (N=58)	Median: 2.7 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	Testicular contact pain	Post op day 2	14% (8/58)	12% (7/58)	NS based on OR=1.17 (95% CI: 0.39 to 3.46)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op day 3	Median: 2.7 (SD: NR) (N=58)	Median: 1.45 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	Pain with ejaculation	Post op week 1	9% (5/58)	7% (4/58)	NS based on OR=1.27 (95% CI: 0.32 to 5)[@]	
	Prolene vs. Vypro II	Pain	Testicular contact pain	Post op week 1	7% (4/58)	7% (4/58)	NS based on OR=1 (95% CI: 0.24 to 4.21)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op week 1	Median: 1.6 (SD: NR) (N=58)	Median: 0.95 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Vypro II	Pain	Pain with ejaculation	Post op week 2	17% (10/58)	7% (4/58)	NS based on OR=2.81 (95% CI: 0.83 to 9.56)[@]	
	Prolene vs. Vypro II	Pain	Testicular contact pain	Post op week 2	12% (7/58)	3% (2/58)	NS based on OR=3.84 (95% CI: 0.76 to 19.35)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op week 2	Median: 0.95 (SD: NR) (N=58)	Median: 0.5 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	Pain with ejaculation	Post op week 4	21% (12/58)	7% (4/58)	p<0.05 based on OR=3.52 (95% CI: 1.06 to 11.67)[@]	
	Prolene vs. Vypro II	Pain	Testicular contact pain	Post op week 4	12% (7/58)	3% (2/58)	NS based on OR=3.84 (95% CI: 0.76 to 19.35)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op week 4	Median: 0.7 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op week 8	Median: 0.5 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	Pain with ejaculation	Post op week 12	21% (12/58)	3% (2/58)	p<0.05 based on OR=7.3 (95% CI: 1.56 to 34.31)[@]	
	Prolene vs. Vypro II	Pain	Testicular contact pain	Post op week 12	14% (8/58)	3% (2/58)	NS based on OR=4.48 (95% CI: 0.91 to 22.1)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op week 12	Median: 0.2 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Vypro II	Pain	Pain with ejaculation	Post op 24 months	3% (2/58)	2% (1/58)	NS based on OR=2.04 (95% CI: 0.18 to 23.09)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op 24 months	Median: 0.1 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	Pain	Pain with ejaculation	Post op 60 months	2% (1/58)	0% (0/58)	NS based on OR=3.05 (95% CI: 0.12 to 76.49)[@]	
	Prolene vs. Vypro II	Pain	VAS pain development after TAPP	Post op 60 months	Median: 0.1 (SD: NR) (N=58)	Median: 0 (SD: NR) (N=58)	NR	
	Prolene vs. Vypro II	QOL	Abdominal wall seroma	Post op day 1	14% (8/58)	10% (6/58)	NS based on OR=1.39 (95% CI: 0.45 to 4.28)[@]	
	Prolene vs. Vypro II	ADV	Scrotal hematoma	Post day 1	5% (3/58)	3% (2/58)	NS based on OR=1.53 (95% CI: 0.25 to 9.5)[@]	
	Prolene vs. Vypro II	QOL	Abdominal wall seroma	Post op day 2	17% (10/58)	14% (8/58)	NS based on OR=1.3 (95% CI: 0.47 to 3.58)[@]	
	Prolene vs. Vypro II	ADV	Scrotal hematoma	Post op day 2	21% (12/58)	17% (10/58)	NS based on OR=1.25 (95% CI: 0.49 to 3.18)[@]	
	Prolene vs. Vypro II	QOL	Abdominal wall seroma	Post op week 1	14% (8/58)	14% (8/58)	NS based on OR=1 (95% CI: 0.35 to 2.87)[@]	
	Prolene vs. Vypro II	ADV	Discomfort with urination	Post op week 1	14% (8/58)	7% (4/58)	NS based on OR=2.16 (95% CI: 0.61 to 7.62)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Vypro II	ADV	Scrotal hematoma	Post op week 1	21% (12/58)	17% (10/58)	NS based on OR=1.25 (95% CI: 0.49 to 3.18)[@]	
	Prolene vs. Vypro II	QOL	Abdominal wall seroma	Post op week 2	14% (8/58)	12% (7/58)	NS based on OR=1.17 (95% CI: 0.39 to 3.46)[@]	
	Prolene vs. Vypro II	ADV	Discomfort with urination	Post op week 2	12% (7/58)	7% (4/58)	NS based on OR=1.85 (95% CI: 0.51 to 6.71)[@]	
	Prolene vs. Vypro II	ADV	Scrotal hematoma	Post op week 2	21% (12/58)	17% (10/58)	NS based on OR=1.25 (95% CI: 0.49 to 3.18)[@]	
	Prolene vs. Vypro II	QOL	Abdominal wall seroma	Post op week 4	10% (6/58)	3% (2/58)	NS based on OR=3.23 (95% CI: 0.62 to 16.73)[@]	
	Prolene vs. Vypro II	ADV	Discomfort with urination	Post op week 4	12% (7/58)	5% (3/58)	NS based on OR=2.52 (95% CI: 0.62 to 10.26)[@]	
	Prolene vs. Vypro II	ADV	Scrotal hematoma	Post op week 4	14% (8/58)	10% (6/58)	NS based on OR=1.39 (95% CI: 0.45 to 4.28)[@]	
	Prolene vs. Vypro II	ADV	Discomfort with urination	Post op week 12	12% (7/58)	3% (2/58)	NS based on OR=3.84 (95% CI: 0.76 to 19.35)[@]	
	Prolene vs. Vypro II	ADV	Discomfort with urination	Post op 24 months	3% (2/58)	2% (1/58)	NS based on OR=2.04 (95% CI: 0.18 to 23.09)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Prolene vs. Vypro II	ADV	Discomfort with urination	Post op 60 months	2% (1/58)	0% (0/58)	NS based on OR=3.05 (95% CI: 0.12 to 76.49)[@]	
	Vypro II vs. Serapen	RC	Recurrence rate	Post op 24 months	0% (0/59)	2% (1/58)	NS based on OR=0.32 (95% CI: 0.01 to 8.07)[@]	
	Vypro II vs. Serapen	RC	Recurrence rate	Post op 60 months	2% (1/59)	2% (1/58)	NS based on OR=0.98 (95% CI: 0.06 to 16.09)[@]	
	Vypro II vs. Serapen	HOSP	Hospital stay (days)	NA	7% (3.9/59)	7% (3.8/58)	NS based on OR=1.01 (95% CI: 0.23 to 4.35)[@]	
	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 1	Median: 2.3 (SD: NR) (N=59)	Median: 2 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 2	Median: 1.45 (SD: NR) (N=59)	Median: 1.1 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 4	Median: 0.55 (SD: NR) (N=59)	Median: 0.4 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 8	Median: 0.1 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op week 12	Median: 0.1 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op 24 months	Median: 0 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	RTDA	VAS impairment of sexual life after TAPP (lower scores better)	Post op 60 months	Median: 0 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	RTW	Average duration of incapacity for work (days)	NA	32.4 (SD: NR) (N=59)	33.3 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	QOL	SF-36 development of pain after TAPP (higher number is better)	24 months	Median: 78 (SD: NR) (N=59)	Median: 79 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	QOL	SF-36 physical function after TAPP (higher number is better)	24 months	Median: 90.2 (SD: NR) (N=59)	Median: 90 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	QOL	SF-36 development of pain after TAPP (higher number is better)	60 months	Median: 78 (SD: NR) (N=59)	Median: 79 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Vypro II vs. Serapen	QOL	SF-36 physical function after TAPP (higher number is better)	60 months	Median: 90 (SD: NR) (N=59)	Median: 90 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Testicular contact pain	Post op day 1	7% (4/59)	7% (4/58)	NS based on OR=0.98 (95% CI: 0.23 to 4.13)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op day 1	Median: 2.6 (SD: NR) (N=59)	Median: 2.7 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Testicular contact pain	Post op day 2	10% (6/59)	12% (7/58)	NS based on OR=0.82 (95% CI: 0.26 to 2.62)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op day 3	Median: 1.5 (SD: NR) (N=59)	Median: 1.45 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Pain with ejaculation	Post op week 1	10% (6/59)	7% (4/58)	NS based on OR=1.53 (95% CI: 0.41 to 5.73)[@]	
	Vypro II vs. Serapen	Pain	Testicular contact pain	Post op week 1	7% (4/59)	7% (4/58)	NS based on OR=0.98 (95% CI: 0.23 to 4.13)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op week 1	Median: 1.1 (SD: NR) (N=59)	Median: 0.95 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Pain with ejaculation	Post op week 2	10% (6/59)	7% (4/58)	NS based on OR=1.53 (95% CI: 0.41 to 5.73)[@]	
	Vypro II vs. Serapen	Pain	Testicular contact pain	Post op week 2	5% (3/59)	3% (2/58)	NS based on OR=1.5 (95% CI: 0.24 to 9.32)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op week 2	Median: 0.3 (SD: NR) (N=59)	Median: 0.5 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Pain with ejaculation	Post op week 4	7% (4/59)	7% (4/58)	NS based on OR=0.98 (95% CI: 0.23 to 4.13)[@]	
	Vypro II vs. Serapen	Pain	Testicular contact pain	Post op week 4	3% (2/59)	3% (2/58)	NS based on OR=0.98 (95% CI: 0.13 to 7.22)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op week 4	Median: 0.1 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op week 8	Median: 0 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Pain with ejaculation	Post op week 12	3% (2/59)	3% (2/58)	NS based on OR=0.98 (95% CI: 0.13 to 7.22)[@]	
	Vypro II vs. Serapen	Pain	Testicular contact pain	Post op week 12	2% (1/59)	3% (2/58)	NS based on OR=0.48 (95% CI: 0.04 to 5.47)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op week 12	Median: 0 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	Pain	Pain with ejaculation	Post op 24 months	0% (0/59)	2% (1/58)	NS based on OR=0.32 (95% CI: 0.01 to 8.07)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op 24 months	Median: 0 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Vypro II vs. Serapen	Pain	Pain with ejaculation	Post op 60 months	0% (0/59)	0% (0/58)	NS based on OR=0.98 (95% CI: 0.02 to 50.38)[@]	
	Vypro II vs. Serapen	Pain	VAS pain development after TAPP	Post op 60 months	Median: 0 (SD: NR) (N=59)	Median: 0 (SD: NR) (N=58)	NR	
	Vypro II vs. Serapen	QOL	Abdominal wall seroma	Post op day 1	10% (6/59)	10% (6/58)	NS based on OR=0.98 (95% CI: 0.3 to 3.24)[@]	
	Vypro II vs. Serapen	ADV	Scrotal hematoma	Post day 1	3% (2/59)	3% (2/58)	NS based on OR=0.98 (95% CI: 0.13 to 7.22)[@]	
	Vypro II vs. Serapen	QOL	Abdominal wall seroma	Post op day 2	14% (8/59)	14% (8/58)	NS based on OR=0.98 (95% CI: 0.34 to 2.82)[@]	
	Vypro II vs. Serapen	ADV	Scrotal hematoma	Post op day 2	17% (10/59)	17% (10/58)	NS based on OR=0.98 (95% CI: 0.37 to 2.57)[@]	
	Vypro II vs. Serapen	QOL	Abdominal wall seroma	Post op week 1	12% (7/59)	14% (8/58)	NS based on OR=0.84 (95% CI: 0.28 to 2.49)[@]	
	Vypro II vs. Serapen	ADV	Discomfort with urination	Post op week 1	8% (5/59)	7% (4/58)	NS based on OR=1.25 (95% CI: 0.32 to 4.91)[@]	
	Vypro II vs. Serapen	ADV	Scrotal hematoma	Post op week 1	17% (10/59)	17% (10/58)	NS based on OR=0.98 (95% CI: 0.37 to 2.57)[@]	
	Vypro II vs. Serapen	QOL	Abdominal wall seroma	Post op week 2	10% (6/59)	12% (7/58)	NS based on OR=0.82 (95% CI: 0.26 to 2.62)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Langenbach et al., 2008[735] (continued)	Vypro II vs. Serapen	ADV	Discomfort with urination	Post op week 2	5% (3/59)	7% (4/58)	NS based on OR=0.72 (95% CI: 0.15 to 3.38)[@]	
	Vypro II vs. Serapen	ADV	Scrotal hematoma	Post op week 2	17% (10/59)	17% (10/58)	NS based on OR=0.98 (95% CI: 0.37 to 2.57)[@]	
	Vypro II vs. Serapen	QOL	Abdominal wall seroma	Post op week 4	7% (4/59)	3% (2/58)	NS based on OR=2.04 (95% CI: 0.36 to 11.58)[@]	
	Vypro II vs. Serapen	ADV	Discomfort with urination	Post op week 4	3% (2/59)	5% (3/58)	NS based on OR=0.64 (95% CI: 0.1 to 4)[@]	
	Vypro II vs. Serapen	ADV	Scrotal hematoma	Post op week 4	10% (6/59)	10% (6/58)	NS based on OR=0.98 (95% CI: 0.3 to 3.24)[@]	
	Vypro II vs. Serapen	ADV	Discomfort with urination	Post op week 12	2% (1/59)	3% (2/58)	NS based on OR=0.48 (95% CI: 0.04 to 5.47)[@]	
	Vypro II vs. Serapen	ADV	Discomfort with urination	Post op 24 months	2% (1/59)	2% (1/58)	NS based on OR=0.98 (95% CI: 0.06 to 16.09)[@]	
	Vypro II vs. Serapen	ADV	Discomfort with urination	Post op 60 months	0% (0/59)	0% (0/58)	NS based on OR=0.98 (95% CI: 0.02 to 50.38)[@]	
Nikkolo et al., 2010[773]	Heavyweight mesh vs. Lightweight mesh	RC	Recurrences	NR	0% (0/64)	0% (0/67)	NS based on OR=1.05 (95% CI: 0.02 to 53.53)[@]	Drop-out rate was 3%; leaving 64 patients in Group A and 67 patients in Group B

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nikkolo et al., 2010[773] (continued)	Heavyweight mesh vs. Lightweight mesh	HOSP	Mean duration of hospital stay (days)	NA	1.4 (Range: 1 to 3) (N=64)	1.3 (Range: 1 to 4) (N=67)	NR	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 bodily pain (higher number is better)	6 months	84.3 (SD: NR) (N=64)	80.1 (SD: NR) (N=67)	p=0.241; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 emotional role (higher number is better)	6 months	85.4 (SD: NR) (N=64)	86.1 (SD: NR) (N=67)	p=0.892; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 general health (higher number is better)	6 months	64.2 (SD: NR) (N=64)	62.2 (SD: NR) (N=67)	p=0.558; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 mental health (higher number is better)	6 months	80.1 (SD: NR) (N=64)	80.7 (SD: NR) (N=67)	p=0.827; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 physical functioning (higher number is better)	6 months	86.1 (SD: NR) (N=64)	84.4 (SD: NR) (N=67)	p=0.637; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 physical role (higher number is better)	6 months	77.7 (SD: NR) (N=64)	75.4 (SD: NR) (N=67)	p=0.706; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 social functioning (higher number is better)	6 months	87.7 (SD: NR) (N=64)	91.0 (SD: NR) (N=67)	p=0.254; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	QOL	SF-36 vitality (higher number is better)	6 months	72.7 (SD: NR) (N=64)	72.5 (SD: NR) (N=67)	p=0.968; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores	Week 1	Median: 19 (Range: 0 to 75) (N=64)	Median: 17 (Range: 0 to 88) (N=67)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nikkolo et al., 2010[773] (continued)	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (>50, severe)	Week 1 post op	14% (9/64)	4% (3/67)	NS based on OR=3.49 (95% CI: 0.9 to 13.54)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (0-none) (higher % is better)	Week 1 post op	8% (5/64)	4% (3/67)	NS based on OR=1.81 (95% CI: 0.41 to 7.9)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (1-10, mild)	Week 1 post op	22% (14/64)	34% (23/67)	NS based on OR=0.54 (95% CI: 0.25 to 1.17)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (11-50, moderate)	Week 1 post op	56% (36/64)	57% (38/67)	NS based on OR=0.98 (95% CI: 0.49 to 1.96)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain at rest	1 month	13% (8/64)	3% (2/67)	p=0.040; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain during physical activity	1 month	38% (24/64)	13% (9/67)	p=0.002; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain while exercising	1 month	36% (23/64)	13% (9/67)	p=0.017; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores	1 month	Median: 5 (Range: 0 to 65) (N=64)	Median: 4 (Range: 0 to 65) (N=67)	NR	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (>50, severe)	1 month	2% (1/64)	1% (1/67)	NS based on OR=1.05 (95% CI: 0.06 to 17.11)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (0-none) (higher % is better)	1 month	22% (14/64)	33% (22/67)	NS based on OR=0.57 (95% CI: 0.26 to 1.25)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nikkolo et al., 2010[773] (continued)	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (1-10, mild)	1 month	48% (31/64)	45% (30/67)	NS based on OR=1.16 (95% CI: 0.58 to 2.3)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (11-50, moderate)	1 month	28% (18/64)	21% (14/67)	NS based on OR=1.48 (95% CI: 0.66 to 3.3)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain at operation site	6 months	9% (6/64)	6% (4/67)	p=0.463; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain at rest	6 months	6% (4/64)	0% (0/67)	p=0.038; Mann Whitney	
	Heavyweight mesh vs. Lightweight mesh	Pain	Pain of any severity (VAS≥1) during any physical activity	After 6 months	59% (38/64)	48% (32/67)	NS based on OR=1.6 (95% CI: 0.8 to 3.19)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS pain scores	6 months	Median: 0 (Range: 0 to 20) (N=64)	Median: 0 (Range: 0 to 0) (N=67)	NR	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (>50, severe)	6 months	0% (0/64)	0% (0/67)	NS based on OR=1.05 (95% CI: 0.02 to 53.53)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (0-none) (higher % is better)	6 months	41% (26/64)	52% (35/67)	NS based on OR=0.63 (95% CI: 0.31 to 1.25)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (1-10, mild)	6 months	36% (23/64)	34% (23/67)	NS based on OR=1.07 (95% CI: 0.52 to 2.2)[@]	
	Heavyweight mesh vs. Lightweight mesh	Pain	VAS severity of pain (11-50, moderate)	6 months	23% (15/64)	13% (9/67)	NS based on OR=1.97 (95% CI: 0.79 to 4.9)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nikkolo et al., 2010[773] (continued)	Heavyweight mesh vs. Lightweight mesh	ADV	Superficial hematoma	Day 7 post op	9% (6/64)	9% (6/67)	NS based on OR=1.05 (95% CI: 0.32 to 3.45)[@]	
	Heavyweight mesh vs. Lightweight mesh	ADV	Wound seroma	Day 7 post op	2% (1/64)	3% (2/67)	NS based on OR=0.52 (95% CI: 0.05 to 5.83)[@]	
	Heavyweight mesh vs. Lightweight mesh	ADV	Feeling of foreign body	After 6 months	33% (21/64)	21% (14/67)	NS based on OR=1.85 (95% CI: 0.84 to 4.06)[@]	
	Heavyweight mesh vs. Lightweight mesh	ADV	Wound suppuration	Post op	0% (0/64)	1% (1/67)	NS based on OR=0.34 (95% CI: 0.01 to 8.59)[@]	
O'Dwyer et al., 2005[775]	Lightweight mesh vs. heavyweight mesh	RC	Hernia recurrence	12 months	6% (8/142)	1% (1/142)	p<0.05 based on OR=8.42 (95% CI: 1.04 to 68.21)[@]	Median time to recurrence 262 days (Range: 163 to 339 days)
	Lightweight mesh vs. heavyweight mesh	RTDA	Hobbies (days)	NA	20 (IQR: 10 to 40) (N=161)	14 (IQR: 7 to 31) (N=154)	NR	
	Lightweight mesh vs. heavyweight mesh	RTDA	Looking after house (days)	NA	10 (IQR: 5 to 24) (N=161)	10 (IQR: 4 to 21) (N=154)	NR	
	Lightweight mesh vs. heavyweight mesh	RTDA	Sex (days)	NA	28 (IQR: 14 to >365) (N=161)	28 (IQR: 14 to >365) (N=154)	NR	
	Lightweight mesh vs. heavyweight mesh	RTDA	Social life (days)	NA	10 (IQR: 5 to 21) (N=161)	14 (IQR: 7 to 24) (N=154)	NR	
	Lightweight mesh vs. heavyweight mesh	RTW	Return to paid work (days)	NA	21 days (IQR: 14 to 42) (N=82)	26 days (IQR: 10 to 49) (N=77)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
O'Dwyer et al., 2005[775] (continued)	Lightweight mesh vs. heavyweight mesh	Pain	Pain	1 month	82% (133/162)	82% (130/159)	NS based on OR=1.02 (95% CI: 0.58 to 1.81)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS Pain (at rest)	1 month	8.3 (SD: 12) (N=162)	9.7 (SD: 16.9) (N=159)	p=0.440, Mann-Whitney U test	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS Pain (moving)	1 month	13.4 (SD: 16.7) (N=162)	14.8 (SD: 20.5) (N=159)	p=0.941, Mann Whitney U	
	Lightweight mesh vs. heavyweight mesh	Pain	Pain	3 months	57% (92/162)	57% (90/159)	NS based on OR=1.01 (95% CI: 0.65 to 1.57)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS Pain (at rest)	3 months	5.2 (SD: 11.4) (N=162)	6.6 (SD: 16.7) (N=159)	p=0.857, Mann Whitney U	
	Lightweight mesh vs. heavyweight mesh	Pain	VAS Pain (moving)	3 months	8.2 (SD: 15.1) (N=162)	8.7 (SD: 17.3) (N=159)	p=0.921, Mann Whitney U	
	Lightweight mesh vs. heavyweight mesh	Pain	Pain of any severity	12 months	40% (64/162)	52% (82/159)	95% CI around the rate difference: -23.1% to -1%; p=0.033	Two-sided test used; ITT analysis
	Lightweight mesh vs. heavyweight mesh	Pain	Pain using last observation carried forward	12 months	33% (45/135)	51% (64/125)	p<0.05 based on OR=0.48 (95% CI: 0.29 to 0.79)[@]	
	Lightweight mesh vs. heavyweight mesh	Pain	Testicular pain	NR	16% (26/162)	22% (35/159)	NS based on OR=0.68 (95% CI: 0.39 to 1.19)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Contralateral hernia	12 months	1% (2/142)	3% (4/142)	NS based on OR=0.49 (95% CI: 0.09 to 2.73)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
O'Dwyer et al., 2005[775] (continued)	Lightweight mesh vs. heavyweight mesh	ADV	Testicular atrophy	12 months	1% (2/142)	0% (0/142)	NS based on OR=5.07 (95% CI: 0.24 to 106.58)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Wound sinus	12 months	0% (0/142)	0% (0/142)	NS based on OR=1 (95% CI: 0.02 to 50.75)[@]	
	Lightweight mesh vs. heavyweight mesh	ADV	Wound infections	Post op	4% (6/162)	6% (10/159)	NS based on OR=0.57 (95% CI: 0.2 to 1.62)[@]	
Paajanen, 2007[781]	Premilene lightweight vs. Premilene heavyweight	RC	Recurrences	After 2 year	1% (1/72)	3% (2/75)	NS based on OR=0.51 (95% CI: 0.05 to 5.8)[@]	Ten patients from original groups were dropped because they could not be reached (N=5) or were deceased (N=5); N=number of hernias; total of 218 patients at 1 & 2 year follow-up and 222 hernias
	Premilene lightweight vs. Premilene heavyweight	RTDA	Normal car driving (most patients retired and used car very seldom) (higher % is better)	First week post op	91% (68/75)	82% (64/78)	NS based on OR=2.13 (95% CI: 0.81 to 5.6)[@]	
	Premilene lightweight vs. Premilene heavyweight	RTDA	Painless walking (higher % is better)	First week post op	88% (66/75)	85% (66/78)	NS based on OR=1.33 (95% CI: 0.53 to 3.38)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Premilene lightweight vs. Premilene heavyweight	RTDA	Normal running (higher % is better)	First month post op	92% (69/75)	87% (68/78)	NS based on OR=1.69 (95% CI: 0.58 to 4.91)[@]	
	Premilene lightweight vs. Premilene heavyweight	RTDA	Normal walking (higher % is better)	First month post op	95% (71/75)	95% (74/78)	NS based on OR=0.96 (95% CI: 0.23 to 3.98)[@]	
	Premilene lightweight vs. Premilene heavyweight	RTW	No problems in work (higher % is better)	First month post op	96% (72/75)	87% (68/78)	NS based on OR=3.53 (95% CI: 0.93 to 13.37)[@]	
	Premilene lightweight vs. Premilene heavyweight	RTW	Sick leave	First month post op	9% (7/75)	14% (11/78)	NS based on OR=0.63 (95% CI: 0.23 to 1.71)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	VAS pain scores	Post op day 1	4.6 (SD: NR) (N=75)	4.35 (SD: NR) (N=78)	NR	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use daily	First week post op	21% (16/75)	40% (31/78)	p<0.05 based on OR=0.41 (95% CI: 0.2 to 0.84)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use none	First week post op	48% (36/75)	42% (33/78)	NS based on OR=1.26 (95% CI: 0.67 to 2.38)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use sometimes	First week post op	31% (23/75)	18% (14/78)	NS based on OR=2.02 (95% CI: 0.95 to 4.32)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	VAS pain scores	Post op week 1	2.7 (SD: NR) (N=75)	2.6 (SD: NR) (N=78)	NR	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use daily	First month post op	3% (2/75)	6% (5/78)	NS based on OR=0.4 (95% CI: 0.08 to 2.13)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use none	First month post op	89% (67/75)	83% (65/78)	NS based on OR=1.68 (95% CI: 0.65 to 4.31)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use sometimes	First month post op	4% (3/75)	8% (6/78)	NS based on OR=0.5 (95% CI: 0.12 to 2.08)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	VAS pain scores	Post op 1 month	1.1 (SD: NR) (N=75)	1.1 (SD: NR) (N=78)	NR	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use daily	After 1 year	1% (1/72)	0% (0/75)	NS based on OR=3.17 (95% CI: 0.13 to 79.04)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use sometimes	After 1 year	0% (0/72)	1% (1/75)	NS based on OR=0.34 (95% CI: 0.01 to 8.55)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	Pain feeling 1 year	After 1 year	10% (7/72)	5% (4/75)	NS based on OR=1.91 (95% CI: 0.53 to 6.83)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	VAS pain scores	Post op 1 year	0.65 (SD: NR) (N=72)	1.1 (SD: NR) (N=75)	NR	
	Premilene lightweight vs. Premilene heavyweight	Pain	Analgesic use	After 2 year	3% (2/72)	1% (1/75)	NS based on OR=2.11 (95% CI: 0.19 to 23.84)[@]	
	Premilene lightweight vs. Premilene heavyweight	Pain	VAS pain scores	Post op 2 years	0.4 (SD: NR) (N=72)	0.7 (SD: NR) (N=75)	NR	
	Premilene lightweight vs. Premilene heavyweight	ADV	Normal wound healing	First week post op	99% (74/75)	97% (76/78)	NS based on OR=1.95 (95% CI: 0.17 to 21.94)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Premilene lightweight vs. Premilene heavyweight	ADV	Wound hematoma	First week post op	1% (1/75)	1% (1/78)	NS based on OR=1.04 (95% CI: 0.06 to 16.94)[@]	
	Premilene lightweight vs. Premilene heavyweight	ADV	Wound infection	First week post op	0% (0/75)	1% (1/78)	NS based on OR=0.34 (95% CI: 0.01 to 8.53)[@]	
	Premilene lightweight vs. Premilene heavyweight	ADV	Wound swelling/ bruises	First month post op	7% (5/75)	4% (3/78)	NS based on OR=1.79 (95% CI: 0.41 to 7.75)[@]	
	Premilene lightweight vs. Premilene heavyweight	ADV	Feeling of foreign body	After 1 year	25% (18/72)	16% (12/75)	NS based on OR=1.75 (95% CI: 0.77 to 3.96)[@]	
	Premilene lightweight vs. Premilene heavyweight	ADV	Feeling of foreign body	After 2 year	11% (8/72)	8% (6/75)	NS based on OR=1.44 (95% CI: 0.47 to 4.37)[@]	
	Vypro II vs. Premilene heavyweight	RC	Recurrences	After 2 year	3% (2/74)	3% (2/75)	NS based on OR=1.01 (95% CI: 0.14 to 7.39)[@]	
	Vypro II vs. Premilene heavyweight	RTDA	Normal car driving (most patients retired and used car very seldom) (higher % is better)	First week post op	80% (63/79)	82% (64/78)	NS based on OR=0.86 (95% CI: 0.39 to 1.91)[@]	
	Vypro II vs. Premilene heavyweight	RTDA	Painless walking (higher % is better)	First week post op	91% (72/79)	85% (66/78)	NS based on OR=1.87 (95% CI: 0.69 to 5.03)[@]	
	Vypro II vs. Premilene heavyweight	RTDA	Normal running (higher % is better)	First month post op	90% (71/79)	87% (68/78)	NS based on OR=1.31 (95% CI: 0.49 to 3.5)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Vypro II vs. Premilene heavyweight	RTDA	Normal walking (higher % is better)	First month post op	94% (74/79)	95% (74/78)	NS based on OR=0.8 (95% CI: 0.21 to 3.1)[@]	
	Vypro II vs. Premilene heavyweight	RTW	No problems in work (higher % is better)	First month post op	95% (75/79)	87% (68/78)	NS based on OR=2.76 (95% CI: 0.83 to 9.2)[@]	
	Vypro II vs. Premilene heavyweight	RTW	Sick leave	First month post op	3% (2/79)	14% (11/78)	p<0.05 based on OR=0.16 (95% CI: 0.03 to 0.74)[@]	
	Vypro II vs. Premilene heavyweight	Pain	VAS pain scores	Post op day 1	4.7 (SD: NR) (N=79)	4.35 (SD: NR) (N=78)	NR	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use daily	First week post op	29% (23/79)	40% (31/78)	NS based on OR=0.62 (95% CI: 0.32 to 1.21)[@]	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use none	First week post op	49% (39/79)	42% (33/78)	NS based on OR=1.33 (95% CI: 0.71 to 2.5)[@]	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use sometimes	First week post op	19% (15/79)	18% (14/78)	NS based on OR=1.07 (95% CI: 0.48 to 2.4)[@]	
	Vypro II vs. Premilene heavyweight	Pain	VAS pain scores	Post op week 1	2.4 (SD: NR) (N=79)	2.6 (SD: NR) (N=78)	NR	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use daily	First month post op	1% (1/79)	6% (5/78)	NS based on OR=0.19 (95% CI: 0.02 to 1.64)[@]	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use none	First month post op	87% (69/79)	83% (65/78)	NS based on OR=1.38 (95% CI: 0.57 to 3.36)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Vypro II vs. Premilene heavyweight	Pain	Analgesic use sometimes	First month post op	6% (5/79)	8% (6/78)	NS based on OR=0.81 (95% CI: 0.24 to 2.78)[@]	
	Vypro II vs. Premilene heavyweight	Pain	VAS pain scores	Post op 1 month	1.1 (SD: NR) (N=79)	1.1 (SD: NR) (N=78)	NR	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use daily	After 1 year	1% (1/74)	0% (0/75)	NS based on OR=3.08 (95% CI: 0.12 to 76.88)[@]	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use sometimes	After 1 year	1% (1/74)	1% (1/75)	NS based on OR=1.01 (95% CI: 0.06 to 16.51)[@]	
	Vypro II vs. Premilene heavyweight	Pain	Pain feeling 1 year	After 1 year	8% (6/74)	5% (4/75)	NS based on OR=1.57 (95% CI: 0.42 to 5.79)[@]	
	Vypro II vs. Premilene heavyweight	Pain	VAS pain scores	Post op 1 year	0.65 (SD: NR) (N=74)	1.1 (SD: NR) (N=75)	NR	
	Vypro II vs. Premilene heavyweight	Pain	Analgesic use	After 2 year	5% (4/74)	1% (1/75)	NS based on OR=4.23 (95% CI: 0.46 to 38.76)[@]	
	Vypro II vs. Premilene heavyweight	Pain	VAS pain scores	Post op 2 years	0.5 (SD: NR) (N=74)	0.7 (SD: NR) (N=75)	NR	
	Vypro II vs. Premilene heavyweight	ADV	Normal wound healing	First week post op	96% (76/79)	97% (76/78)	NS based on OR=0.67 (95% CI: 0.11 to 4.1)[@]	
	Vypro II vs. Premilene heavyweight	ADV	Wound hematoma	First week post op	3% (2/79)	1% (1/78)	NS based on OR=2 (95% CI: 0.18 to 22.52)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Vypro II vs. Premilene heavyweight	ADV	Wound infection	First week post op	1% (1/79)	1% (1/78)	NS based on OR=0.99 (95% CI: 0.06 to 16.07)[@]	
	Vypro II vs. Premilene heavyweight	ADV	Wound swelling/ bruises	First month post op	9% (7/79)	4% (3/78)	NS based on OR=2.43 (95% CI: 0.6 to 9.76)[@]	
	Vypro II vs. Premilene heavyweight	ADV	Feeling of foreign body	After 1 year	16% (12/74)	16% (12/75)	NS based on OR=1.02 (95% CI: 0.42 to 2.43)[@]	
	Vypro II vs. Premilene heavyweight	ADV	Feeling of foreign body	After 2 year	7% (5/74)	8% (6/75)	NS based on OR=0.83 (95% CI: 0.24 to 2.86)[@]	
	Vypro II vs. Premilene lightweight	RC	Recurrences	After 2 year	3% (2/74)	1% (1/72)	NS based on OR=1.97 (95% CI: 0.17 to 22.24)[@]	
	Vypro II vs. Premilene lightweight	RTDA	Normal car driving (most patients retired and used car very seldom) (higher % is better)	First week post op	80% (63/79)	91% (68/75)	NS based on OR=0.41 (95% CI: 0.16 to 1.05)[@]	
	Vypro II vs. Premilene lightweight	RTDA	Painless walking (higher % is better)	First week post op	91% (72/79)	88% (66/75)	NS based on OR=1.4 (95% CI: 0.49 to 3.98)[@]	
	Vypro II vs. Premilene lightweight	RTDA	Normal running (higher % is better)	First month post op	90% (71/79)	92% (69/75)	NS based on OR=0.77 (95% CI: 0.25 to 2.34)[@]	
	Vypro II vs. Premilene lightweight	RTDA	Normal walking (higher % is better)	First month post op	94% (74/79)	95% (71/75)	NS based on OR=0.83 (95% CI: 0.22 to 3.23)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Vypro II vs. Premilene lightweight	RTW	No problems in work (higher % is better)	First month post op	95% (75/79)	96% (72/75)	NS based on OR=0.78 (95% CI: 0.17 to 3.61)[@]	
	Vypro II vs. Premilene lightweight	RTW	Sick leave	First month post op	3% (2/79)	9% (7/75)	NS based on OR=0.25 (95% CI: 0.05 to 1.26)[@]	
	Vypro II vs. Premilene lightweight	Pain	VAS pain scores	Post op day 1	4.7 (SD: NR) (N=79)	4.6 (SD: NR) (N=75)	NR	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use daily	First week post op	29% (23/79)	21% (16/75)	NS based on OR=1.51 (95% CI: 0.73 to 3.16)[@]	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use none	First week post op	49% (39/79)	48% (36/75)	NS based on OR=1.06 (95% CI: 0.56 to 1.99)[@]	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use sometimes	First week post op	19% (15/79)	31% (23/75)	NS based on OR=0.53 (95% CI: 0.25 to 1.12)[@]	
	Vypro II vs. Premilene lightweight	Pain	VAS pain scores	Post op week 1	2.4 (SD: NR) (N=79)	2.7 (SD: NR) (N=75)	NR	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use daily	First month post op	1% (1/79)	3% (2/75)	NS based on OR=0.47 (95% CI: 0.04 to 5.27)[@]	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use none	First month post op	87% (69/79)	89% (67/75)	NS based on OR=0.82 (95% CI: 0.31 to 2.21)[@]	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use sometimes	First month post op	6% (5/79)	4% (3/75)	NS based on OR=1.62 (95% CI: 0.37 to 7.04)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Vypro II vs. Premilene lightweight	Pain	VAS pain scores	Post op 1 month	1.1 (SD: NR) (N=79)	1.1 (SD: NR) (N=75)	NR	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use daily	After 1 year	1% (1/74)	1% (1/72)	NS based on OR=0.97 (95% CI: 0.06 to 15.85)[@]	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use sometimes	After 1 year	1% (1/74)	0% (0/72)	NS based on OR=2.96 (95% CI: 0.12 to 73.85)[@]	
	Vypro II vs. Premilene lightweight	Pain	Pain feeling 1 year	After 1 year	8% (6/74)	10% (7/72)	NS based on OR=0.82 (95% CI: 0.26 to 2.57)[@]	
	Vypro II vs. Premilene lightweight	Pain	VAS pain scores	Post op 1 year	0.65 (SD: NR) (N=74)	0.65 (SD: NR) (N=72)	NR	
	Vypro II vs. Premilene lightweight	Pain	Analgesic use	After 2 year	5% (4/74)	3% (2/72)	NS based on OR=2 (95% CI: 0.35 to 11.27)[@]	
	Vypro II vs. Premilene lightweight	Pain	VAS pain scores	Post op 2 years	0.5 (SD: NR) (N=74)	0.4 (SD: NR) (N=72)	NR	
	Vypro II vs. Premilene lightweight	ADV	Normal wound healing	First week post op	96% (76/79)	99% (74/75)	NS based on OR=0.34 (95% CI: 0.03 to 3.37)[@]	
	Vypro II vs. Premilene lightweight	ADV	Wound hematoma	First week post op	3% (2/79)	1% (1/75)	NS based on OR=1.92 (95% CI: 0.17 to 21.65)[@]	
	Vypro II vs. Premilene lightweight	ADV	Wound infection	First week post op	1% (1/79)	0% (0/75)	NS based on OR=2.89 (95% CI: 0.12 to 71.94)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2007[781] (continued)	Vypro II vs. Premilene lightweight	ADV	Wound swelling/ bruises	First month post op	9% (7/79)	7% (5/75)	NS based on OR=1.36 (95% CI: 0.41 to 4.49)[@]	
	Vypro II vs. Premilene lightweight	ADV	Feeling of foreign body	After 1 year	16% (12/74)	25% (18/72)	NS based on OR=0.58 (95% CI: 0.26 to 1.31)[@]	
	Vypro II vs. Premilene lightweight	ADV	Feeling of foreign body	After 2 year	7% (5/74)	11% (8/72)	NS based on OR=0.58 (95% CI: 0.18 to 1.86)[@]	
Paradowski et al., 2009[784]	Micromesh vs. Surgipro	RC	Hernia recurrence	1 year	0 (NS NR)	0 (NS NR)	NC	72 patients completed 1 year follow-up; separate group NS NR
	Micromesh vs. Surgipro	HOSP	Time of hospital stay (hours)	NA	48 (SD: 5.2) (N=25)	46.2 (SD: 10.5) (N=25)	p=0.003 for comparison of group 1 with group 3; t-test or Mann Whitney U	
	Micromesh vs. Surgipro	RTDA	Time to return to normal activity (days)	NA	8.5 (SD: 2.6) (N=25)	7.5 (SD: 1.5) (N=25)	p=0.02 for comparison between group 1 and group 2; t-test or Mann Whitney U	
	Micromesh vs. Surgipro	Pain	VAS	After 7 days	Median: 0 (Range: 0 to 6) (N=25)	Median: 0 (Range: 0 to 5) (N=25)	p=0.0001 for group 1 vs. group 3; p=0.00008 for group 1 vs. group 2; t-test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paradowski et al., 2009[784] (continued)	Micromesh vs. Surgipro	Pain	VAS (>5)	After 3 months	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Micromesh vs. Surgipro	Pain	VAS (1-2)	After 3 months	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
	Micromesh vs. Surgipro	Pain	VAS (3-5)	After 3 months	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	Micromesh vs. Surgipro	Pain	Bodily pain score SF-36 (higher number is better)	1 year	Median: 53 (SD: NR) (NS NR)	Median: 48 (SD: NR) (NS NR)	NR	
	Micromesh vs. Surgipro	Pain	VAS (>2)	After 1 year	0 (NS NR)	0 (NS NR)	NC	
	Micromesh vs. Surgipro	Pain	VAS (1-2)	After 1 year	2 (NS NR)	0 (NS NR)	NC	
	Micromesh vs. Surgipro	ADV	Infection	Post op	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	Micromesh vs. Surgipro	ADV	Redness of wound	Post op	16% (4/25)	0% (0/25)	NS based on OR=10.67 (95% CI: 0.54 to 209.66)[@]	
	Surgimesh vs. Micromesh	RC	Hernia recurrence	1 year	0 (NS NR)	0 (NS NR)	NC	
	Surgimesh vs. Micromesh	HOSP	Time of hospital stay (hours)	NA	57.7 (SD: 19.3) (N=25)	48 (SD: 5.2) (N=25)	p=0.003 for comparison of Group 1 with Group 3; t-test or Mann Whitney U	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paradowski et al., 2009[784] (continued)	Surgimesh vs. Micromesh	RTDA	Time to return to normal activity (days)	NA	8.5 (SD: 3.28) (N=25)	8.5 (SD: 2.6) (N=25)	p=0.02 for comparison between Group 1 and Group 2; t-test or Mann Whitney U	
	Surgimesh vs. Micromesh	Pain	VAS	After 7 days	Median: 5 (Range: 0 to 9) (N=25)	Median: 0 (Range: 0 to 6) (N=25)	p=0.0001 for group 1 vs. group 3; p=0.00008 for group 1 vs. group 2; t-test	
	Surgimesh vs. Micromesh	Pain	VAS (>5)	After 3 months	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Surgimesh vs. Micromesh	Pain	VAS (1-2)	After 3 months	16% (4/25)	4% (1/25)	NS based on OR=4.57 (95% CI: 0.47 to 44.17)[@]	
	Surgimesh vs. Micromesh	Pain	VAS (3-5)	After 3 months	0% (0/25)	4% (1/25)	NS based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
	Surgimesh vs. Micromesh	Pain	Bodily pain score SF-36 (higher number is better)	1 year	Median: 38 (SD: NR) (NS NR)	Median: 53 (SD: NR) (NS NR)	NR	
	Surgimesh vs. Micromesh	Pain	VAS (>2)	After 1 year	0 (NS NR)	0 (NS NR)	NC	
	Surgimesh vs. Micromesh	Pain	VAS (1-2)	After 1 year	1 (NS NR)	2 (NS NR)	NC	
	Surgimesh vs. Micromesh	ADV	Infection	Post op	0% (0/25)	4% (1/25)	NS based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paradowski et al., 2009[784] (continued)	Surgimesh vs. Micromesh	ADV	Redness of wound	Post op	4% (1/25)	16% (4/25)	NS based on OR=0.22 (95% CI: 0.02 to 2.11)[@]	
	Surgimesh vs. surgipro	RC	Hernia recurrence	1 year	0 (NS NR)	0 (NS NR)	NC	
	Surgimesh vs. surgipro	HOSP	Time of hospital stay (hours)	NA	57.7 (SD: 19.3) (N=25)	46.2 (SD: 10.5) (N=25)	p=0.003 for comparison of Group 1 with Group 3; t-test or Mann Whitney U	
	Surgimesh vs. surgipro	RTDA	Time to return to normal activity (days)	NA	8.5 (SD: 3.28) (N=25)	7.5 (SD: 1.5) (N=25)	p=0.02 for comparison between Group 1 and Group 2; t-test or Mann Whitney U	
	Surgimesh vs. surgipro	Pain	VAS	After 7 days	Median: 5 (Range: 0 to 9) (N=25)	Median: 0 (Range: 0 to 5) (N=25)	p=0.0001 for Group 1 vs. Group 3; p=0.00008 for Group 1 vs. Group 2; t-test	
	Surgimesh vs. surgipro	Pain	VAS (>5)	After 3 months	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Surgimesh vs. surgipro	Pain	VAS (1-2)	After 3 months	16% (4/25)	4% (1/25)	NS based on OR=4.57 (95% CI: 0.47 to 44.17)[@]	
	Surgimesh vs. surgipro	Pain	VAS (3-5)	After 3 months	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paradowski et al., 2009[784] (continued)	Surgimesh vs. surgipro	Pain	Bodily pain score SF-36 (higher number is better)	1 year	Median: 38 (SD: NR) (NS NR)	Median: 48 (SD: NR) (NS NR)	NR	
	Surgimesh vs. surgipro	Pain	VAS (>2)	After 1 year	0 (NS NR)	0 (NS NR)	NC	
	Surgimesh vs. surgipro	Pain	VAS (1-2)	After 1 year	1 (NS NR)	0 (NS NR)	NC	
	Surgimesh vs. surgipro	ADV	Infection	Post op	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Surgimesh vs. surgipro	ADV	Redness of wound	Post op	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
Peters et al., 2010[788]	Marlex vs. TiMesh	RC	Hernia recurrence	1 year	0 (NS NR)	0 (NS NR)	NC	
	Marlex vs. TiMesh	RTDA	Return to daily activities	NA	Median: 3 (IQR: 1 to 7) (N=20)	Median: 3 (IQR: 2 to 3) (N=19)	NR	
	Marlex vs. TiMesh	RTDA	Return to sports activities	NA	Median: 25 (IQR: 21 to 47) (N=20)	Median: 27 (IQR: 2 to 43) (N=19)	p=0.045 between Group B (Vypro II) and Group A (Marlex)/ Group C (TiMesh). Mann Whitney	
	Marlex vs. TiMesh	RTW	Return to professional activities	NA	Median: 16 (IQR: 14 to 21) (N=20)	Median: 14 (IQR: 10 to 28) (N=19)	NR	
	Marlex vs. TiMesh	Pain	Mild inguinal pain	1 year	1 (NS NR)	2 (NS NR)	NC	
	Marlex vs. TiMesh	Pain	Moderate inguinal pain	1 year	1 (NS NR)	0 (NS NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Peters et al., 2010[788] (continued)	Marlex vs. TiMesh	ADV	Numbness	1 year	0 (NS NR)	1 (NS NR)	NC	
	Marlex vs. TiMesh	ADV	Severe inguinal pain	1 year	0 (NS NR)	0 (NS NR)	NC	
	Marlex vs. TiMesh	ADV	Hematoma	Post op	10% (2/20)	11% (2/19)	NS based on OR=0.94 (95% CI: 0.12 to 7.48)[@]	
	Marlex vs. TiMesh	ADV	Seroma	Post op	10% (2/20)	5% (1/19)	NS based on OR=2 (95% CI: 0.17 to 24.07)[@]	
	Marlex vs. TiMesh	ADV	Suction drain	Post op	0% (0/20)	5% (1/19)	NS based on OR=0.3 (95% CI: 0.01 to 7.85)[@]	
	Marlex vs. Vypro II	RC	Hernia recurrence	1 year	0 (NS NR)	0 (NS NR)	NC	
	Marlex vs. Vypro II	RTDA	Return to daily activities	NA	Median: 3 (IQR: 1 to 7) (N=20)	Median: 5 (IQR: 2.7 to 8) (N=20)	NR	
	Marlex vs. Vypro II	RTDA	Return to sports activities	NA	Median: 25 (IQR: 21 to 47) (N=20)	Median: 21 (IQR: 14 to 21) (N=20)	p=0.045 between Group B (Vypro II) and Group A (Marlex)/ Group C (TiMesh). Mann Whitney	
	Marlex vs. Vypro II	RTW	Return to professional activities	NA	Median: 16 (IQR: 14 to 21) (N=20)	Median: 8 (IQR: 8 to 21) (N=20)	NR	
	Marlex vs. Vypro II	Pain	Mild inguinal pain	1 year	1 (NS NR)	1 (NS NR)	NC	
	Marlex vs. Vypro II	Pain	Moderate inguinal pain	1 year	1 (NS NR)	1 (NS NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Peters et al., 2010[788] (continued)	Marlex vs. Vypro II	ADV	Numbness	1 year	0 (NS NR)	2 (NS NR)	NC	
	Marlex vs. Vypro II	ADV	Severe inguinal pain	1 year	0 (NS NR)	1 (NS NR)	NC	
	Marlex vs. Vypro II	ADV	Hematoma	Post op	10% (2/20)	5% (1/20)	NS based on OR=2.11 (95% CI: 0.18 to 25.35)[@]	
	Marlex vs. Vypro II	ADV	Seroma	Post op	10% (2/20)	5% (1/20)	NS based on OR=2.11 (95% CI: 0.18 to 25.35)[@]	
	Marlex vs. Vypro II	ADV	Suction drain	Post op	0% (0/20)	5% (1/20)	NS based on OR=0.32 (95% CI: 0.01 to 8.26)[@]	
	Vypro II vs. TiMesh	RC	Hernia recurrence	1 year	0 (NS NR)	0 (NS NR)	NC	
	Vypro II vs. TiMesh	RTDA	Return to daily activities	NA	Median: 5 (IQR: 2.7 to 8) (N=20)	Median: 3 (IQR: 2 to 3) (N=19)	NR	
	Vypro II vs. TiMesh	RTDA	Return to sports activities	NA	Median: 21 (IQR: 14 to 21) (N=20)	Median: 27 (IQR: 2 to 43) (N=19)	p=0.045 between Group B (Vypro II) and Group A (Marlex)/ Group C (TiMesh). Mann Whitney	
	Vypro II vs. TiMesh	RTW	Return to professional activities	NA	Median: 8 (IQR: 8 to 21) (N=20)	Median: 14 (IQR: 10 to 28) (N=19)	NR	
	Vypro II vs. TiMesh	Pain	Mild inguinal pain	1 year	1 (NS NR)	2 (NS NR)	NC	
	Vypro II vs. TiMesh	Pain	Moderate inguinal pain	1 year	1 (NS NR)	0 (NS NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Peters et al., 2010[788] (continued)	Vypro II vs. TiMesh	ADV	Numbness	1 year	2 (NS NR)	1 (NS NR)	NC	
	Vypro II vs. TiMesh	ADV	Severe inguinal pain	1 year	1 (NS NR)	0 (NS NR)	NC	
	Vypro II vs. TiMesh	ADV	Hematoma	Post op	5% (1/20)	11% (2/19)	NS based on OR=0.45 (95% CI: 0.04 to 5.39)[@]	
	Vypro II vs. TiMesh	ADV	Seroma	Post op	5% (1/20)	5% (1/19)	NS based on OR=0.95 (95% CI: 0.06 to 16.31)[@]	
	Vypro II vs. TiMesh	ADV	Suction drain	Post op	5% (1/20)	5% (1/19)	NS based on OR=0.95 (95% CI: 0.06 to 16.31)[@]	
Post et al., 2004[793]	Surgipro vs. Vypro	RC	Hernia recurrence	6 months	3% (2/58)	4% (2/48)	NS based on OR=0.82 (95% CI 0.11 to 6.06)[@]	N=number of hernias
	Surgipro vs. Vypro	HOSP	Mean hospital stay (days)	NA	2.3 (SD: NR) (N=60)	2.4 (SD: NR) (N=48)	NR	N=number of patients
	Surgipro vs. Vypro	QOL	SF-36 bodily pain (higher number is better)	6 months	Median: 90 (SD: NR) (NS NR)	Median: 98 (SD: NR) (NS NR)	NR	# patients NR; # hernias was 58 in Group 1 and 48 in Group 2
	Surgipro vs. Vypro	QOL	SF-36 general health (higher number is better)	6 months	Median: 70 (SD: NR) (NS NR)	Median: 70.5 (SD: NR) (NS NR)	NR	
	Surgipro vs. Vypro	QOL	SF-36 mental health (higher number is better)	6 months	Median: 81 (SD: NR) (NS NR)	Median: 79.5 (SD: NR) (NS NR)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Post et al., 2004[793] (continued)	Surgipro vs. Vypro	QOL	SF-36 physical functioning (higher number is better)	6 months	Median: 90.5 (SD: NR) (NS NR)	Median: 87 (SD: NR) (NS NR)	NR	
	Surgipro vs. Vypro	QOL	SF-36 role emotional (higher number is better)	6 months	Median: 80 (SD: NR) (NS NR)	Median: 92 (SD: NR) (NS NR)	NR	
	Surgipro vs. Vypro	QOL	SF-36 role physical (higher number is better)	6 months	Median: 90 (SD: NR) (NS NR)	Median: 95 (SD: NR) (NS NR)	NR	
	Surgipro vs. Vypro	QOL	SF-36 social functioning (higher number is better)	6 months	Median: 98 (SD: NR) (NS NR)	Median: 98 (SD: NR) (NS NR)	NR	
	Surgipro vs. Vypro	QOL	SF-36 vitality (higher number is better)	6 months	Median: 68 (SD: NR) (NS NR)	Median: 59.8 (SD: NR) (NS NR)	NR	
	Surgipro vs. Vypro	Pain	VAS pain at rest	2 days	3 (SD: NR, Range: 0 to 5) (NS NR)	3.76 (SD: NR, Range: 0 to 5) (NS NR)	p=0.059 Kruskal Wallis	
	Surgipro vs. Vypro	Pain	VAS pain on physical activity	6 months	0.16 (SD: NR, Range: 0 to 5) (NS NR)	0.79 (SD: NR, Range: 0 to 5) (NS NR)	p=0.042 Kruskal Wallis	
	Surgipro vs. Vypro	ADV	Hematoma	2 days	3% (2/64)	2% (1/53)	NS based on OR=1.68 (95% CI: 0.15 to 19.03)[@]	N=number of hernias
	Surgipro vs. Vypro	ADV	Seroma >10 ml	2 days	33% (21/64)	38% (20/53)	NS based on OR=0.81 (95% CI: 0.38 to 1.73)[@]	N=number of hernias
	Surgipro vs. Vypro	ADV	Collection of serous fluid around mesh	6 months	0 (NS NR)	2 (NS NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Post et al., 2004[793] (continued)	Surgipro vs. Vypro	ADV	Feeling of foreign body	6 months	17% (10/58)	44% (21/48)	p<0.05 based on OR=0.27 (95% CI: 0.11 to 0.65)[@]	N=number of hernias
	Surgipro vs. Vypro	ADV	Seroma >10 ml	6 months	0% (0/58)	4% (2/48)	NS based on OR=0.16 (95% CI: 0.01 to 3.39)[@]	N=number of hernias
	Surgipro vs. Vypro	ADV	Testicular atrophy	6 months	2% (1/58)	0% (0/48)	NS based on OR=2.53 (95% CI: 0.1 to 63.55)[@]	N=number of hernias
	Surgipro vs. Vypro	ADV	Intraoperative complications	NA	0% (0/60)	0% (0/48)	NS based on OR=0.8 (95% CI: 0.02 to 41.14)[@]	
Puccio et al., 2005[794]	Prolene vs. Surgisis	RC	Hernia recurrence	NA	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Surgisis	RTDA	Median time to full recovery (days)	NA	Median: 20 (SD: NR) (N=15)	Median: 10 (SD: NR) (N=15)	NR	
	Prolene vs. Surgisis	Pain	Prolonged pain	<30 days	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Surgisis	Pain	Prolonged pain	>30 days	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Surgisis	ADV	Delayed wound healing	<30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Prolene vs. Surgisis	ADV	Discomfort	<30 days	53% (8/15)	13% (2/15)	p<0.05 based on OR=7.43 (95% CI: 1.23 to 45.01)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Puccio et al., 2005[794] (continued)	Prolene vs. Surgisis	ADV	Hematoma	<30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Prolene vs. Surgisis	ADV	Hyperesthesia	>30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Prolene vs. Surgisis	ADV	Sensory loss	<30 days	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Surgisis	ADV	Sensory loss	>30 days	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Surgisis	ADV	Seroma	<30 days	7% (1/15)	7% (1/15)	NS based on OR=1 (95% CI: 0.06 to 17.62)[@]	
	Prolene vs. Surgisis	ADV	Feeling of stiffness and a foreign body in groin	Post op	53% (8/15)	13% (2/15)	p<0.05 based on OR=7.43 (95% CI: 1.23 to 45.01)[@]	
	Prolene vs. Vypro	RC	Hernia recurrence	NA	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Prolene vs. Vypro	RTDA	Median time to full recovery (days)	NA	Median: 20 (SD: NR) (N=15)	Median: 18 (SD: NR) (N=15)	NR	
	Prolene vs. Vypro	Pain	Prolonged pain	<30 days	0% (0/15)	7% (1/15)	NS based on OR=0.31 (95% CI: 0.01 to 8.29)[@]	
	Prolene vs. Vypro	Pain	Prolonged pain	>30 days	0% (0/15)	7% (1/15)	NS based on OR=0.31 (95% CI: 0.01 to 8.29)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Puccio et al., 2005[794] (continued)	Prolene vs. Vypro	ADV	Delayed wound healing	<30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Prolene vs. Vypro	ADV	Discomfort	<30 days	53% (8/15)	47% (7/15)	NS based on OR=1.31 (95% CI: 0.31 to 5.48)[@]	
	Prolene vs. Vypro	ADV	Hematoma	<30 days	7% (1/15)	13% (2/15)	NS based on OR=0.46 (95% CI: 0.04 to 5.75)[@]	
	Prolene vs. Vypro	ADV	Hyperesthesia	>30 days	7% (1/15)	7% (1/15)	NS based on OR=1 (95% CI: 0.06 to 17.62)[@]	
	Prolene vs. Vypro	ADV	Sensory loss	<30 days	0% (0/15)	7% (1/15)	NS based on OR=0.31 (95% CI: 0.01 to 8.29)[@]	
	Prolene vs. Vypro	ADV	Sensory loss	>30 days	0% (0/15)	7% (1/15)	NS based on OR=0.31 (95% CI: 0.01 to 8.29)[@]	
	Prolene vs. Vypro	ADV	Seroma	<30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Prolene vs. Vypro	ADV	Feeling of stiffness and a foreign body in groin	Post op	53% (8/15)	47% (7/15)	NS based on OR=1.31 (95% CI: 0.31 to 5.48)[@]	
	Vypro vs. Surgisis	RC	Hernia recurrence	NA	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Vypro vs. Surgisis	RTDA	Median time to full recovery (days)	NA	Median: 18 (SD: NR) (N=15)	Median: 10 (SD: NR) (N=15)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Puccio et al., 2005[794] (continued)	Vypro vs. Surgisis	Pain	Prolonged pain	<30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Vypro vs. Surgisis	Pain	Prolonged pain	>30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Vypro vs. Surgisis	ADV	Delayed wound healing	<30 days	0% (0/15)	0% (0/15)	NS based on OR=1 (95% CI: 0.02 to 53.66)[@]	
	Vypro vs. Surgisis	ADV	Discomfort	<30 days	47% (7/15)	13% (2/15)	NS based on OR=5.69 (95% CI: 0.94 to 34.46)[@]	
	Vypro vs. Surgisis	ADV	Hematoma	<30 days	13% (2/15)	0% (0/15)	NS based on OR=5.74 (95% CI: 0.25 to 130.38)[@]	
	Vypro vs. Surgisis	ADV	Hyperesthesia	>30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Vypro vs. Surgisis	ADV	Sensory loss	<30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Vypro vs. Surgisis	ADV	Sensory loss	>30 days	7% (1/15)	0% (0/15)	NS based on OR=3.21 (95% CI: 0.12 to 85.21)[@]	
	Vypro vs. Surgisis	ADV	Seroma	<30 days	0% (0/15)	7% (1/15)	NS based on OR=0.31 (95% CI: 0.01 to 8.29)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Puccio et al., 2005[794] (continued)	Vypro vs. Surgisis	ADV	Feeling of stiffness and a foreign body in groin	post op	47% (7/15)	13% (2/15)	NS based on OR=5.69 (95% CI: 0.94 to 34.46)[@]	
Schopf et al., 2011[802]	Lightweight mesh vs. extralightweight mesh	RC	Hernia recurrence	3 year observation period	3% (7/225)	3% (5/194)	p=0.724; test not specified	Of 380 patients operated on, 344 came personally for a physical examination and questioning in detail, for a follow-up rate of 90%
	Lightweight mesh vs. extralightweight mesh	Pain	Acute pain	Post op (immediate post op period 3 months or less)	13% (30/225)	22% (43/194)	p<0.05 based on OR=0.54 (95% CI: 0.32 to 0.9)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Chronic inguinal pain	Post op	5% (12/225)	2% (3/194)	p=0.037; test not specified	
	Lightweight mesh vs. extralightweight mesh	Pain	Need painkillers - no	Follow-up	95% (213/225)	98% (191/194)	NS based on OR=0.28 (95% CI: 0.08 to 1)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Need painkillers - yes	Follow-up	5% (12/225)	2% (3/194)	NS based on OR=3.59 (95% CI: 1 to 12.9)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	NSAR painkillers	Follow-up	5% (12/225)	2% (3/194)	NS based on OR=3.59 (95% CI: 1 to 12.9)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain affect daily life - little	Follow-up	3% (6/225)	0% (0/194)	NS based on OR=11.52 (95% CI: 0.64 to 205.82)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Schopf et al., 2011[802] (continued)	Lightweight mesh vs. extralightweight mesh	Pain	Pain affect daily life – no problem (higher % is better)	Follow-up	95% (213/225)	98% (191/194)	NS based on OR=0.28 (95% CI: 0.08 to 1)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain affect daily life - very limiting	Follow-up	3% (6/225)	2% (3/194)	NS based on OR=1.74 (95% CI: 0.43 to 7.07)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain related to hernia repair - every day	Follow-up	3% (6/225)	2% (3/194)	NS based on OR=1.74 (95% CI: 0.43 to 7.07)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain related to hernia repair - no (higher % is better)	Follow-up	95% (213/225)	98% (191/194)	NS based on OR=0.28 (95% CI: 0.08 to 1)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain related to hernia repair - occasionally	Follow-up	0% (1/225)	0% (0/194)	NS based on OR=2.6 (95% CI: 0.11 to 64.17)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain related to hernia repair - once a week	Follow-up	2% (5/225)	0% (0/194)	NS based on OR=9.7 (95% CI: 0.53 to 176.61)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	Pain related to hernia repair - yes	Follow-up	5% (12/225)	2% (3/194)	NS based on OR=3.59 (95% CI: 1 to 12.9)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 0 (higher % is better)	Follow-up	95% (213/225)	98% (191/194)	NS based on OR=0.28 (95% CI: 0.08 to 1)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 1	Follow-up	0% (1/225)	0% (0/194)	NS based on OR=2.6 (95% CI: 0.11 to 64.17)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Schopf et al., 2011[802] (continued)	Lightweight mesh vs. extralightweight mesh	Pain	VAS 10	Follow-up	0% (0/225)	0% (0/194)	NS based on OR=0.86 (95% CI: 0.02 to 43.68)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 2	Follow-up	1% (2/225)	0% (0/194)	NS based on OR=4.35 (95% CI: 0.21 to 91.19)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 3	Follow-up	1% (3/225)	0% (0/194)	NS based on OR=6.12 (95% CI: 0.31 to 119.21)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 4	Follow-up	1% (2/225)	0% (0/194)	NS based on OR=4.35 (95% CI: 0.21 to 91.19)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 5	Follow-up	1% (2/225)	0% (0/194)	NS based on OR=4.35 (95% CI: 0.21 to 91.19)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 6	Follow-up	0% (1/225)	0% (0/194)	NS based on OR=2.6 (95% CI: 0.11 to 64.17)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 7	Follow-up	0% (0/225)	1% (1/194)	NS based on OR=0.29 (95% CI: 0.01 to 7.06)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 8	Follow-up	0% (1/225)	1% (2/194)	NS based on OR=0.43 (95% CI: 0.04 to 4.76)[@]	
	Lightweight mesh vs. extralightweight mesh	Pain	VAS 9	Follow-up	0% (0/225)	0% (0/194)	NS based on OR=0.86 (95% CI: 0.02 to 43.68)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Schopf et al., 2011[802] (continued)	Lightweight mesh vs. extralightweight mesh	ADV	Acupuncture	Follow-up	0% (0/225)	1% (2/194)	NS based on OR=0.17 (95% CI: 0.01 to 3.58)[@]	
Sutalo et al., 2010[818]	Standard mesh vs. PHS	RC	Incidence of recurrence	1 year	0% (0/40)	0% (0/40)	NS based on OR=1 (95% CI: 0.02 to 51.63)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness at rest	1 month	15% (6/40)	18% (7/40)	NS based on OR=0.83 (95% CI: 0.25 to 2.74)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness during physical activity	1 month	18% (7/40)	23% (9/40)	NS based on OR=0.73 (95% CI: 0.24 to 2.2)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness at rest	3 months	10% (4/40)	10% (4/40)	NS based on OR=1 (95% CI: 0.23 to 4.31)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness during physical activity	3 months	8% (3/40)	15% (6/40)	NS based on OR=0.46 (95% CI: 0.11 to 1.98)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness at rest	6 months	0% (0/40)	0% (0/40)	NS based on OR=1 (95% CI: 0.02 to 51.63)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness during physical activity	6 months	0% (0/40)	3% (1/40)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Standard mesh vs. PHS	Pain	Pain and numbness at rest	12 months	0% (0/40)	0% (0/40)	NS based on OR=1 (95% CI: 0.02 to 51.63)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sutalo et al., 2010[818] (continued)	Standard mesh vs. PHS	Pain	Pain and numbness during physical activity	12 months	0% (0/40)	0% (0/40)	NS based on OR=1 (95% CI: 0.02 to 51.63)[@]	
	Standard mesh vs. PHS	ADV	Sensory loss	1 month	28% (11/40)	30% (12/40)	NS based on OR=0.89 (95% CI: 0.34 to 2.33)[@]	
	Standard mesh vs. PHS	ADV	Sensory loss	3 months	18% (7/40)	20% (8/40)	NS based on OR=0.85 (95% CI: 0.28 to 2.61)[@]	
	Standard mesh vs. PHS	ADV	Sensory loss	6 months	3% (1/40)	5% (2/40)	NS based on OR=0.49 (95% CI: 0.04 to 5.6)[@]	
	Standard mesh vs. PHS	ADV	Sensory loss	12 months	0% (0/40)	3% (1/40)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Standard mesh vs. PHS	ADV	Hematoma	Post op	0% (0/40)	3% (1/40)	NS based on OR=0.33 (95% CI: 0.01 to 8.22)[@]	
	Standard mesh vs. PHS	ADV	Seroma	Post op	5% (2 /40)	5% (2/40)	NS based on OR=1 (95% CI: 0.13 to 7.47)[@]	
	Standard mesh vs. PHS	ADV	Without complications	Post op	93% (37/40)	88% (35/40)	NS based on OR=1.76 (95% CI: 0.39 to 7.93)[@]	
	Standard mesh vs. PHS	ADV	Wound infection	Post op	3% (1/40)	5% (2/40)	NS based on OR=0.49 (95% CI: 0.04 to 5.6)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Torcivia et al., 2010[825]	Prolene vs. Glucamesh	HOSP	Average length of stay in hospital (min)	NA	360 (SEM 48) (N=23)	288 (SEM 35) (N=24)	p=0.02	50 randomized and three patients excluded from study due to insufficient data or incomplete follow-up
	Prolene vs. Glucamesh	QOL	QoL scores (higher number is better)	Day 7	37 (SD: NR) (N=23)	38 (SD: NR) (N=24)	NR	
	Prolene vs. Glucamesh	QOL	QoL scores (higher number is better)	Day 30	39.4 (SD: NR) (N=23)	39 (SD: NR) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 1 pm	24 (Range: 2 to 60) (N=23)	21.6 (Range: 0 to 60) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 1 am	25.2 (Range: 2 to 60) (N=23)	26 (Range: 0 to 50) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 2 pm	21.3 (Range: 1.5 to 50) (N=23)	17.5 (Range: 0 to 50) (N=24)	p=0.02, test not reported	
	Prolene vs. Glucamesh	Pain	VAS	Day 2 am	24 (Range: 1.5 to 60) (N=23)	19.2 (Range: 0 to 50) (N=24)	p=0.02, test not reported	
	Prolene vs. Glucamesh	Pain	VAS	Day 3 pm	18 (Range: 0 to 50) (N=23)	13.3 (Range: 0 to 40) (N=24)	p=0.01, test not reported	
	Prolene vs. Glucamesh	Pain	VAS	Day 3 am	20 (Range: 1.5 to 50) (N=23)	13 (Range: 0 to 40) (N=24)	p=0.01, test not reported	
	Prolene vs. Glucamesh	Pain	VAS	Day 4 am	16 (Range: 0 to 40) (N=23)	10 (Range: 0 to 40) (N=24)	p=0.02, test not reported	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Torcivia et al., 2010[825] (continued)	Prolene vs. Glucamesh	Pain	VAS	Day 4 pm	15 (Range: 0 to 40) (N=23)	11.2 (Range: 0 to 50) (N=24)	p=0.3, test not reported	
	Prolene vs. Glucamesh	Pain	VAS	Day 5 am	11 (Range: 0 to 40) (N=23)	7.2 (Range: 0 to 30) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 5 pm	12 (Range: 0 to 40) (N=23)	7.9 (Range: 0 to 40) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 6 am	8.5 (Range: 0 to 30) (N=23)	6.7 (Range: 0 to 30) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 6 pm	8.4 (Range: 0 to 40) (N=23)	7 (Range: 0 to 30) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 7 am	6 (Range: 0 to 30) (N=23)	4.3 (Range: 0 to 30) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS	Day 7 pm	5 (Range: 0 to 30) (N=23)	5 (Range: 0 to 30) (N=24)	NR	
	Prolene vs. Glucamesh	Pain	VAS=0	1 month	35% (8/23)	75% (18/24)	p<0.05 based on OR=0.18 (95% CI: 0.05 to 0.63)[@]	
	Prolene vs. Glucamesh	Pain	VAS score	Post op	31.7 (SEM 6.2) (N=23)	21.6 (SEM 2.4) (N=24)	p=0.02	
	Prolene vs. Glucamesh	ADV	Post operative complications	Post op	0% (0/23)	0% (0/24)	NS based on OR=1.04 (95% CI: 0.02 to 54.72)[@]	

Table Note:
[@] Calculated by evidence reviewer

Key Question 6 Tables

Table 59. Key Question 6: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Kim-Fuchs et al., 2011[710,711]	Switzerland	Aarau	1	RCT	Lichtenstein with sutured mesh fixation vs. Lichtenstein with tissue glue mesh fixation	264	January 2001 to December 2004	Surgical Clinic	NR
Garg et al., 2011[698]	India	Haryana	1	RCT	TEP with stapled mesh vs. TEP with non-fixated mesh	104	September 1 to December 20, 2008	Rural referral hospital	Author's report no financial ties/interest to disclose.
Paajanen et al., 2011[782]	Finland	Joensuu	3	RCT	Lichtenstein with suture fixed mesh vs. Lichtenstein with glue fixed mesh	302	June 2007 to May 2009	Ambulatory surgery unit of three hospitals	Authors state – no financial or material support was received from any commercial company. The authors declare no conflict of interest.
Wong et al., 2011[835]	Taiwan	Taipei	1	RCT	Open repair with sutured mesh vs. Open repair with mesh fixed with fibrin glue	56	July 15, 2007 to December 15, 2007	Hospital	NR
Fortelny et al., 2011[695]	Austria	Vienna	1	RCT	TAPP with mesh fixed with fibrin sealant vs. TAPP with stapled mesh	89	NR	Hospital	One author Professor Redl works as senior consultant for Baxter Biosciences. All other authors report no conflicts of interest or financial ties to disclose.

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Boldo et al., 2008[639]	Spain	Castellon	1	RCT	TAPP with fibrin (FG) mesh fixation vs. TAPP with staples (SG) mesh fixation	27	March 2006 to June 2006	Hospital	The public foundation for promoting investigation in health sciences of the Consorcio Hospitalario Provincial de Castellon – technical and financial support
Canonico et al., 1999[650]	Italy	Naples	1	RCT	Lichtensteing with Marlex Mesh (CR Bard) and human fibrin glue (HFG) vs. Lichtenstein with Marlex Mesh (CR Bard) without HFG	50	January 1997 to December 1997	NR	NR
Douglas et al., 2002[676]	United States	Dallas, TX	1	RCT	Lichtenstein, mesh fixation with suture vs. Lichtenstein, mexh fixation with tacks	34	May 1998 to July 1999	Hospital	NR
Ferzli et al., 1999[687]	United States	Staten Island, NY	1	RCT	Laparoscopic technique stapled mesh vs. Laparoscopic technique unstapled mesh	92	Data collected over a 15 month period	Department of Surgery	NR
Helbling et al., 2003[710,711]	Switzerland	Aarau	1	RCT	Lichtenstein with Vypro II and sutures vs. Lichtenstein with Vypro II with glue	46	January 2001 to December 2001	NR	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Koch et al., 2006[723]	United States	Rochester, MN	1	RCT	TEP with fixation of mesh vs. TEP without fixation of mesh	40	January 2002 to January 2004	NR	NR
Lau et al., 2005[738]	China	Hong Kong Special Administrative Region (SAR)	1	RCT	TEP with Prolene mesh (Ethicon) and Fibrin Sealant (FS) vs. TEP with Prolene mesh (Ethicon) and Staples	93	July 2002 to March 2004	Hospital	Trial sponsored by a Research Fund from the Tung Wah Group of Hospitals
Leibl et al., 2002[740]	Germany	Stuttgart	1	RCT	TAPP incised vs. TAPP non-incised mesh and clip fixation vs. TAPP suturing the mesh	360	Study started in 1997, randomization ended in 1998	Clinic for General and Visceral Surgery	NR
Lovisetto et al., 2007[749]	Italy	Milano	1	RCT	TAPP with mesh fixed with staples vs. TAPP with mesh fixed with fibrin glue	197	June 2003 to February 2005	Hospital	NR
Mills et al., 1998[751]	United Kingdom	Northampton	1	RCT	Lichtenstein with Polypropylene mesh and polypropylene sutures vs. Lichtenstein with Polypropylene mesh and staples	50	NR	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Moreno-Egea et al., 2004[752]	Spain	Murcia	1	RCT	TEP with Parietex mesh and staples vs. TEP with Parietex mesh without staples	170	January 1999 to December 2001	Abdominal wall unit, department of general surgery	NR
Nowobilski et al., 2004[774]	Poland	Gdynia	1	RCT	Lichtenstein, mesh fixation with butyl-2-cyanoacrylate vs. Lichtenstein, mesh fixation with sutures	46	May to November 2003	Hospital	NR
Olmi et al., 2007[778]	Italy	Monza	1	RCT	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	600	September 2001 to September 2004	Hospital	NR
Paajanen, 2002[780]	Finland	Mikkeli	2	RCT	Lichtenstein with Premilene mesh and absorbable fixation (Dexon) vs. Lichtensteing with Premilene mesh and nonresorbable sutures (Prolene)	162	NR	Outpatient Clinic and Hospital	NR
Parshad et al., 2005[785]	India	New Delhi	1	RCT	Tep with staples vs. TEP without staples	50	NR	NR	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N	Date range of surgeries	Surgical setting	Study funding source(s)
Sevonius et al., 2009[535,805-813]	Sweden	95% of all hospitals in Sweden	NR	Non-randomized comparative study	Numerous comparisons	142,578 hernias	1992 to 2006	57% of repairs performed in medium-sized non-teaching hospitals; 32% performed in small-sized non-teaching hospitals; 11% performed in teaching hospitals	Sweden's National Board of Health and Welfare, the Swedish Association of Local Authorities, and by the County Council of Jämtland
Smith et al., 1999[816]	Australia	Stockport	2	RCT	TAPP, mesh unstapled vs. TAPP, mesh stapled	502	January 1995 to March 1997	Hospital and Infirmary	NR
Taylor et al., 2008[823]	Australia	Gold Coast, Tweed Heads, and Tungun	3	RCT	TEP with Polypropylene mesh and fixation with spiral tacks vs. TEP with polypropylene mesh and non fixation	360	December 2004 to February 2006	Three adjacent institutions	NR
Testini et al., 2010[824]	Italy	Bari	1	RCT	Plug and Mesh with Sutures vs. Plug and Mesh with Human Fibrin Glue (HFG) vs. Plug and Mesh with N-butyl-2-cyanoacrylate	169	January 1, 2003 to December 31, 2007	General surgey department	Authors report no competing interests

Table Note:
For Taylor et al., 2008[823] As randomization was performed by hernia rather than by patient, each side was considered separately in bilateral repairs, giving rise to three possible situations fixation performed on both sides, neither side, or one side only. In the last situation, the side randomized to receive fixation was repaired first so that any mesh overlap in the midline would not create inadvertent fication of the other side. These patients were studied further as a subgroup since they allowed direct comparison between the techniques.
For Testini et al., 2010[824] If a bilateral hernia was present, the patient was assigned to one group and both hernias received the same treatment.

Table 60. Key Question 6: Patient enrollment criteria related to hernia types

eStudy	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Kim-Fuchs et al., 2011[710,711]			X			X			X							
Garg et al., 2011[698]			X				X	X								
Paajanen et al., 2011[782]			X			X	X		X						X	
Wong et al., 2011[835]			X	X	X				X					X		
Fortelny et al., 2011[695]			X		X											
Boldo, 2008[639]		x											x		x	
Canonico et al., 1999[650]			x													
Douglas et al., 2002[676]				x												
Ferzli et al., 1999[687]			x													
Helbling and Schlumpf, 2003[710,711]			x		x	x	x		x							
Koch et al., 2006[723]																
Lau, 2005[738]																
Leibl et al., 2002[740]			x	x												
Lovisetto et al., 2007[749]																
Mills et al., 1997[751]			x	x	x	x	x									
Moreno-Egea et al., 2004[752]						x	x		x					x		
Nowobilski et al., 2004[774]				x		x										

eStudy	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Olmi et al., 2007[778]																
Paajanen, 2002[780]																
Parshad et al., 2005[785]			x		x											
Sevonius et al., 2009[535,805-813]																
Smith et al., 1999[816]					x	x										
Taylor et al., 2008[823]																
Testini et al., 2010[824]			x		x	x	x						x			

Table 61. Key Question 6: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Kim-Fuchs et al., 2011[710,711]	>25											X			
Garg et al., 2011[698]	16+						X								
Paajanen et al., 2011[782]	>18														
Wong et al., 2011[835]	20+														
Fortelny et al., 2011[695]	18-70						X			X					
Boldo, 2008[639]	Adults														
Canonico et al., 1999[650]	Adults														
Douglas et al., 2002[676]	Adults	x													
Ferzli et al., 1999[687]	>18	x													
Helbling and Schlumpf, 2003[710,711]	25+														
Koch et al., 2006[723]	18-100	x			x										
Lau, 2005[738]	18+				x										
Leibl et al., 2002[740]	Adults	x													
Lovisetto et al., 2007[749]	18+				x	4+		x							
Mills et al., 1997[751]	Adults														
Moreno-Egea et al., 2004[752]	Adults					4+						x			
Nowobilski et al., 2004[774]	20-78	x													
Olmi et al., 2007[778]	<80														
Paajanen, 2002[780]	Adults														
Parshad et al., 2005[785]	Adults						x								

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Sevonius et al., 2009[535,805-813]	15+														
Smith et al., 1999[816]	Adults				x										
Taylor et al., 2008[823]	18+														
Testini et al., 2010[824]	16+										x				

Table 62. Key Question 6: Patient enrollment criteria, other

Study	Other enrollment criteria
Kim-Fuchs et al., 2011[710,711]	Included: elective operation, primary hernia, inguinal hernia, defect size (lateral >3 cm; medial 1.5-3 cm; medial > 3 cm; medial lateral defect combined). Excluded: less than 25 years; lateral <1.5 cm, lateral 1.5-3 cm, medial < 1.5 cm; hydrocele or varicocele on hernia side; infected operation field; and immune deficiency.
Garg et al., 2011[698]	Included: patients diagnosed with a primary, unilateral or bilateral reducible inguinal hernia. Excluded: patients unfit for anesthesia
Paajanen et al., 2011[782]	Included: patients with unilateral or bilateral inguinal hernia. Excluded: allergy to polypropylene and patient refusal
Wong et al., 2011[835]	Included: patients with primary hernia. Excluded: patients refusing to take part in the trail; receiving concomitant abdominal surgery; receiving long-term analgesic or steroid treatment; had a history of alcohol or drug abuse; cirrhosis; preivious treatment with or hypersentivity to bovine aprotinin; known immunodeficiency; severly compromised physical or psychological health; participating in another clinical trial or received another investigational drug or device within the 30 days preceding surgery.
Fortelny et al., 2011[695]	Included: patients undergoing TAPP for primary unilateral and bilateral hernias. Excluded: patients with deficient language skills.
Boldo, 2008[639]	Excluded patients with a history of ventral or incisional hernia repair by mesh fixation; patients whose cardiopulmonary diseases advised against the use of general anesthesia or pneumoperitoneum.
Canonico et al., 1999[650]	Included only those with coagulation disorders. Coagulopathies were defined according to the following criteria: prothrombin time <10.5 seconds, activated partial thromboplastin <21 seconds, and fibrinogen <230 mg/dL.
Douglas et al., 2002[676]	No other criteria
Ferzli et al., 1999[687]	No other criteria
Helbling and Schlumpf, 2003[710,711]	Included: lateral >3 cm, medial 1.5-3 cm, medial >3 cm, combined defect (medial and lateral). Excluded: lateral <1.5 cm, lateral 1.5 - 3 cm, medial <1.5 cm
Koch et al., 2006[723]	Excluded those with a history of radical prostatectomy or low anterior colon/rectal resection, or those with an underlying coagulopathy
Lau, 2005[738]	Included those suitable for TEP, excluded those undergoing concomitant operations
Leibl et al., 2002[740]	Only included operations involving a generous preperitoneal dissection between the anterior superior iliac spine and the symphysis, as well as toward the psoas muscle, was doen so that a wide peritoneal compartment could be created (this type of incision was defined as an inclusion criterion for study entry to facilitate foldless application of 15x10 cm large, non-incised mesh).
Lovisetto et al., 2007[749]	Excluded bowel obstruction, bowel strangulation, peritonitis, bowel perforation, local or systemic infection, contraindications to pelvic laparoscopy, a history of open prostatectomy, or a life expectancy of less than 2 years, those affected by spondyloarthrosis with involvement of the dorsal lumbar nervous radices or by lumbar somatic discus hernia, with or without surgical correction, and patients with diabetic polyneuropathy, and patients participating in another trial.
Mills et al., 1997[751]	No other criteria
Moreno-Egea et al., 2004[752]	Excluded neoplasia, mental incompetence.
Nowobilski et al., 2004[774]	No other criteria
Olmi et al., 2007[778]	Excluded: contraindications to laparoscopic procedures (i.e., severe cardiopulmonary disorders and portal hypertension.
Paajanen, 2002[780]	No other criteria

Study	Other enrollment criteria
Parshad et al., 2005[785]	No other criteria
Sevonius et al., 2009[535,805-813]	Groin repairs in Sweden. One of the publications excluded those without recurrent hernia,[805] and another excluded those with recurrent or bilateral hernia.[808]
Smith et al., 1999[816]	Excluded previous retropubic prostatectomy
Taylor et al., 2008[823]	Excluded: suffering dementia or other cognitive impairment, being unable/unwilling to participate in fixation blinding and ongoing clinical follow-up, patients with hernias considered unsuitable for TEP repair
Testini et al., 2010[824]	Included: those using epidural anesthesia. Excluded: those with chronic obstructive pulmonary disease or disorders of hemostasis, and those whose surgery used a laparoscopic approach.

Table 63. Key Question 6: Treatment details

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Kim-Fuchs et al., 2011[710,711]	Lichtenstein with sutures (PDS 2.0, polydioxanone; Ethicon). Vypro II mesh used in procedure.	Lichtenstein with tissue glue (Histoacryl, Braun Medical). Vypro II mesh used in procedure.			Senior surgeon supervised all operations performed by residents. As hernia repair is one of the primary teaching operations, the performing residents were in the 2nd or higher year of education. Post operative procedure was identical in both groups. The patients moved freely byt lifting was restricted to 7 kg for the first 2 weeks.
Garg et al., 2011[698]	TEP with mesh fixed with staples (ProTack, Covidien). Mesh size, 15 x 10 cm, polypropylene	TEP with non-fixated mesh. Mesh size, 15 x 10 cm polypropylene.			An injection of diclofenac intramuscularly was given 4 hours after the procedure. All cases done with the patient under spinal anesthesia. Bilateral hernia repair was performed on patients who had bilateral hernia, cough impulse, or bubonocele on the other side, and on those who opted for it. All operations were done by a single experience surgical team. The members of the team had crossed their learning curve by performing more than 4000 TEP repairs from 1994 to 2008.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Paajanen et al., 2011[782]	Lichtenstein with sutured mesh (Absorbable polyglycolic acid 3/0 sutures, Dexon).	Lichtensteing with mesh fixated with 1 ml butyl-2-cyanoacrylate tissue glue (Gluban, GEM).			Optilene mesh (60 g/m^2) 9x13 cm trimmed lightweight polypropylene mesh. Four surgeons did all the surgery on study patients during weekly operative schedule (average 3 patients per week per surgeon). All surgeons were senior consultants with wide experience of open inguinal hernia surgery. Procedures carried out under local anesthesia as an outpatient. No prophylactic antibiotics were used.
Wong et al., 2011[835]	Open repair with sutured mesh. Sutures (Ethicon) were polyglactin monofilament sutures coated Vicryl. Three sutures, loosely tied, were used to fix the onlay mesh on the upper later in each case.	Open repair, mesh fixedwith fibrin glue (2 mL of Tissucol/Tisseel).			Two kinds of bilayer monofilament polypropylene mesh were used at the discretion of the surgeon: Prolene Hernia System (PHS, Ethicon) and Bard Modified Kugel Hernia Patch (Davol, Inc.). In patients who had a relative localized defect of the posterior wall, the PHS system was used; in patients with severe destruction of the posterior wall, the modified Kugel was used. During the study period, one experience surgeon performed 97 primary open inguinal; hernia repairs.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Fortelny et al., 2011[695]	TAPP with mesh fixed with fibrin sealant (TISSEEL, baxter healthcare coporation). Mesh was fixed with 2 mL fibrin sealant per side.	TAPP with mesh fixed with staples (ENDOPATH endoscopic multifeed stapler, Ethicon). Mesh was fixed ith 4 to 5 staples in defined locations, preserving the pubic tubercle and the area of the course of the iliohypogastric nerve.			TiMESH extra light (16 g/m^2) for lateral hernias and TiMESH light (35 g/m^2) for medial hernias. All meshes were 10 cm x 15 cm and were not tailored. For bilateral repair, the meshes were positioned with an overlap of a t least 3 cm in the midline.
Boldo, 2008[639]	TAPP with FG: mesh fixed with autologous fibrin sealant derived from the patients. Autologous fibrin was prepared by the Vivostat (Vivolution A/S) system.	TAPP with SG: The ProTrack device was used (USSC Auto Suture). Staples were applied, when possible, pushing gently the tip of the Protrack device against the gron tissues externally compressed by the surgeons (or assistant's) left hand.	NA	NA	A 6x6 in^2 polypropylene mesh was used, trimmed according to need. Mesh was introduced, unrolled in the preperitoneal space, and positioned to cover the entire space from the symphysis pubis in the midline to the anterior superior iliac spine laterally. If hernias were bilateral, two pieces of mesh were used and overlapped.
Canonico et al., 1999[650]	Lichtenstein with Marlex Mesh (CR Bard) with Human Fibrin Glue (HFG): (Tissucol, Immuno AG, Vienna Austria). The glue is aprotinin (3000 kallidinogenase inactivator units/mL) and lyophilized thrombin (500 units/mL) mixed during the operation to form fibrin and sprayed by a spraying device, allowing an even covering of all layers of the wound.	Lichtenstein with Marlex Mesh (CR Bard) without HFG	NA	NA	Surgery was performed by 1 surgeon with advanced personal experience in hernia repair, and electrocautery was always used to minimize postoperative bleeding.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Douglas et al., 2002[676]	Lichtenstein with Sutures: 2-0 polypropylene suture	Lichtenstein with tacks: Tacker (Origin Stat tack) used to secure mesh, disposable instrument with a 5 mm tip containing 15 titanium tacks that resemble small coils. Mesh was initially secured to the pubic tubercle using either one polypropylene simple suture or tack. However, it was soon noted that strong and easy approximation of the mesh to the pubic tubercle was possible using the tacker, and the remaining patients therefore underwent placement of mesh using only the tacker, except for the suture used to approximate the tails. Care was taken to avoid penetration of the pubic tubercle. tacks were then placed along the inferior edge of the mesh to the level of the internal ring laterally making certain not to penetrate the femoral vessels. Fewer numbers of tacks were also placed in the mesh and transversalis fascia superiorly.	NA	NA	All operations were performed under local anesthesia (mixture of 0.5% bupivacaine and 1% lidocaine) by one surgeon (senior assistant).

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Ferzli et al., 1999[687]	Laparoscopic with stapled mesh: performedat the level of the symphysis pubis, the Cooper's ligament medially, and the transverse abdomins laterally. Four staples were placed with the Endoscopic Hernia Stapler (Ethicon).	Laparoscopic technique with unstapled mesh: mesh left free to accommodate the defect.	NA	NA	Applied implant was in all cases a propylene mesh (Prolene, Ethicon)
Helbling and Schlumpf, 2003[710,711]	Lichtenstein with Vypro II and Sutures: mesh 14 x 8 cm. Prothesis was fixed to the aponeurotic tissue above the pubic tubercle (avoiding the periost) and along the inguinal ligament with a running suture and to the internal oblique with interrupted sutures. Laterally to the inner ring, the overlaying cranial part of the mesh was fixed to the lower part of the mesh and to the inguinal ligament with interrupted sutures (all sutures made with PDS 2/0)	Lichtensten with Vypro II: mesh 14 x 8 cm. Positioning of the prosthesis was equal, but it was glued on to the pubic tubercle, the inguinal ligament and the internal oblique with small dots of n-butyl-cyanoacrylate (Histoacryl B. Braun Melsungen, Germany).	NA	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Koch et al., 2006[723]	TEP with mesh fixation: polypropylene mesh (Prolene, Ethicon) trimmed to appropriate size to cover entire myopectineal orfice including defect. Mesh coapted to Cooper's ligament and anterior abdominal wall using 5 to 8 spiral tacks in patients enrolled	TEP without fixation: pre-formed 15 x 10 cm mesh (3D-MAX, Davol Inc) used without tack fixation	NA	NA	No baseline data reported in this article

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Lau, 2005[738]	TEP with Prolene (Ethicon) mesh and fibrin sealant: two Prolene meshes, each measuring abou 10x15 cm^2. Patients had fixation of the mesh with TISSEEL VH 2 mL (Baxter Healthcare). The 2 components of FS, sealer protein solution 2 mL and thrombin solution 2 mL, were reconstituted using the fibrinotherm heating and stirring device (Baxter Healthcare) at the commencement of surgery. The 2 solutions were drawn into 2 separate syringes, which were then fitted into the laparoscopic applicator, Duplocath 35 M.I.C. (Baxter). Once 2 meshes were deployed to desired position, FS 1 mL was applied over each Cooper's ligament. The rest of FS (2 mL) was applied to the inferior edge and upper medial corner of the meshes. To ensure the setting FS adhere firmly to the underlying structures, the mesh was steadied in position by graspers for a few minutes until the FS appeared opalescent on the television monitor.	TEP with Prolene (Ethicon) and staples: 2 Prolene meshes 10 x 15 cm^2. Endoscopic stapler (EMS Hernia Stapler, Ethicon), used to anchor each mesh over the Cooper's ligament, along its medial edge and upper lateral corner. No staples were placed below the iliopubic tract lateral to the Cooper's ligament.	NA	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Leibl et al., 2002[740]	TAPP incised: mesh was implanted with a central incision, creating a deep inguinal ring by overlapping the two incised sides. Six staples applied, two alond Cooper's ligament, one ventral of the symphisis, and two along the ventral-lateral edge of the mesh	TAPP non-incised mesh and clip fixation: non-incised mesh fixed with staples. Six staples applied, two alond Cooper's ligament, one ventral of the symphisis, and two along the ventral-lateral edge of the mesh	TAPP sutured mesh: non-incised mesh fixed with non-resorbable sutures (Prolene, Ethicon) fixed medially as well as laterally	NA	Patients found to have bilateral hernias at operation underwent repair of opposite side simultaneously. Two pieces of mesh, one on each side overlapping the midline. Dissection of opposite side to search for incipient hernias was not done routinely in all cases.
Lovisetto et al., 2007[749]	TAPP with staples: Endopath Multifeed Stapler 10 mm shaft (EMS, Ethicon Endosurgery) with titanium staples was used. The mesh was cut with a slit for the cord structures. The technique involved positioning 3 metal clips at the level of Cooper's ligament and the pubic tubercle. Some fixations were carried out laterally at the level of the deep inguinal ring. The inferior branch of the mesh was passed beneath the spermatic cord to reconstruct the internal inguinal ring and was successively anchored to the superior branch with metal clips.	TAPP with fibrin glue: Tissucol fixation (Baxter Healthcare), the tails of the mesh were wrapped around the spermatic cord and the mesh was anchored with 1 mL of fibrin glue applied both anterior and posterior to the mesh using a dedicated laparoscopic tool (Dulplotip, Baxter Healthcare) inserted in a 5 or 10 mm trocar. slight pressure was applied to the entire perimeter of the mesh using Dulplotip. The Tissucol was applied to the entire perimeter of the mesh and in particular at the level of the superior margin, the "triangle of disaster" and in proximity of the prevesical fat to assure good adhesion. The peritoneal flaps were then closed using small, continuous, resorbable 2/0 sutures.	NA	NA	Polpropylene prostheses (14 x 13 cm) mesh. All patients received one 100 mg dose of Ketoprofene to manage postoperative pain. Local infiltration at the incision sites was not used, and the abdomen was not irrigated with any form of analgesic solution after closure of peritoneum over the mesh.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Mills et al., 1997[751]	Lichtenstein with Polypropylene mesh and Polypropylene sutures: mesh 11 x 6 cm cut to shape; mesh fixed in position by a continuous suture of 2/0 polypropylene along the inguinal ligament inferiorly from the pubic tubercle to the lateral edge of the mesh. Interrupted polypropylene sutures were then placed medially and supperiorly into the internal oblique and transversalis muscles. Skin closure was completed using a continous suture of subcuticular 3/0 polydioxanone which was subsequently left in place.	Lichtenstein with Polypropylene mesh and staples: mesh 11 x 6 cm cut to shape; Mesh positioned with a Proximate RH rotating Head Skin Stapler (Ethicon), containing 35 preloaded stainless steel staples, was used to secure it. A staple was placed into the pubic tubercle with between seven and nine staples along wth inguinal ligament placed 1-2 cm apart. A further eight to ten staples were placed in the internal oblique and transversalis muscles medially and superiorly and the overlapping free edges of the mesh were stapled together with two staples lateral to the cord. Skin closure was completed using staples from the same staple gun and these were removed 7 days after operation.	NA	NA	In both groups the external onlique aponeurosis was closed with a continuous suture of 2/0 Vicryl (Ethicon) and the subcutaneous tusses were then approximated with the same suture. All operations were performed under general anesthesia by a consultant surgeon (D.A.R.)
Moreno-Egea et al., 2004[752]	TEP with Parietex mesh (Sofradim, Villefranche sur Saone, France): Mesh was a self-expandable, 3D, anatomical mesh. Mesh fixated with stapling to the Cooper's ligament	TEP with Parietex mesh and no fixation: Mesh was self-expanadable, 3D, anatomical mesh.	NA	NA	All operations were performed by 2 surgeons with previous experience (more than 3 years and 60 cases)

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Nowobilski et al., 2004[774]	Lichtenstein with butyl-2-cyanoacrylate: adhesive (Indermil, Loctite) applied over the surface of the mesh (polypropylene). Adhesive permeated through the perforations in the mesh thus fixing it to the underlying tissues. Approximately 10 seconds was allowed for adhesive to set. The spermatic cord and genitofemoral nerve was lifted in order to avoid anyy direct contact until the glue was dried. Tails of the mesh were also overlapped with glue. The external aponeurosis and skin was approximated by linear traction between forceps and the adhesive applied to the edges and allowed to set. To complete the entire procedure, about 0.5 grams of adhesive was required.	Lichetenstein with sutures: polypropylene mesh was fixed in position by a running suture (3/0 dexon, Tyco) along the inguinal ligament inferiorly from the pubic tubercle to lateral edge of the mesh. Interrupted sutures were placed medially and superiorly into the internal oblique and transverse muscles. Tails of mesh allowed the spermatic cord to pass between them, and they were overlapped with a suture. The external oblique aponeurosis, similar as the subcutaneous tissue, was closed with a continuous suture. Skin closure was completed using a continuous subcuticular suture (3/0 Monosof, Tyco).	NA	NA	All repairs involved polypropylene mesh. All participating surgeons (four) were trained at the same surgery unit under the supervision of the leading skilled surgeon (#1) who also trained the surgeons in TAPP hernia repair with Tissucol. The first experience of tension-free TAPP was performed in January 2003 and each member of the surgical team had carried out more than 50 TAPP procedures with Tissucol before beginning the trial. In patients with bilateral hernias the same procedures were performed sequentially to repair the hernia on the other side (generally smaller).

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Olmi et al., 2007[778]	TAPP with Protrak (Tyco): an Endopath Multifeed stapler 10 mm shaft, used two L-shaped 14 x 13 cm meshes, positioned 2 tacks medially and 3 laterally to epigastric vessels and 2 tacks on the Cooper ligament. No tacks were positioned on the "triangle of disaster" and "triangle of pain."	TAPP with EndoANCHOR (Ethicon): an Endopath Multifeed stapler 10 mm shaft, used two L-shaped 14x13cm meshes, positioned 2 tacks medially and 3 laterally to epigastric vessels and 2 tacks on the Cooper ligament. No tacks were positioned on the "triangle of disaster" and "triangle of pain."	TAPP with EMS (Ethicon)	TAPP with Tissucol/Tisseal (Baxter healthcare): Used 1 mL of Tissucol for unilateral hernias and 2 mL for bilateral hernias. The prosthesis was fixed along its upper margin, from Cooper ligament to the "triangle of disaster" and to the "triangle of pain," using a 3 mm catheter (Duplotip, Baxter Healthcare).	The surgoen, anesthesiologist, and the intraoperative and postoperative analgesic regimen were the same for all patients.
Paajanen, 2002[780]	Lichtenstein with Premilene (B. Braun Germany) mesh and resorbable : mesh 9 x 13 cm polypropylene; Continuous absorbable 2-0 braided polyglycolic acid (Dexon II, Tyco Healthcare)	Lichtenstein with Premilene (B. Braun Germany) mesh and nonresorbable: mesh 9x13 cm polypropylene; nonresorbable continuous sutures of 2-0 polypropylene (Prolene, Ethicon)	NA	NA	All patients were operated by the same senior consultant surgeon with good experience in inguinal hernia procedures
Parshad et al., 2005[785]	TEP with staples: polypropylene mes 15 x 11 cm to 15 x 13 cm based on patient's habitus	TEP without staples: polypropylene mesh 15 x 11 cm to 15 x 13 cm based on patients body habitus	NA	NA	X
Sevonius et al., 2009[535,805-813]	Any operation, nonabsorbable sutures	Any operation, long-term absorbable sutures	Any operation, short-term absorbable sutures	NA	X

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Smith et al., 1999[816]	TAPP, mesh unstapled: repaired using one umbilical 10 mm port and two lateral 5 mm ports, with dissection of the preperitoneal space to allow insertion of 15 x 10 cm polypropylene mesh with not fixation. The peritoneum then was closed with a continuous 2-0 Vicryl suture. Finally the 10 mm port was closed with 0-PDS to the linea alba.	TAPP, mesh stapled: similar preperitoneal dissection, with the exception that the contralateral por to the hernia was 12 mm to allow access of the staplin device (EMS Ethicon). The mesh was fixed t o muscle and Cooper's ligament. Then the peritoneum was closed with staples, and a port-site closure device was used for the 12 mm lateral port.	NA	NA	The primary surgeons were first and second year general surgery residents and all procedures were performed under general anesthesia. Both groups underwent herniorrhaphy with placement of mesh. The mesh was secured to the pubic tubercle and Poupart's ligament inferiorly and to the transversalis fascia superiorly. Tails of the mesh allowed the spermatic cord to pass between them and in both groups they were overlapped and secured to one another lateral to the spermatic cord using polypropylene suture.
Taylor et al., 2008[823]	TEP with Polypropylene mesh and spiral tacks: mesh 10 x 15 cm; fixation was performed with titanium spiral tacks were used (Autosuture Protack)	TEP with Polypropylene mesh and nonfixation: mesh 10 x 15 cm	NA	NA	All participating surgeons had performed at least 300 TEP repairs prior to commencement. All hernias repaired in the study were performed in a standardized way agreed upon by all surgeons and institutions prior to commencement.

Study	Treatment A	Treatment B	Treatment C	Treatment D	Comments
Testini et al., 2010[824]	Plug and Mesh and sutures: preshaped monofilament knitted polypropylene mesh and plug (mesh PerFix plug, Bard); uninterrputed single layer of 3/0 polypropylene sutures and the mesh was positioned on this layer	Plug and Mesh and human fibrin glue: preshaped monofilament knitted polypropylene mesh and plug (mesh PerFix plug, Bard); 2 mL fibrin glue applied all over mesh	Plug and Mesh and N-butyl-2-cyanoacrylate: preshaped monofilament knitted polypropylene mesh and plug (mesh PerFix plug, Bard); 1 mL N-butyl-2-cyanoacrylate applied all over mesh	NA	Surgeon has experience in inguinal hernia surgey

Table 64. Key Question 6: Baseline characteristics

Study	Characteristic	Group A	Group B	Group C	Comments
Kim-Fuchs et al., 2011[710,711]	Median age (range)	56.8 (25-83)	55.1 (28-85)		
	% Lateral hernia >3 cm	33.8% (45/133)	31.1% (41/131)		
	% Medial hernia 1.5-3 cm	9.1% (12/133)	5.2% (7/131)		
	% Medial hernia >3 cm	24.1% (32/133)	29.7% (39/131)		
	% Medial/lateral hernia 1.5-3 cm	6.7% (9/133)	3% (4/131)		
	% Medial/lateral >3 cm	26.3% (35/133)	31% (40/131)		
	% local anesthesia	84.2% (113/133)	80.9% (106/131)		
	% spinal/epidural anesthesia	6% (8/133)	3.8% (5/131)		
	% general anesthesia	9.1% (12/133)	15.3% (20/131)		
	% residents performing procedures	82% (109/133)	83.2% (109/131)		
	% staff surgeons performing procedures	3.8% (5/133)	2.3% (3/131)		
	% chief physician performing procedures	14.2% (19/133)	14.5% (19/131)		
Garg et al., 2011[698]	# of hernias	98	96		
	% Male	98% (51/52)	94.2% (49/52)		
	% Female	2% (1/52)	5.8% (3/52)		
	Mean age (SD)	47.2 (12.9)	51.9 (16.8)	P=0.12 (ns)	
	% Unilateral hernia repair	11.5% (6/52)	15.4% (8/52)	P=0.77	
	% Drain	11.5% (6/52)	15.4% (8/52)	P=0.77	
	Operating tine (min)	37.7 (SD 4.3)	35.9 (SD 3.6)	P=0.022, author's report a significant difference.	
Paajanen et al., 2011[782]	Mean Age (SD)	53 (15)	53 (15)	P=0.679 Mann-Whitney	
	% Male	89% (135/151)	87% (131/151)		
	% Female	10.6% (16/151)	13.2% (20/151)		
	BMI (kg/m^2)	25 (SD 3)	25 (SD3)	P=0.547 Mann Whitney	

Study	Characteristic	Group A	Group B	Group C	Comments
Paajanen et al., 2011[782] (continued)	Left side hernia	52.3% (79/151)	39.1% (59/151)		
	Right side hernia	47.7% (72/151)	60.9% (92/151)		
	Direct	36.4% (55/151)	27.2% (41/151)		
	Indirect	59.6% (90/151)	68.9% (104/151)		
	Combined	4% (6/151)	4% (6/151)		
	<1.5 cm	33.1% (50/151)	36.4% (55/151)		
	1.5 – 3 cm	60.3% (91/151)	54.3% (82/151)		
	>3cm	5.6% (10/151)	9.3% (14/151)		
	Preop use of analgesia	23.2% (35/151)	25.8% (39/151)		
	Preop op VAS score	4 (SD 2.5)	4 (SD 2.4)	P=0.118 Mann Whitney	
	Duration of symptoms (months)	28 (SD 58)	18 (SD 28)		
	Duration of operation (min)	36 (SD 13)	34 (SD: 12)		
	Overnight admission	1.3% (2/151)	6% (9/151)		
Wong et al., 2011[835]	Mean age (SD)	55.19 (SD 17.76)	55.90 (SD:15.44)		
	% Male	84.6% (22/26)	90% (27/30)		
	% Female	15.4% (4/26)	10% (3/30)		
	Gilbert 2 or 3	76.9% (20/26)	73.3% (22/30)		
	Gilbert 4-6	23.1% (6/26)	26.7% (8/30)		
	Right side	38.5% (10/26)	56.7% (17/30)		
	Left side	61.5% (16/26)	43.3% (13/30)		
	PHS mesh	42.3% (11/26)	60% (18/30)		
	Modified Kugel patch	57.7% (15/26)	40% (12/30)		
Fortelny et al., 2011[695]	Mean age (SD)	45.5 (11.3)	45.0 (14.0)		
	% Bilateral	25% (11/44)	22.2% (10/45)		
	% Unilateral	75% (33/44)	78% (35/45)		
	BMI (SD)	26 (7.2)	25.6 (3.4)		
	ASA scores (SD)	1.25 (0.5)	1.3 (0.5)		

Study	Characteristic	Group A	Group B	Group C	Comments
Fortelny et al., 2011[695] (continued)	Mean operation time (min)	70 (SD 19)	69 (SD 23)		
	Mean duration of hospitalization (days)	4.5 (SD 0.8)	4.2 (SD 0.9)		
Boldo, 2008[639]	% Nyhus type 1	0% (0/22)	14% (3/22)		
	% Nyhus type 2	36% (8/22)	18% (4/22)		
	% Nyhus type 3	5% (1/22)	5% (1/22)		
	% Nyhus type 4	9% (2/22)	5% (1/22)		
	% Nyhus type 5	45% (10/22)	59% (13/22)		
	% Nyhus type 6	5% (1/22)	0% (0/22)		
	Time of evolution (median months)	5 (NR) (N=22)	7.5 (NR) (N=22)		
	% smoking	36% (8/22)	36% (8/22)		
	% work Heavy physical	68% (15/22)	68% (15/22)		
	Age	57.7 (SD: 12.8; Range: 35-77) (N=22)	57.7 (SD: 12.8; Range: 35-77) (N=22)		
	BMI (kg/m^2)	25.4 (SD: 2.6; Range: 18.8-29.7) (N=22)	25.4 (SD: 2.6; Range: 18.8-29.7) (N=22)		
	% Chronic pulmonary disease	5% (1/22)	5% (1/22)		
Canonico et al., 1999[650]	% combined direct/indirect	Entire study 4% (2/50)			
	% direct	Entire study 12% (6/50)			

Study	Characteristic	Group A	Group B	Group C	Comments
Canonico et al., 1999[650] (continued)	% indirect	Entire study 84% (42/50)			
	% recurrent	Entire study 0% (0/50)			
	Age	Entire study 47 (Range: 32 to 90) (N=50)			
	% Anticoagulant therapy for ischemic heart disease or cardiac rhythm disturbances	Entire study 20% (10/50)			
	% Cirrhosis	Entire study 28% (14/50)			
	% Fatty Liver disease	Entire study 52% (26/50)			
Douglas et al., 2002[676]	% bilateral	0% (N was NR)	0% (N was NR)		
	% male	100% (N was NR)	100% (N was NR)		
	Age	39 (NR) (N=NR)	37 (NR) (N=NR)		
Ferzli et al., 1999[687]	% bilateral	16% (7/43)	2% (1/49)		
	% direct	47% (20/43)	33% (16/49)		
	% indirect	53% (23/43)	67% (33/49)		
	% Indirect and femoral	0% (0/43)	2% (1/49)		
	% left-sided	56% (24/43)	61% (30/49)		
	% recurrent	0% (0/43)	0% (0/49)		
	% right-side	60% (26/43)	41% (20/49)		

Study	Characteristic	Group A	Group B	Group C	Comments
Ferzli et al., 1999[687] (continued)	Age	55 (NR) (N=43)	53 (NR) (N=49)		
Helbling et al., 2003[710,711]	% Lateral >3 cm	33% (8/24)	32% (7/22)		
	% left-sided	Entire study 35% (16/46)			
	% Medial >3 cm	29% (7/24)	23% (5/22)		
	% Medial 1.5-3 cm	4% (1/24)	14% (3/22)		
	% Medial and lateral >3cm	29% (7/24)	32% (7/22)		
	% Medial and lateral 1.5-3 cm	4% (1/24)	0% (0/22)		
	% right-side	Entire study 65% (30/46)			
	% male	96% (23/24)	95% (21/22)		
	% Obesity	8% (2/24)	18% (4/22)		
	% Chronic obstructive pulmonary disease	4% (1/24)	9% (2/22)		
	% Constipation	8% (2/24)	9% (2/22)		
	% diabetes	8% (2/24)	14% (3/22)		
	% Hyperplasia of prostate	13% (3/24)	9% (2/22)		
	VAS rising from horizontal to vertical position	Median: 4 (2-19) (N=295)	Median: 4 (2-19) (N=296)		
	% recurrent	0% (0/24)	0% (0/22)		
Koch et al., 2006[723]	% bilateral	30% (6/20)	35% (7/20)		

Study	Characteristic	Group A	Group B	Group C	Comments
Koch et al., 2006[723] (continued)	% direct	65% (13/20)	60% (12/20)		
	% femoral	0% (0/20)	5% (1/20)		
	% indirect	50% (10/20)	60% (12/20)		
	% pantaloon	15% (3/20)	10% (2/20)		
	% primary	130% (26/20)	120% (24/20)		
	% recurrent	0% (0/20)	15% (3/20)		
	% unilateral	70% (14/20)	65% (13/20)		
	Age	56.3 (SD: 11.5) (N=20)	54.6 (SD: 16.1) (N=20)		
	BMI (kg/m^2)	27 (SD: 3.6) (N=20)	27.2 (SD: 3.1) (N=20)		
	pain	0.9 (SD: 1.7) (N=20)	0.5 (SD: 1) (N=20)		
Lau, 2005[738]	% Nyhus type 2	23% (21/92)	17% (16/94)		N is hernias. There were 93 patients with 186 inguinal hernias
	% Nyhus type 3a	57% (52/92)	57% (54/94)		N is hernias.
	% Nyhus type 3b	15% (14/92)	14% (13/94)		N is hernias.
	% Nyhus type 3c	0% (0/92)	1% (1/94)		N is hernias.
	% Nyhus type 4a	4% (4/92)	9% (8/94)		N is hernias.
	% Nyhus type 4b	1% (1/92)	1% (1/94)		N is hernias.

Study	Characteristic	Group A	Group B	Group C	Comments
Lau, 2005[738] (continued)	% recurrent	5% (5/92)	10% (9/94)		N is hernias.
	% male	98% (45/46)	100% (47/47)		
	Age	64 (Range: 55.8-71.3) (N=46)	66 (Range: 55-76) (N=47)		
	Body weight (kg)	60 (Range: 53.5-66.7) (N=46)	62 (Range: 58-69.7) (N=47)		
Leibl et al., 2002[740]	% bilateral	0% (0/124)	0% (0/116)	0% (0/120)	
	% Nyhus type 2	19% (23/124)	17% (20/116)	13% (16/120)	
	% Nyhus type 3a	34% (42/124)	20% (23/116)	31% (37/120)	
	% Nyhus type 3b	48% (59/124)	63% (73/116)	56% (67/120)	
	% recurrent	0% (0/124)	0% (0/116)	0% (0/120)	
	Age	Median: 58 (Range: 21-85) (N=124)	Median: 56 (Range: 21-88) (N=116)	55.5 (Range: 19-76) (N=120)	
	BMI (kg/m^2)	Median: 24.6 (NR) (N=124)	Median: 24.8 (NR) (N=116)	Median: 24.7 (NR) (N=120)	
	% Previous intraabdominal surgery	29% (36/124)	39% (45/116)	34% (41/120)	
	% Surgeon I procedures	38% (47/124)	38% (44/116)	43% (51/120)	
	% Surgeon II procedures	31% (39/124)	30% (35/116)	28% (34/120)	
	% Surgeon III procedures	31% (38/124)	32% (37/116)	29% (35/120)	
Lovisetto et al., 2007[749]	% direct	14% (14/98)	17% (17/99)		

Study	Characteristic	Group A	Group B	Group C	Comments
Lovisetto et al., 2007[749] (continued)	% femoral	3% (3/98)	6% (6/99)		
	% indirect	83% (81/98)	77% (76/99)		
	% alcoholism	3% (3/98)	2% (2/99)		
	% male	91% (89/98)	88% (87/99)		
	% Obesity	4% (4/98)	6% (6/99)		
	% smoking	16% (16/98)	17% (17/99)		
	Age	53.2 (SD: 12.6) (N=98)	52.9 (SD: 14.6) (N=99)		
	% ASA score 2	55% (54/98)	49% (49/99)		
	% ASA score 3	10% (10/98)	5% (5/99)		
	% ASA score 7	35% (34/98)	45% (45/99)		
	% Chronic cough	5% (5/98)	7% (7/99)		
	% chronic obstructive pulmonary disease	6% (6/98)	9% (9/99)		
	% Congestive heart failure	4% (4/98)	4% (4/99)		
	% diabetes	8% (8/98)	10% (10/99)		
	% Hypertension	15% (15/98)	19% (19/99)		
	% Liver disorder	7% (7/98)	6% (6/99)		
	% Prior myocardial infarction	7% (7/98)	5% (5/99)		

Study	Characteristic	Group A	Group B	Group C	Comments
Lovisetto et al., 2007[749] (continued)	% Prostatism	4% (4/98)	7% (7/99)		
Mills et al., 1997[751]	% bilateral	0% (0/25)	0% (0/25)		
	% direct	32% (8/25)	28% (7/25)		
	% indirect	68% (17/25)	72% (18/25)		
	% left-sided	36% (9/25)	48% (12/25)		
	% right-side	64% (16/25)	52% (13/25)		
	Age	Median: 61 (Range: 18-75) (N=25)	Median: 57.5 (Range: 21-82) (N=25)		
	% recurrent	0% (0/25)	0% (0/25)		
Moreno-Egea et al., 2004[752]	% bilateral	39% (33/85)	31% (26/85)		
	% Direct bilateral hernia	13% (11/85)	14% (12/85)		
	% Direct unilateral	14% (12/85)	24% (20/85)		
	% Indirect bilateral	26% (22/85)	16% (14/85)		
	% Indirect unilateral	47% (40/85)	46% (39/85)		
	% left-sided	26% (22/85)	25% (21/85)		
	% other hernia	13% (11/85)	19% (16/85)		
	% recurrent	19% (16/85)	25% (21/85)		
	% right-side	36% (31/85)	44% (37/85)		

Study	Characteristic	Group A	Group B	Group C	Comments
Moreno-Egea et al., 2004[752] (continued)	% male	92% (78/85)	93% (79/85)		
	Age	53.8 (SD: 15.6) (N=85)	56.9 (SD: 16.3) (N=85)		
	% Previous surgery	33% (28/85)	40% (34/85)		
Nowobilski et al., 2004[774]	% bilateral	0% (0/22)	0% (0/24)		
	% direct	41% (9/22)	33% (8/24)		
	% indirect	59% (13/22)	67% (16/24)		
	% left-sided	45% (10/22)	42% (10/24)		
	% right-side	55% (12/22)	58% (14/24)		
	Age	Median: 60.5 (Range: 30-76) (N=22)	Median: 52.6 (Range: 20-78) (N=24)		
Olmi et al., 2007[778]	% bilateral	26% (39/150)	32% (48/150)	29% (44/150)	
	% recurrent	14% (21/150)	11% (16/150)	14% (21/150)	
	% unilateral	74% (111/150)	68% (102/150)	71% (106/150)	
	% male	98% (147/150)	99% (148/150)	99% (148/150)	
	Age	47 (Range: 21-70) (N=150)	45 (Range: 20-75) (N=150)	42 (Range: 23-72) (N=150)	
Paajanen, 2002[780]	% direct	30% (24/81)	62% (50/81)		
	% indirect	68% (55/81)	38% (31/81)		

Study	Characteristic	Group A	Group B	Group C	Comments
Paajanen, 2002[780] (continued)	% left-sided	48% (39/81)	52% (42/81)		
	% primary	93% (75/81)	89% (72/81)		
	% recurrent	7% (6/81)	11% (9/81)		
	% right-side	49% (40/81)	36% (29/81)		
	% male	94% (76/81)	99% (80/81)		
	Age	50 (SD: 13; Range: 17-71) (N=81)	52 (SD: 14; Range: 24-83) (N=81)		
Parshad et al., 2005[785]	% recurrent	0% (0/25)	0% (0/25)		
	Symptom Duration (months)	15.71 (SD: 25.53) (N=25)	14.96 (SD: 17.53) (N=25)		
	Age	46.4 (SD: 15.19) (N=25)	47.16 (SD: 16.40) (N=25)		
	Duration of analgesics (wks)	1.16 (SD: 0.37) (N=25)	1.08 (SD: 0.28) (N=25)		
	Return to activity (days)	2.68 (SD: 1.63) (N=25)	2.12 (SD: 1.51) (N=25)		
Sevonius et al., 2009[535,805-813]	No baseline data reported for the 82,015 patients who met the inclusion criteria for the publication reporting data on Key Question 6				
Smith et al., 1999[816]	% bilateral	4% (10/253)	10% (24/249)		
	% male	98% (247/253)	96% (239/249)		

Study	Characteristic	Group A	Group B	Group C	Comments
Smith et al., 1999[816] (continued)	Age	Median: 53 (Range: 14-85) (N=253)	Median: 54 (Range: 15-86) (N=249)		
	Weight (kg)	Median: 78 (Range: 60-110) (N=253)	Median: 76 (Range: 59-120) (N=249)		
Taylor et al., 2008[823]	% 1-2 cm	50% (N was NR)	49% (N was NR)		Hernias were randomized not patients. 500 hernias in 360 patients. Study did not report the number of hernias in each group, just percentages.
	% bilateral	33% (N was NR)	33% (N was NR)		
	% Direct (Nyhus IIIa)	24% (N was NR)	25% (N was NR)		
	% femoral	4% (N was NR)	4% (N was NR)		
	% hernia <1cm	27% (N was NR)	26% (N was NR)		
	% hernia >2 cm	23% (N was NR)	25% (N was NR)		
	% Incarcerated	6% (N was NR)	6% (N was NR)		
	% indirect	53% (N was NR)	52% (N was NR)		
	% Nyhus type 3b	9% (N was NR)	9% (N was NR)		
	% recurrent	10% (N was NR)	10% (N was NR)		
	% Private Insurance	48% (N was NR)	48% (N was NR)		
	Age	59.3 (NR) (N=NR)	59.6 (NR) (N=NR)		

Study	Characteristic	Group A	Group B	Group C	Comments
Testini et al., 2010[824]	% bilateral	11% (6/53)	6% (3/49)	4% (2/54)	Twelve patients lost during follow-up, 1 died in a motor vehicle collision; therefore 156 patients with 167 hernias.
	% Combined	8% (4/53)	6% (3/49)	4% (2/54)	
	% direct	58% (31/53)	43% (21/49)	44% (24/54)	
	% hernia >3 cm	36% (19/53)	43% (21/49)	31% (17/54)	
	% indirect	34% (18/53)	51% (25/49)	52% (28/54)	
	% left-sided	49% (26/53)	43% (21/49)	52% (28/54)	
	% recurrent	0% (0/53)	0% (0/49)	0% (0/54)	
	% right-side	40% (21/53)	51% (25/49)	44% (24/54)	
	% male	94% (50/53)	94% (46/49)	89% (48/54)	
	Age	Entire study 58 (NR) (N=102)			

Table 65. Key Question 6: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Kim-Fuchs et al., 2011[710,711]	Hematoma	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Major complications	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Reoperations	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Median Hospital stay days (range)	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Hypesthesia	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Pain	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Recurrence	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Hypesthesia	12 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Pain	12 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Recurrence	12 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Hypesthesia	5 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Pain	5 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	Y	Y	Mod.
	Recurrence	5 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Overall Recurrence	5 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Patient satisfaction	NR	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	Y	Y	Mod.
Garg et al., 2011[698]	Urinary retention	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Seroma	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hospital stay (days)	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Days to normal activities	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Recurrence	Minimum follow-up of 25 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	N	Y	Mod.
	Pain score 24 hours	Post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain score 1 week	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain score 1 month	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain socre 1 year	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain score 2 year	Post-op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Paajanen et al., 2011[782]	Normal wound	24 hours	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hematoma	24 hours	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Need for analgesia	24 hours	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS score	24 hours	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Normal wound	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hematoma	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Daily need for analgesia	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sometimes need analgesia	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	No need for analgesia	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain free walking	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Normal car driving	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Normal wound	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hematoma/swelling	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Infection	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Daily need for analgesia	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sometimes need analgesia	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	No need for analgesia	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain free walking	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain free daily working	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	1 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Recurrence	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	VAS ≥2	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Paajanen et al., 2011[782] (continued)	Scrotal or testicular pain	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Feeling of foreign body	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Not satisfied	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Daily need for analgesia	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Sometimes need analgesia	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	No need for analgesia	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain free walking	1 year	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
Wong et al., 2011[835]	Acute urinary retention	Post-op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Seroma/hematoma	Post-op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Wound infection	Post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Recurrence	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Non-specific pain	Post-op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS mean (SD)	1 month	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS mean (SD)	3 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	VAS mean (SD)	6 months	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Mod.
Fortelny et al., 2011[695]	Recurrence	8 to 9 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	VAS (mean; range)	Preop	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS (mean; range)	Recovery room	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS (mean; range)	Day 0	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS (mean; range)	Day 10	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS (mean; range)	3 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	VAS (mean; range)	1 year	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
Boldo et al., 2008[639]	Hernia relapse	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hernia relapse	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	VAS score	week 1	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Boldo et al., 2008[639] (continued)	VAS score	1 month	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS score	6 months	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Seroma	week 1	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Seroma	1 month	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Canonico et al., 1999[650]	Ecchymosis	discharge after 24 hours	Y	?	Y	Y	Y	Y	?	Y	Y	?	Y	Y	Y	Y	Y	Mod.
	Hematoma	discharge after 24 hours	Y	?	Y	Y	Y	Y	?	Y	Y	?	Y	Y	Y	Y	Y	Mod.
	Hemmorrgagic complications	post op	Y	?	Y	Y	Y	Y	?	Y	Y	?	Y	Y	Y	Y	Y	Mod.
	Intraoperative complications	NA	Y	?	Y	Y	Y	Y	?	Y	Y	?	Y	Y	?	Y	Y	Mod.
	Scar immobility or fibrosis	6 months	Y	?	Y	Y	Y	Y	?	Y	Y	?	Y	Y	Y	Y	Y	Mod.
	Technical complications, recurrences, overall complications	during follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	?	?	Mod.
Ferzli et al., 1999[687]	Recurrence	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	time until return to work and regular activities	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	y	Y	Y	Mod.
	Peritoneal tears	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Seroma	post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Helbling et al., 2003[710,711]	Hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Normal activity	3 weeks	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Normal activity	3 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain pubic tubecle	3 weeks	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain pubic tubecle	3 months	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain scar	3 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain scar	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Helbling et al., 2003[710,711] (continued)	Hematoma	early morbidity	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Intraoperative complications	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Scrotal hypaesthesia	3 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Scrotal hypaesthesia	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Superficial infection	3 weeks	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Superficial infection	3 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Koch et al., 2006[723]	Recurrence	Long term follow-up: Median: 9 months, Range: 6 to 30 months	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	?	Mod.
	Admitted to hospital	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Length of hospital stay (hours)	NA	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to normal activity with lifting restrictions	4 weeks post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Likert (0-10) pain level	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Mild pain	last follow-up	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	1st hour on floor	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	Enter post anesthesia care unit (PACU)	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	Leav PACU	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	4 weeks post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	1 week post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain	prior to discharge	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Postop narcotic use	1st hour on floor	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Postop narcotic use	PACU	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Postop narcotic use	prior to discharge	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	urinary retention	post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Lau et al., 2005[738]	Recurrence	Median follow-up: 1.2 years (Range: 8 to 27 months)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	?	?	Mod.
	Inpatient median length of hospital stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Outpatient procedures	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	time to resume normal outdoor activities (days)	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	time to return to work (days)	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	?	?	Mod.
	Chronic pain	follow-up exceeding 1 year	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	?	?	Mod.
	VAS pain score at rest	Day 0	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score at rest	Day 1	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score at rest	Day 2	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score at rest	Day 3	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score at rest	Day 4	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score at rest	Day 5	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score at rest	Day 6	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score on coughing	Day 0	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score on coughing	Day 1	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score on coughing	Day 2	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score on coughing	Day 3	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Lau et al., 2005[738] (continued)	VAS pain score on coughing	Day 4	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score on coughing	Day 5	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score on coughing	Day 6	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Intraoperative complications	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Seroma	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	urinary retention	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Leibl et al., 2002[740]	Recurrence	NR	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Bleeding	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Nerve lesions	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Punctured seromas	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Testicular swelling or evidence of atrophy later on	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Total seromas	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Lovisetto et al., 2007[749]	Recurrence	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Postoperative hospital time (day)	NR	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Recovery time to normal physical activity (days)	NR	Y	?	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	Y	Low
	SF-36 #1	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #1	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #1	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #1	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #2	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #2	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #2	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #2	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Lovisetto et al., 2007[749] (continued)	SF-36 #3	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #3	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #3	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #3	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #4	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #4	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #4	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #4	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #5	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #5	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #5	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #5	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #6	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #6	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #6	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 #6	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 total	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 total	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 total	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	SF-36 total	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	nonspecific pain	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	nonspecific pain	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS score	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS score	3 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS score	6 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS score	12 months	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Hematoma or seroma	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Hematoma or seroma	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Infection	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Lovisetto et al., 2007[749] (continued)	Intraoperative complications	NR	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	neuralgia	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	neuralgia	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Orchitis	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Orchitis or testicular problems	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Other	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Other	late post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	urinary retention	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Urinary tract infection	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Wound infection	early post op complications	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Mills et al., 1998[751]	Recurrence	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	GP consultation (check-up)	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	GP consultation (complication)	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	GP consultation (pain)	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	GP consultation (removal clips)	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	GP consultation (work certificate)	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Hospital stay	7 days	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay	discharged on first post op day	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital stay	5 days post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Number of general practitioner consultations	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to driving	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Return to normal activity	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Mills et al., 1998[751] (continued)	Return to work	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain score	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Persistent groin pain	post op	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	Y	Y	Y	Y	Mod.
	Superficial wound infection	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	urinary retention	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound hematoma	post op	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Moreno-Egea et al., 2004[752]	Recurrence	during follow-up	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Hospital admission	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Chronic pain	NR	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	?	Y	Y	Mod.
	VAS pain score	24 hours	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	VAS pain score	1 month	Y	?	Y	Y	Y	Y	Y	Y	?	Y	?	N	Y	Y	Y	Mod.
	Ambulatory surgery	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Bleeding	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Failures	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	intraoperative bleeding	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Intraoperative transitory neuralgia	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Intraoperative wound infection	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Orchitis	NR	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Transitory neuralgia	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Wound infection	post op	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Nowobilski et al., 2004[774]	Hospital stay (days)	post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Pain score	First post op day	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain score	1 week post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Edema	7 days	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Seroma	7 days	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Olmi et al., 2007[778]	Recurrences	data collected up to 1 month post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Hospital stay (days)	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Resumption of work (days)	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Persistent pain	data collected up to 1 month post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	6 hours	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	12 hours	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	72 hours	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	24 hours	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	48 hours	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Vas pain	7 days	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	15 days	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain	1 month	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain score	24 to 72 hours post op	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain score	7 days	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	VAS pain score	1 month	Y	?	Y	Y	Y	Y	?	Y	?	Y	Y	N	Y	Y	Y	Mod.
	Hematoma	data collected up to 1 month post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	neuralgia	data collected up to 1 month post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Seroma	data collected up to 1 month post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	urinary retention	data collected up to 1 month post op	Y	?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Paajanen, 2002[780]	Recurrence	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Satisfied with operation	Mean follow-up: 2.1 years	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Mild radiating pain into testicles	Mean follow-up: 2.1 years	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Paajanen, 2002[780] (continued)	Pain causes limitations in work/leisure time activities	Mean follow-up: 2.1 years	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain within the last month	Mean follow-up: 2.1 years	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain-relieving drugs	Mean follow-up: 2.1 years	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Some wound healing problems (mild hemmorrhage/pain, etc.)	Mean follow-up: 2.1 years	Y	?	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Wound hematoma	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Wound infection	NR	Y	?	Y	Y	Y	Y	?	Y	Y	Y	?	Y	?	Y	Y	Mod.
	Recurrence	Mean follow-up: 25.76 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Post op stay (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Return to acitivit (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	duration of analgesics (wks)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Pain score	day 0	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain score	day 1	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Pain score	day 7	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Contralateral hernia development	2 years after initial operation	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Seroma	NR	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Subcutaneous emphysems	NR	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
Sevonius et al., 2009[535,805-813]	Hernia recurrence	between 0 and 7 years	N	N	Y	N	N	Y	?	?	Y	?	N	?	?	Y	Y	High
Smith et al., 1999[816]	Recurrences	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Return to work	NA	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	?	N	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Smith et al., 1999[816] (continued)	Bruising/seroma	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Lateral port hernia	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Mesh infection	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Umbilical hernia	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	urinary retention	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
	Wound infection	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Low
Taylor et al., 2008[823]	Recurrence	minimum 6 months	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
	Any new pain	minimum 6 months	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	?	Mod.
	Pain score ≥2	minimum 6 months	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	?	Mod.
	Pain score ≥3	minimum 6 months	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	?	Mod.
	Pain score ≥4	minimum 6 months	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	N	Y	Y	?	Mod.
	Morbidity	NR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	Mod.
Testini et al., 2010[824]	Recurrence	Long term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Length of postoperative hospital stay (hours)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	time to return to work (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Chronic pain	Long term	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Post operative pain	short term	Y	Y	Y	Y	Y	Y	?	Y	?	Y	?	N	Y	Y	Y	Mod.
	Hematoma	short term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Testini et al., 2010[824] (continued)	Intraoperative morbidity	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Local numbness	short term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.
	Sensation of extraneous body	Long term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	N	Y	Y	Y	Mod.
	Seroma, wound infection, urinary retention	short term	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	?	Y	Y	Y	Y	Mod.

Table 66. Key Question 6: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Kim-Fuchs et al., 2011[710,711]	Sutures vs. Glue	ADV	Hematoma	Post op	3.7% (5/133)	2.3% (3/131)	Author's report p - n.s.	
	Sutures vs. Glue	ADV	Major complications	Post op	0% (0/133)	0% (0/131)		
	Sutures vs. Glue	ADV	Reoperations	Post op	0% (0/133)	0% (0/131)		
	Sutures vs. Glue	ADV	Median Hospital stay days (range)	Post op	3.39 (1-9)	3.35 (2-13)	Student t test p=0.816	
	Sutures vs. Glue	ADV	Hypesthesia	3 months	23.7% (31/131)	20.9% (27/129)	Fisher's exact test p=0.597	
	Sutures vs. Glue	Pain	Pain	3 months	16% (21/131)	10.1% (13/129)	Fisher's exact test p=0.155	
	Sutures vs. Glue	RC	Recurrence	3 months	0/131	1/129	Author's report p=n.s.	
	Sutures vs. Glue	ADV	Hypesthesia	12 months	12.7% (15/118)	11.7% (13/111)	Fisher's exact test p=0.842	
	Sutures vs. Glue	Pain	Pain	12 months	10.2% (12/118)	5.4% (6/111)	Fisher's exact test p=0.440	
	Sutures vs. Glue	RC	Recurrence	12 months	0/118	0/111		
	Sutures vs. Glue	ADV	Hypesthesia	5 years	13.4% (11/85)	12.8% (9/70)	Fisher's exact test p=1.0	
	Sutures vs. Glue	Pain	Pain	5 years	12.2% (10/85)	4.2% (3/70)	Fisher's exact test p=0.108	
	Sutures vs. Glue	RC	Recurrence	5 years	5/85	7/70	Fisher's exact test p=0.379	
	Sutures vs. Glue	RC	Overall Recurrence	5 years	5/85	8/71	Fisher's exact test p=0.256	
	Sutures vs. Glue	SFN	Patient satisfaction	NR	Avg: 9.21 (Range: 5-10)	Avg: 9.45 (Range: 6-10)	Author's report p=0.167	
Garg et al., 2011[698]	Staples vs. no fixations	ADV	Urinary retention	Post-op	0/48	0/52		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Garg et al., 2011[698] (continued)	Staples vs. no fixations	ADV	Seroma	Post-op	10.4% (5/48)	15.4% (8/52)	P=0.56	
	Staples vs. no fixations	RTW	Hospital stay (days)	Post-op	1.12 (SD: 0.3)	1.15 (SD: 0.4)	P=0.7	
	Staples vs. no fixations	RTDA	Days to normal activities	Post-op	7.77 (SD: 1.3)	7.96 (SD: 1.15)	P=0.44	
	Staples vs. no fixations	RC	Recurrence	Minimum follow-up of 25 months	0	0		
	Staples vs. no fixations	Pain	Pain score 24 hours	Post op	1.31 (SD: 0.4)	1.42 (SD: 0.5)	P=0.23	Staples – n=48, 90 hernias; no fixation – n=52, 96 hernias
	Staples vs. no fixations	Pain	Pain score 1 week	Post-op	1.25 (SD: 0.5)	1.34 (SD: 0.6)	P=0.42	Staples – n=48, 90 hernias; no fixation – n=52, 96 hernias
	Staples vs. no fixations	Pain	Pain score 1 month	Post-op	1.06 (SD: 0.2)	1.17 (SD: 0.4)	P=0.12	Staples – n=48, 90 hernias; no fixation – n=52, 96 hernias
	Staples vs. no fixations	Pain	Pain socre 1 year	Post-op	1.04 (SD: 0.2)	1.13 (SD: 0.4)	P=0.11	Staples – n=48, 90 hernias; no fixation – n=52, 96 hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Garg et al., 2011[698] (continued)	Staples vs. no fixations	Pain	Pain score 2 year	Post-op	1.03 (SD: 0.2)	1.0 (SD: NR)	P=0.17	Staples – n=48, 90 hernias; no fixation – n=52, 96 hernias
Paajanen et al., 2011[782]	Sutures vs. Glue	ADV	Normal wound	24 hours	90.7% (137/151)	92.7% (140/151)		
	Sutures vs. Glue	ADV	Hematoma	24 hours	9.3% (14/151)	7.3% (11/151)		
	Sutures vs. Glue	Pain	Need for analgesia	24 hours	92.7% (140/151)	95.4% (144/151)		
	Sutures vs. Glue	Pain	VAS score	24 hours	5 (SD: 2.3)	5 (SD: 2.1)		
	Sutures vs. Glue	ADV	Normal wound	7 days	92.5% (136/147)	91.8% (135/147)		
	Sutures vs. Glue	ADV	Hematoma	7 days	7.5% (11/147)	8.2% (12/147)		
	Sutures vs. Glue	Pain	Daily need for analgesia	7 days	34% (50/147)	33.3% (49/147)		
	Sutures vs. Glue	Pain	Sometimes need analgesia	7 days	30.6% (45/147)	31.3% (46/147)		
	Sutures vs. Glue	Pain	No need for analgesia	7 days	35.4% (52/147)	35.4% (52/147)		
	Sutures vs. Glue	Pain	Pain free walking	7 days	72.8% (107/147)	70.1% (103/147)		
	Sutures vs. Glue	RTDA	Normal car driving	7 days	76.9% (113/147)	78.2% (115/147)		
	Sutures vs. Glue	Pain	VAS	7 days	3 (SD: 1.7)	3 (SD: 1.8)		
	Sutures vs. Glue	ADV	Normal wound	1 month	97.3% (143/147)	94.5% (138/146)		
	Sutures vs. Glue	ADV	Hematoma/ swelling	1 month	2.7% (4/147)	5.5% (8/146)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen et al., 2011[782] (continued)	Sutures vs. Glue	ADV	Infection	1 month	1.4% (2/147)	3.4% (5/146)		
	Sutures vs. Glue	Pain	Daily need for analgesia	1 month	0% (0/147)	2.7% (4/146)		
	Sutures vs. Glue	Pain	Sometimes need analgesia	1 month	12.2% (18/147)	7.5% (11/146)		
	Sutures vs. Glue	Pain	No need for analgesia	1 month	87.8% (129/147)	89.7% (131/146)		
	Sutures vs. Glue	Pain	Pain free walking	1 month	98% (144/147)	97.9% (143/146)		
	Sutures vs. Glue	Pain	Pain free daily working	1 month	93.2% (137/147)	91.8% (134/146)		
	Sutures vs. Glue	Pain	VAS	1 month	1 (SD: 1.3)	1 (SD: 1.2)		
	Sutures vs. Glue	RC	Recurrence	1 year	1.4% (2/142)	1.4% (2/144)		
	Sutures vs. Glue	Pain	VAS $\geq$ 2	1 year	15.5% (22/142)	20.1% (29/144)		
	Sutures vs. Glue	Pain	VAS	1 year	1 (SD: 1.5)	1 (SD: 1.8)		
	Sutures vs. Glue	Pain	Scrotal or testicular pain	1 year	1.4% (2/142)	0.7% (1/144)		
	Sutures vs. Glue	ADV	Feeling of foreign body	1 year	22.5% (32/142)	26.4% (38/144)		
	Sutures vs. Glue	SFN	Not satisfied	1 year	4.9% (7/142)	6.2% (9/144)		
	Sutures vs. Glue	Pain	Daily need for analgesia	1 year	0.7% (1/142)	0.7% (1/144)		
	Sutures vs. Glue	Pain	Sometimes need analgesia	1 year	2.1% (3/142)	2.8% (4/144)		
	Sutures vs. Glue	Pain	No need for analgesia	1 year	97.2% (138/142)	96.6% (139/144)		
	Sutures vs. Glue	Pain	Pain free walking	1 year	97.9% (139/142)	99.3% (143/144)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Wong et al., 2011[835]	Sutures vs. Fibrin glue	ADV	Acute urinary retention	Post-op	11.5% (3/26)	0% (0/30)	P=0.094 fishers exact test	
	Sutures vs. Fibrin glue	ADV	Seroma/hematoma	Post-op	3.8% (1/26)	3.3% (1/30)	P=1.000 fishers exact test	
	Sutures vs. Fibrin glue	ADV	Wound infection	Post op	0% (0/26)	3.3% (1/30)	P=1.000 fishers exact test	
	Sutures vs. Fibrin glue	RC	Recurrence	6 months	3.8% (1/26)	0% (0/30)	P=0.464 fishers exact test	
	Sutures vs. Fibrin glue	Pain	Non-specific pain	Post-op	7.7% (2/26)	6.7% (2/30)	P=1.000 fishers exact test	
	Sutures vs. Fibrin glue	Pain	VAS mean (SD)	1 month	1.7 (SD: 0.7)	1.5 (SD: 0.4)		
	Sutures vs. Fibrin glue	Pain	VAS mean (SD)	3 months	1.5 (SD: 0.6)	1.3 (SD: 0.2)		
	Sutures vs. Fibrin glue	Pain	VAS mean (SD)	6 months	1.2 (SD: 0.4)	1.1 (SD: 0.2)		
Fortelny et al., 2011[695]	Fibrin sealant vs. staples	RC	Recurrence	8 to 9 months	2.3% (1/44)	2.2% (1/45)		
	Fibrin sealant vs. staples	Pain	VAS (mean; range)	Preop	1.7 (Range: 0-7.5)	2.2 (Range: 0-6)		
	Fibrin sealant vs. staples	Pain	VAS (mean; range)	Recovery room	2.2 (Range: 0-5)	3.1 (Range: 0-6)		
	Fibrin sealant vs. staples	Pain	VAS (mean; range)	Day 0	1.8 (Range: 0-6)	2.3 (Range: 0.7)		
	Fibrin sealant vs. staples	Pain	VAS (mean; range)	Day 10	1.4 (Range: 0-5)	1.2 (Range: 0-5)		
	Fibrin sealant vs. staples	Pain	VAS (mean; range)	3 months	0.8 (Range: 0-6)	0.95 (Range: 0-3.5)		

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Fortelny et al., 2011[695] (continued)	Fibrin sealant vs. staples	Pain	VAS (mean; range)	1 year	0.4 (SD: 0.3)	0.9 (SD: 0.7)		Author's report reduction in VAS scores in the FS group (pre op vs. post op) proved to be significant (p<0.05, paired t test)
Boldo et al., 2008[639]	Glue vs. staples	RC	Hernia relapse	1 month	5% (1/22)	0% (0/22)	NS based on OR=3.14 (95% CI: 0.12 to 81.36)[@]	
	Glue vs. staples	RC	Hernia relapse	6 months	9% (2/22)	9% (2/22)	NS based on OR=1 (95% CI: 0.13 to 7.81)[@]	
	Glue vs. staples	Pain	VAS score	week 1	Median: 1.7 (IQR: 0 to 3) (N=22)	Median: 4.5 (IQR: 3 to 7) (N=22)	p=0.05; Mann Whitney	
	Glue vs. staples	Pain	VAS score	1 month	Median: 0 (IQR: 0 to 0) (N=22)	Median: 0.5 (IQR: 0 to 3) (N=22)	p=0.072; Mann Whitney	
	Glue vs. staples	Pain	VAS score	6 months	Median: 0 (SD: NR) (N=19)	Median: 0 (SD: NR) (N=20)	NR	patients with recurrent hernia excluded
	Glue vs. staples	ADV	Hematoma	week 1	0% (0/22)	9% (2/22)	NS based on OR=0.18 (95% CI: 0.01 to 4.02)[@]	
	Glue vs. staples	ADV	Seroma	week 1	41% (9/22)	36% (8/22)	NS based on OR=1.21 (95% CI: 0.36 to 4.08)[@]	
	Glue vs. staples	ADV	Seroma	1 month	23% (5/22)	23% (5/22)	NS based on OR=1 (95% CI: 0.24 to 4.1)[@]	
Canonico et al., 1999[650]	Glue vs. no glue	ADV	Ecchymosis	discharge after 24 hours	4% (1/25)	16% (4/25)	NS based on OR=0.22 (95% CI: 0.02 to 2.11)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Canonico et al., 1999[650] (continued)	Glue vs. no glue	ADV	Hematoma	discharge after 24 hours	0% (0/25)	8% (2/25)	NS based on OR=0.18 (95% CI: 0.01 to 4.04)[@]	
	Glue vs. no glue	ADV	Scar immobility or fibrosis	6 months	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Glue vs. no glue	ADV	Intraoperative complications	NA	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Glue vs. no glue	ADV	Hemmorrgagic complications	post op	4% (1/25)	24% (6/25)	NS based on OR=0.13 (95% CI: 0.01 to 1.19)[@]	
Douglas et al., 2002[676]	Sutures vs. tacks	RC	Technical complications, recurrences, overall complications	during follow-up	0 (NS NR)	0 (NS NR)	NC	34 patients randomized to two groups; numbers for each group NR
Ferzli et al., 1999[687]	Staples vs. no staples	RC	Hernia recurrence	NR	0% (0/43)	0% (0/50)	NS based on OR=1.16 (95% CI: 0.02 to 59.75)[@]	
	Staples vs. no staples	RTW	Time until return to work and regular activities	NR	3.5 (SD: 1) (N=43)	3.5 (SD: 1) (N=50)	NR	
	Staples vs. no staples	ADV	Peritoneal tears	NR	5% (2/43)	2% (1/50)	NS based on OR=2.39 (95% CI: 0.21 to 27.32)[@]	
	Staples vs. no staples	ADV	Seroma	post op	2% (1/43)	0% (0/50)	NS based on OR=3.56 (95% CI: 0.14 to 89.81)[@]	
Helbling et al., 2003[710,711]	Sutures vs. Glue	HOSP	Hospital stay (days)	NA	3.4 (SD: NR) (N=24)	3.4 (SD: NR) (N=22)	NR	
	Sutures vs. Glue	RTDA	Normal activity (higher % is better)	3 weeks	42% (10/24)	55% (12/22)	NS based on OR=0.6 (95% CI: 0.19 to 1.91)[@]	
	Sutures vs. Glue	RTDA	Normal activity (higher % is better)	3 months	96% (23/24)	100% (22/22)	NS based on OR=0.35 (95% CI: 0.01 to 9)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Helbling et al., 2003[710,711] (continued)	Sutures vs. Glue	Pain	Pain pubic tubecle	3 weeks	21% (5/24)	14% (3/22)	NS based on OR=1.67 (95% CI: 0.35 to 7.98)[@]	
	Sutures vs. Glue	Pain	Pain scar	3 weeks	8% (2/24)	0% (0/22)	NS based on OR=5 (95% CI: 0.23 to 110.12)[@]	
	Sutures vs. Glue	Pain	Pain pubic tubecle	3 months	13% (3/24)	5% (1/22)	NS based on OR=3 (95% CI: 0.29 to 31.23)[@]	
	Sutures vs. Glue	Pain	Pain scar	3 months	0% (0/24)	0% (0/22)	NS based on OR=0.92 (95% CI: 0.02 to 48.25)[@]	
	Sutures vs. Glue	ADV	Hematoma	early morbidity	21% (5/24)	14% (3/22)	NS based on OR=1.67 (95% CI: 0.35 to 7.98)[@]	
	Sutures vs. Glue	ADV	Scrotal hypaesthesia	3 weeks	42% (10/24)	27% (6/22)	NS based on OR=1.9 (95% CI: 0.55 to 6.59)[@]	
	Sutures vs. Glue	ADV	Superficial infection	3 weeks	4% (1/24)	0% (0/22)	NS based on OR=2.87 (95% CI: 0.11 to 74.26)[@]	
	Sutures vs. Glue	ADV	Scrotal hypaesthesia	3 months	42% (10/24)	27% (6/22)	NS based on OR=1.9 (95% CI: 0.55 to 6.59)[@]	
	Sutures vs. Glue	ADV	Superficial infection	3 months	0% (0/24)	0% (0/22)	NS based on OR=0.92 (95% CI: 0.02 to 48.25)[@]	
	Sutures vs. Glue	ADV	Intraoperative complications	NA	0% (0/24)	0% (0/22)	NS based on OR=0.92 (95% CI: 0.02 to 48.25)[@]	
Koch et al., 2006[723]	Fixation vs. no fixation	RC	Hernia recurrence	Median: 9 months, Range: 6 to 30 months	0 (NS NR)	0 (NS NR)	NC	
	Fixation vs. no fixation	HOSP	Admitted to hospital	NA	50% (10/20)	10% (2/20)	p<0.05 based on OR=9 (95% CI: 1.64 to 49.45)[@]	
	Fixation vs. no fixation	HOSP	Length of hospital stay (hours)	NA	16 (SD: 11.6) (N=20)	8.3 (SD: 5.2) (N=20)	p=0.01	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koch et al., 2006[723] (continued)	Fixation vs. no fixation	RTDA	Return to normal activity with lifting restrictions	4 weeks post op	60% (12/20)	80% (16/20)	NS based on OR=0.38 (95% CI: 0.09 to 1.54)[@]	
	Fixation vs. no fixation	Pain	Pain	1st hour on floor	2.8 (SD: 1.5) (N=20)	2.9 (SD: 2.2) (N=20)	p=0.87	
	Fixation vs. no fixation	Pain	Postop narcotic use	1st hour on floor	1 (SD: 2.7) (N=20)	0.9 (SD: 2.2) (N=20)	p=0.79	
	Fixation vs. no fixation	Pain	Pain	Enter post anesthesia care unit (PACU)	1.9 (SD: 2.3) (N=20)	1.1 (SD: 1.6) (N=20)	p=0.25	
	Fixation vs. no fixation	Pain	Pain	prior to discharge	1.8 (SD: 1.6) (N=20)	1.4 (SD: 1.2) (N=20)	p=0.48	
	Fixation vs. no fixation	Pain	Postop narcotic use	prior to discharge	4.5 (SD: 9.7) (N=20)	2.4 (SD: 4.6) (N=20)	p=0.43	
	Fixation vs. no fixation	Pain	Pain	1 week post op	1.5 (SD: 1.3) (N=20)	1.2 (SD: 1) (N=20)	p=0.40	
	Fixation vs. no fixation	Pain	Pain	4 weeks post op	0.8 (SD: 1.7) (N=20)	0.3 (SD: 0.8) (N=20)	p=0.15	
	Fixation vs. no fixation	Pain	Likert (0-10) pain level	NR	0.53 (SD: 1.3) (N=20)	0.88 (SD: 1.5) (N=18)	p=0.35	
	Fixation vs. no fixation	Pain	Mild pain	last follow-up	15% (3/20)	28% (5/18)	NS based on OR=0.46 (95% CI: 0.09 to 2.28)[@]	
	Fixation vs. no fixation	Pain	Pain	Leav PACU	2.3 (SD: 1.7) (N=20)	1.6 (SD: 1.6) (N=20)	p=0.19	
	Fixation vs. no fixation	Pain	Postop narcotic use	PACU	2.9 (SD: 5.1) (N=20)	0.1 (SD: 0.6) (N=20)	p=0.01	
	Fixation vs. no fixation	ADV	urinary retention	post op	35% (7/20)	5% (1/20)	p<0.05 based on OR=10.23 (95% CI: 1.12 to 93.35)[@]	
Lau et al., 2005[738]	Glue vs. staples	RC	Hernia recurrence	Median follow-up: 1.2 years (Range: 8 to 27 months)	0 (NS NR)	0 (NS NR)	NC	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lau et al., 2005[738] (continued)	Glue vs. staples	HOSP	Inpatient median length of hospital stay (days)	NA	Median: 1 (Range: 1 to 1) (N=31)	Median: 1 (Range: 1 to 2) (N=37)	p=0.428 Mann Whitney	
	Glue vs. staples	HOSP	Outpatient procedures	NA	33% (15/46)	21% (10/47)	NS based on OR=1.79 (95% CI: 0.71 to 4.55)[@]	
	Glue vs. staples	RTDA	Time to resume normal outdoor activities (days)	post op	Median: 3 (Range: 2 to 5) (N=46)	Median: 3 (Range: 2 to 4) (N=47)	p=0.681 Mann Whitney	
	Glue vs. staples	RTW	Time to return to work (days)	post op	Median: 8 (SD: NR Range: 4 to 10) (NS NR)	Median: 6 (SD: NR Range: 5 to 10) (NS NR)	p=0.915 Mann Whitney	
	Glue vs. staples	Pain	VAS pain score at rest	Day 0	Median: 2 (IQR: 0 to 3) (N=46)	Median: 1 (IQR: 0 to 2) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score on coughing	Day 0	Median: 4 (IQR: 3.5 to 5) (N=46)	Median: 3.5 (IQR: 2 to 5) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score at rest	Day 1	Median: 0.4 (IQR: 0 to 2) (N=46)	Median: 1 (IQR: 0 to 2) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score on coughing	Day 1	Median: 4 (IQR: 2 to 5) (N=46)	Median: 4 (IQR: 2 to 5) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score at rest	Day 2	Median: 1 (IQR: 0 to 3) (N=46)	Median: 1 (IQR: 0 to 2) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score on coughing	Day 2	Median: 4 (IQR: 2 to 5) (N=46)	Median: 3.5 (IQR: 2 to 5) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score at rest	Day 3	Median: 2 (IQR: 0.4 to 3) (N=46)	Median: 1 (IQR: 0 to 2) (N=47)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lau et al., 2005[738] (continued)	Glue vs. staples	Pain	VAS pain score on coughing	Day 3	Median: 3 (IQR: 2 to 4) (N=46)	Median: 3 (IQR: 2 to 5) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score at rest	Day 4	Median: 1 (IQR: 0 to 3) (N=46)	Median: 0.4 (IQR: 0 to 2) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score on coughing	Day 4	Median: 3 (IQR: 2 to 4) (N=46)	Median: 2 (IQR: 2 to 4) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score at rest	Day 5	Median: 1 (IQR: 0 to 2) (N=46)	Median: 0 (IQR: 0 to 1.5) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score on coughing	Day 5	Median: 2 (IQR: 2 to 3) (N=46)	Median: 2 (IQR: 1 to 4) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score at rest	Day 6	Median: 0 (IQR: 0 to 1.5) (N=46)	Median: 0 (IQR: 0 to 1) (N=47)	NR	
	Glue vs. staples	Pain	VAS pain score on coughing	Day 6	Median: 2 (IQR: 0 to 2) (N=46)	Median: 2 (IQR: 0 to 2) (N=47)	NR	
	Glue vs. staples	Pain	Chronic pain	follow-up exceeding 1 year	13% (5/38)	20% (8/40)	NS based on OR=0.61 (95% CI: 0.18 to 2.05)[@]	
	Glue vs. staples	ADV	Intraoperative complications	NA	0% (0/46)	0% (0/47)	NS based on OR=1.02 (95% CI: 0.02 to 52.57)[@]	
	Glue vs. staples	ADV	Seroma	post op	35% (16/46)	11% (5/47)	p=0.009	
	Glue vs. staples	ADV	urinary retention	post op	2% (1/46)	2% (1/47)	NS based on OR=1.02 (95% CI: 0.06 to 16.85)[@]	
Leibl et al., 2002[740]	Incised mesh with staples vs. nonincised mesh with staples	RC	Hernia recurrence	NR	0% (0/124)	0% (0/116)	NS based on OR=0.94 (95% CI: 0.02 to 47.55)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Leibl et al., 2002[740] (continued)	Incised mesh with staples vs. nonincised mesh with staples	ADV	Testicular swelling or evidence of atrophy later on	NA	0% (0/124)	0% (0/116)	NS based on OR=0.94 (95% CI: 0.02 to 47.55)[@]	
	Incised mesh with staples vs. nonincised mesh with staples	ADV	Bleeding	post op	0% (0/124)	0% (0/116)	NS based on OR=0.94 (95% CI: 0.02 to 47.55)[@]	
	Incised mesh with staples vs. nonincised mesh with staples	ADV	Nerve lesions	post op	2% (2/124)	3% (3/116)	NS based on OR=0.62 (95% CI: 0.1 to 3.76)[@]	
	Incised mesh with staples vs. nonincised mesh with staples	ADV	Punctured seromas	post op	2% (3/124)	0% (0/116)	NS based on OR=6.71 (95% CI: 0.34 to 131.37)[@]	
	Incised mesh with staples vs. nonincised mesh with staples	ADV	Total seromas	post op	26% (32/124)	27% (31/116)	NS based on OR=0.95 (95% CI: 0.54 to 1.7)[@]	
	Incised mesh with staples vs. nonincised mesh with sutures	RC	Hernia recurrence	NR	0% (0/124)	1% (1/120)	NS based on OR=0.32 (95% CI: 0.01 to 7.93)[@]	
	Incised mesh with staples vs. nonincised mesh with sutures	ADV	Testicular swelling or evidence of atrophy later on	NA	0% (0/124)	0% (0/120)	NS based on OR=0.97 (95% CI: 0.02 to 49.17)[@]	
	Incised mesh with staples vs. nonincised mesh with sutures	ADV	Bleeding	post op	0% (0/124)	0% (0/120)	NS based on OR=0.97 (95% CI: 0.02 to 49.17)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Leibl et al., 2002[740] (continued)	Incised mesh with staples vs. nonincised mesh with sutures	ADV	Nerve lesions	post op	2% (2/124)	0% (0/120)	NS based on OR=4.92 (95% CI: 0.23 to 103.52)[@]	
	Incised mesh with staples vs. nonincised mesh with sutures	ADV	Punctured seromas	post op	2% (3/124)	3% (4/120)	NS based on OR=0.72 (95% CI: 0.16 to 3.28)[@]	
	Incised mesh with staples vs. nonincised mesh with sutures	ADV	Total seromas	post op	26% (32/124)	28% (34/120)	NS based on OR=0.88 (95% CI: 0.5 to 1.55)[@]	
	Nonincised mesh with staples vs. Nonincised mesh with sutures	RC	Hernia recurrence	NR	0% (0/116)	1% (1/120)	NS based on OR=0.34 (95% CI: 0.01 to 8.48)[@]	
	Nonincised mesh with staples vs. Nonincised mesh with sutures	ADV	Testicular swelling or evidence of atrophy later on	NA	0% (0/116)	0% (0/120)	NS based on OR=1.03 (95% CI: 0.02 to 52.56)[@]	
	Nonincised mesh with staples vs. Nonincised mesh with sutures	ADV	Bleeding	post op	0% (0/116)	0% (0/120)	NS based on OR=1.03 (95% CI: 0.02 to 52.56)[@]	
	Nonincised mesh with staples vs. Nonincised mesh with sutures	ADV	Nerve lesions	post op	3% (3/116)	0% (0/120)	NS based on OR=7.43 (95% CI: 0.38 to 145.48)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Leibl et al., 2002[740] (continued)	Nonincised mesh with staples vs. Nonincised mesh with sutures	ADV	Punctured seromas	post op	0% (0/116)	3% (4/120)	NS based on OR=0.11 (95% CI: 0.01 to 2.09)[@]	
	Nonincised mesh with staples vs. Nonincised mesh with sutures	ADV	Total seromas	post op	27% (31/116)	28% (34/120)	NS based on OR=0.92 (95% CI: 0.52 to 1.63)[@]	
Lovisetto et al., 2007[749]	Staples vs. glue	RC	Hernia recurrence	late post op complications	0% (0/98)	1% (1/99)	NS based on OR=0.33 (95% CI: 0.01 to 8.28)[@]	
	Staples vs. glue	HOSP	Postoperative hospital time (day)	NR	1 (SD: NR) (N=98)	1 (SD: NR) (N=99)	NR	
	Staples vs. glue	RTDA	Recovery time to normal physical activity (days)	NR	9.1 (Range: 7 to 11) (N=98)	7.9 (Range: 5 to 11) (N=99)	NR	
	Staples vs. glue	QOL	SF-36 #1 (higher number is better)	1 month	3.5 (SD: 0.5) (N=98)	3.4 (SD: 0.3) (N=99)	p=0.092	
	Staples vs. glue	QOL	SF-36 #2 (higher number is better)	1 month	3.3 (SD: 0.4) (N=98)	3.2 (SD: 0.6) (N=99)	p=0.171	
	Staples vs. glue	QOL	SF-36 #3 (higher number is better)	1 month	5.1 (SD: 0.4) (N=98)	5 (SD: 0.5) (N=99)	p=0.123	
	Staples vs. glue	QOL	SF-36 #4 (higher number is better)	1 month	3.5 (SD: 0.6) (N=98)	3.4 (SD: 0.3) (N=99)	p=0.140	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lovisetto et al., 2007[749] (continued)	Staples vs. glue	QOL	SF-36 #5 (higher number is better)	1 month	4 (SD: 0.3) (N=98)	4.4 (SD: 0.2) (N=99)	p=0.000	
	Staples vs. glue	QOL	SF-36 #6 (higher number is better)	1 month	3.1 (SD: 0.3) (N=98)	3.7 (SD: 0.1) (N=99)	p=0.000	
	Staples vs. glue	QOL	SF-36 total (higher number is better)	1 month	22.5 (SD: 0.4) (N=98)	23.1 (SD: 0.3) (N=99)	p=0.000	
	Staples vs. glue	QOL	SF-36 #1 (higher number is better)	3 months	3.7 (SD: 0.9) (N=98)	3.5 (SD: 0.7) (N=99)	p=0.083	
	Staples vs. glue	QOL	SF-36 #2 (higher number is better)	3 months	3.3 (SD: 0.8) (N=98)	3.1 (SD: 0.8) (N=99)	p=0.081	
	Staples vs. glue	QOL	SF-36 #3 (higher number is better)	3 months	5.3 (SD: 0.9) (N=98)	5.1 (SD: 0.7) (N=99)	p=0.083	
	Staples vs. glue	QOL	SF-36 #4 (higher number is better)	3 months	3.4 (SD: 0.4) (N=98)	3.4 (SD: 0.3) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 #5 (higher number is better)	3 months	4.2 (SD: 0.3) (N=98)	4.6 (SD: 0.3) (N=99)	p=0.000	
	Staples vs. glue	QOL	SF-36 #6 (higher number is better)	3 months	3.5 (SD: 0.1) (N=98)	3.8 (SD: 0.3) (N=99)	p=0.000	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lovisetto et al., 2007[749] (continued)	Staples vs. glue	QOL	SF-36 total (higher number is better)	3 months	23.4 (SD: 0.5) (N=98)	23.5 (SD: 0.4) (N=99)	p=0.120	
	Staples vs. glue	QOL	SF-36 #1 (higher number is better)	6 months	3.6 (SD: 0.4) (N=98)	3.5 (SD: 0.5) (N=99)	p=0.123	
	Staples vs. glue	QOL	SF-36 #2 (higher number is better)	6 months	3.3 (SD: 0.8) (N=98)	3.1 (SD: 0.9) (N=99)	p=0.101	
	Staples vs. glue	QOL	SF-36 #3 (higher number is better)	6 months	5.3 (SD: 0.4) (N=98)	5.3 (SD: 0.3) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 #4 (higher number is better)	6 months	3.5 (SD: 0.4) (N=98)	3.4 (SD: 0.4) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 #5 (higher number is better)	6 months	4.3 (SD: 0.3) (N=98)	4.6 (SD: 0.2) (N=99)	p=0.000	
	Staples vs. glue	QOL	SF-36 #6 (higher number is better)	6 months	3.4 (SD: 0.5) (N=98)	3.7 (SD: 0.4) (N=99)	p=0.000	
	Staples vs. glue	QOL	SF-36 total (higher number is better)	6 months	23.4 (SD: 0.4) (N=98)	23.6 (SD: 0.4) (N=99)	p=0.095	
	Staples vs. glue	QOL	SF-36 #1 (higher number is better)	12 months	3.5 (SD: 0.5) (N=98)	3.5 (SD: 0.4) (N=99)	p=1.000	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lovisetto et al., 2007[749] (continued)	Staples vs. glue	QOL	SF-36 #2 (higher number is better)	12 months	3.2 (SD: 0.5) (N=98)	3.1 (SD: 0.2) (N=99)	p=0.066	
	Staples vs. glue	QOL	SF-36 #3 (higher number is better)	12 months	5.3 (SD: 0.5) (N=98)	5.3 (SD: 0.3) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 #4 (higher number is better)	12 months	3.4 (SD: 0.3) (N=98)	3.4 (SD: 0.2) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 #5 (higher number is better)	12 months	4.5 (SD: 0.3) (N=98)	4.6 (SD: 0.3) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 #6 (higher number is better)	12 months	3.7 (SD: 0.5) (N=98)	3.7 (SD: 0.3) (N=99)	p=1.000	
	Staples vs. glue	QOL	SF-36 total (higher number is better)	12 months	23.6 (SD: 0.4) (N=98)	23.6 (SD: 0.2) (N=99)	p=1.000	
	Staples vs. glue	Pain	nonspecific pain	early post op complications	4% (4/98)	3% (3/99)	NS based on OR=1.36 (95% CI: 0.3 to 6.25)[@]	
	Staples vs. glue	Pain	VAS score	1 month	26 (Range: 22 to 30) (N=98)	19 (Range: 16 to 23) (N=99)	p<0.05	VAS in mm
	Staples vs. glue	Pain	VAS score	3 months	23 (Range: 21 to 26) (N=98)	11 (Range: 8 to 14) (N=99)	p<0.001	VAS in mm
	Staples vs. glue	Pain	VAS score	6 months	20 (Range: 17 to 23) (N=98)	11 (Range: 8 to 14) (N=99)	p<0.05	VAS in mm

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lovisetto et al., 2007[749] (continued)	Staples vs. glue	Pain	VAS score	12 months	12 (Range: 10 to 14) (N=98)	8 (Range: 6 to 10) (N=99)	NR	VAS in mm
	Staples vs. glue	Pain	nonspecific pain	late post op complications	5% (5/98)	1% (1/99)	NS based on OR=5.27 (95% CI: 0.6 to 45.95)[@]	
	Staples vs. glue	ADV	Hematoma or seroma	early post op complications	4% (4/98)	3% (3/99)	NS based on OR=1.36 (95% CI: 0.3 to 6.25)[@]	
	Staples vs. glue	ADV	neuralgia	early post op complications	0% (0/98)	0% (0/99)	NS based on OR=1.01 (95% CI: 0.02 to 51.42)[@]	
	Staples vs. glue	ADV	Orchitis	early post op complications	1% (1/98)	1% (1/99)	NS based on OR=1.01 (95% CI: 0.06 to 16.38)[@]	
	Staples vs. glue	ADV	Other	early post op complications	2% (2/98)	1% (1/99)	NS based on OR=2.04 (95% CI: 0.18 to 22.89)[@]	
	Staples vs. glue	ADV	urinary retention	early post op complications	0% (0/98)	0% (0/99)	NS based on OR=1.01 (95% CI: 0.02 to 51.42)[@]	
	Staples vs. glue	ADV	Urinary tract infection	early post op complications	1% (1/98)	0% (0/99)	NS based on OR=3.06 (95% CI: 0.12 to 76.08)[@]	
	Staples vs. glue	ADV	Wound infection	early post op complications	0% (0/98)	0% (0/99)	NS based on OR=1.01 (95% CI: 0.02 to 51.42)[@]	
	Staples vs. glue	ADV	Hematoma or seroma	late post op complications	1% (1/98)	0% (0/99)	NS based on OR=3.06 (95% CI: 0.12 to 76.08)[@]	
	Staples vs. glue	ADV	Infection	late post op complications	0% (0/98)	0% (0/99)	NS based on OR=1.01 (95% CI: 0.02 to 51.42)[@]	
	Staples vs. glue	ADV	Intraoperative complications	NR	0% (0/98)	0% (0/99)	NS based on OR=1.01 (95% CI: 0.02 to 51.42)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Lovisetto et al., 2007[749] (continued)	Staples vs. glue	ADV	neuralgia	late post op complications	1% (1/98)	0% (0/99)	NS based on OR=3.06 (95% CI: 0.12 to 76.08)[@]	
	Staples vs. glue	ADV	Orchitis or testicular problems	late post op complications	1% (1/98)	0% (0/99)	NS based on OR=3.06 (95% CI: 0.12 to 76.08)[@]	
	Staples vs. glue	ADV	Other	late post op complications	1% (1/98)	1% (1/99)	NS based on OR=1.01 (95% CI: 0.06 to 16.38)[@]	
Mills et al., 1998[751]	Sutures vs. staples	RC	Hernia recurrence	post op	0% (0/25)	0% (0/25)	NS based on OR=1 (95% CI: 0.02 to 52.37)[@]	
	Sutures vs. staples	HOSP	Hospital stay	discharged on first post op day	44% (11/25)	52% (13/25)	NS based on OR=0.73 (95% CI: 0.24 to 2.21)[@]	
	Sutures vs. staples	HOSP	Hospital stay	5 days post op	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	Sutures vs. staples	HOSP	Hospital stay	7 days	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	Sutures vs. staples	HOSP	GP consultation (check-up)	post op	8% (2/24)	8% (2/24)	NS based on OR=1 (95% CI: 0.13 to 7.75)[@]	
	Sutures vs. staples	HOSP	GP consultation (complication)	post op	13% (3/24)	8% (2/24)	NS based on OR=1.57 (95% CI: 0.24 to 10.37)[@]	
	Sutures vs. staples	HOSP	GP consultation (removal clips)	post op	0% (0/24)	8% (2/24)	NS based on OR=0.18 (95% CI: 0.01 to 4.04)[@]	
	Sutures vs. staples	HOSP	Number of general practitioner consultations	post op	42% (10/24)	29% (7/24)	NS based on OR=1.73 (95% CI: 0.52 to 5.74)[@]	
	Sutures vs. staples	RTDA	Return to driving	post op	3 weeks 5 days (Range: 0.4 to 8) (N=16)	3 weeks (Range: 1 to 8) (N=17)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Mills et al., 1998[751] (continued)	Sutures vs. staples	RTDA	Return to normal activity	post op	6 wks 2 days (Range: 0.5 to 14) (N=22)	4 weeks (Range: 0.6 to 12) (N=23)	NR	
	Sutures vs. staples	RTW	GP consultation (work certificate)	post op	8% (2/24)	4% (1/24)	NS based on OR=2.09 (95% CI: 0.18 to 24.74)[@]	
	Sutures vs. staples	RTW	Return to work	post op	6 weeks (Range: 0.4 to 12) (N=11)	5 weeks 4 days (Range: 1 to 13) (N=14)	NR	
	Sutures vs. staples	Pain	GP consultation (pain)	post op	13% (3/24)	0% (0/24)	NS based on OR=7.98 (95% CI: 0.39 to 163.34)[@]	
	Sutures vs. staples	Pain	Pain score	post op	47.5 (Range: 0 to 100) (N=20)	32 (Range: 0 to 84) (N=23)	NR	
	Sutures vs. staples	Pain	Persistent groin pain	post op	4% (1/25)	0% (0/25)	NS based on OR=3.12 (95% CI: 0.12 to 80.4)[@]	
	Sutures vs. staples	ADV	Superficial wound infection	post op	8% (2/25)	0% (0/25)	NS based on OR=5.43 (95% CI: 0.25 to 118.96)[@]	
	Sutures vs. staples	ADV	urinary retention	post op	0% (0/25)	4% (1/25)	NS based on OR=0.32 (95% CI: 0.01 to 8.25)[@]	
	Sutures vs. staples	ADV	Wound hematoma	post op	8% (2/25)	8% (2/25)	NS based on OR=1 (95% CI: 0.13 to 7.72)[@]	
Moreno-Egea et al., 2004[752]	Staples vs. no staples	RC	Hernia recurrence	during follow-up	0% (0/85)	4% (3/85)	NS based on OR=0.14 (95% CI: 0.01 to 2.71)[@]	3 cases of recurrence in two patients
	Staples vs. no staples	RC	Failures	NA	5% (4/85)	2% (2/85)	NS based on OR=2.05 (95% CI: 0.37 to 11.5)[@]	
	Staples vs. no staples	HOSP	Ambulatory surgery	NA	91% (77/85)	96% (82/85)	NS based on OR=0.35 (95% CI: 0.09 to 1.38)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Moreno-Egea et al., 2004[752] (continued)	Staples vs. no staples	HOSP	Hospital admission	NA	9% (8/85)	4% (3/85)	NS based on OR=2.84 (95% CI: 0.73 to 11.1)[@]	
	Staples vs. no staples	Pain	VAS pain score	24 hours	1.78 (SD: 1.4) (N=85)	1.65 (SD: 1.3) (N=85)	p=0.26	
	Staples vs. no staples	Pain	VAS pain score	1 month	0.16 (SD: 0.6) (N=85)	0.14 (SD: 1.7) (N=85)	p=0.46	
	Staples vs. no staples	Pain	Chronic pain	NR	1% (1/85)	1% (1/85)	NS based on OR=1 (95% CI: 0.06 to 16.25)[@]	
	Staples vs. no staples	ADV	intraoperative bleeding	NA	4% (3/85)	0% (0/85)	NS based on OR=7.25 (95% CI: 0.37 to 142.63)[@]	
	Staples vs. no staples	ADV	Intraoperative transitory neuralgia	NA	2% (2/85)	2% (2/85)	NS based on OR=1 (95% CI: 0.14 to 7.27)[@]	
	Staples vs. no staples	ADV	Intraoperative wound infection	NA	0% (0/85)	1% (1/85)	NS based on OR=0.33 (95% CI: 0.01 to 8.2)[@]	
	Staples vs. no staples	ADV	Bleeding	post op	13% (11/85)	12% (10/85)	NS based on OR=1.11 (95% CI: 0.45 to 2.78)[@]	
	Staples vs. no staples	ADV	Orchitis	NR	0% (0/85)	0% (0/85)	NS based on OR=1 (95% CI: 0.02 to 50.98)[@]	
	Staples vs. no staples	ADV	Transitory neuralgia	post op	1% (1/85)	1% (1/85)	NS based on OR=1 (95% CI: 0.06 to 16.25)[@]	
	Staples vs. no staples	ADV	Wound infection	post op	1% (1/85)	0% (0/85)	NS based on OR=3.04 (95% CI: 0.12 to 75.58)[@]	
Nowobilski et al., 2004[774]	Glue vs. sutures	HOSP	Hospital stay (days)	post op	1.25 (SD: NR) (N=22)	1.75 (SD: NR) (N=24)	NR	
	Glue vs. sutures	Pain	Pain score	First post op day	23.4 (SD: 8.9; Range: 10 to 40) (N=22)	32.4 (SD: 9.9; Range: 10 to 60) (N=24)	p=0.0025	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Nowobilski et al., 2004[774] (continued)	Glue vs. sutures	Pain	Pain score	1 week post op	4.1 (Range: 0 to 20) (N=22)	5 (Range: 0 to 20) (N=24)	p=0.69, either t-test or Mann Whitney (did not reported which)	
	Glue vs. sutures	ADV	Edema	7 days	9% (2/22)	0% (0/24)	NS based on OR=5.98 (95% CI: 0.27 to 131.67)[@]	
	Glue vs. sutures	ADV	Seroma	7 days	0% (0/22)	4% (1/24)	NS based on OR=0.35 (95% CI: 0.01 to 9)[@]	
Olmi et al., 2007[778]	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	RC	Recurrences	data collected up to 1 month post op	2% (3/150)	0% (0/150)	NS based on OR=7.14 (95% CI: 0.37 to 139.49)[@]	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	HOSP	Hospital stay (days)	NR	1.2 (Range: 1 to 4) (N=150)	1 (Range: 1 to 3) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	RTW	Resumption of work (days)	NR	9 (Range: 5 to 22) (N=150)	5 (Range: 3 to 8) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	6 hours	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	12 hours	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	24 hours	3 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	48 hours	4 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	24 to 72 hours post op	3 to 4 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	72 hours	3 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	7 days	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	7 days	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	15 days	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	Persistent pain	data collected up to 1 month post op	1% (2/150)	0% (0/150)	NS based on OR=5.07 (95% CI: 0.24 to 106.45)[@]	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	1 month	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	1 month	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	ADV	Hematoma	data collected up to 1 month post op	3% (4/150)	0% (0/150)	NS based on OR=9.25 (95% CI: 0.49 to 173.26)[@]	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	ADV	neuralgia	data collected up to 1 month post op	4% (6/150)	0% (0/150)	NS based on OR=13.54 (95% CI: 0.76 to 242.54)[@]	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	ADV	Seroma	data collected up to 1 month post op	9% (13/150)	3% (5/150)	NS based on OR=2.75 (95% CI: 0.96 to 7.92)[@]	
	TAPP mesh fixed with EMS vs. TAPP mesh fixed with Tissucol	ADV	urinary retention	data collected up to 1 month post op	1% (2/150)	0% (0/150)	NS based on OR=5.07 (95% CI: 0.24 to 106.45)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	RC	Recurrences	data collected up to 1 month post op	0% (0/150)	2% (3/150)	NS based on OR=0.14 (95% CI: 0.01 to 2.73)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	HOSP	Hospital stay (days)	NR	1.1 (Range: 1 to 3) (N=150)	1.2 (Range: 1 to 4) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	RTW	Resumption of work (days)	NR	7 (Range: 5 to 12) (N=150)	9 (Range: 5 to 22) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	6 hours	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	12 hours	2 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	24 hours	4 (SD: NR) (N=150)	3 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	48 hours	5 (SD: NR) (N=150)	4 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain score	24 to 72 hours post op	4 to 5 (SD: NR) (N=150)	3 to 4 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	72 hours	4 (SD: NR) (N=150)	3 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	Vas pain	7 days	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain score	7 days	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	15 days	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	Persistent pain	data collected up to 1 month post op	2% (3/150)	1% (2/150)	NS based on OR=1.51 (95% CI: 0.25 to 9.17)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain	1 month	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	Pain	VAS pain score	1 month	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	ADV	Hematoma	data collected up to 1 month post op	2% (3/150)	3% (4/150)	NS based on OR=0.74 (95% CI: 0.16 to 3.39)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	ADV	neuralgia	data collected up to 1 month post op	4% (6/150)	4% (6/150)	NS based on OR=1 (95% CI: 0.32 to 3.17)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	ADV	Seroma	data collected up to 1 month post op	10% (15/150)	9% (13/150)	NS based on OR=1.17 (95% CI: 0.54 to 2.55)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with EMS	ADV	urinary retention	data collected up to 1 month post op	0% (0/150)	1% (2/150)	NS based on OR=0.2 (95% CI: 0.01 to 4.15)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	RC	Recurrences	data collected up to 1 month post op	0% (0/150)	0% (0/150)	NS based on OR=1 (95% CI: 0.02 to 50.73)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	HOSP	Hospital stay (days)	NR	1.1 (Range: 1 to 3) (N=150)	1 (Range: 1 to 3) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	RTW	Resumption of work (days)	NR	7 (Range: 5 to 12) (N=150)	5 (Range: 3 to 8) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	6 hours	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	12 hours	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	24 hours	4 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	48 hours	5 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	24 to 72 hours post op	4 to 5 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	72 hours	4 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	Vas pain	7 days	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	7 days	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	15 days	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	Persistent pain	data collected up to 1 month post op	2% (3/150)	0% (0/150)	NS based on OR=7.14 (95% CI: 0.37 to 139.49)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	1 month	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	1 month	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	ADV	Hematoma	data collected up to 1 month post op	2% (3/150)	0% (0/150)	NS based on OR=7.14 (95% CI: 0.37 to 139.49)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	ADV	neuralgia	data collected up to 1 month post op	4% (6/150)	0% (0/150)	NS based on OR=13.54 (95% CI: 0.76 to 242.54)[@]	
	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	ADV	Seroma	data collected up to 1 month post op	10% (15/150)	3% (5/150)	p<0.05 based on OR=3.22 (95% CI: 1.14 to 9.11)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with EndoANCHOR vs. TAPP mesh fixed with Tissucol	ADV	urinary retention	data collected up to 1 month post op	0% (0/150)	0% (0/150)	NS based on OR=1 (95% CI: 0.02 to 50.73)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	RC	Recurrences	data collected up to 1 month post op	0% (0/150)	2% (3/150)	NS based on OR=0.14 (95% CI: 0.01 to 2.73)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	HOSP	Hospital stay (days)	NR	1.1 (Range: 1 to 3) (N=150)	1.2 (Range: 1 to 4) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	RTW	Resumption of work (days)	NR	9 (Range: 5 to 20) (N=150)	9 (Range: 5 to 22) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	6 hours	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	12 hours	2 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	24 hours	6 (SD: NR) (N=150)	3 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	48 hours	7 (SD: NR) (N=150)	4 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain score	24 to 72 hours post op	5 to 7 (SD: NR) (N=150)	3 to 4 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	72 hours	5 (SD: NR) (N=150)	3 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	Vas pain	7 days	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain score	7 days	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	15 days	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	Persistent pain	data collected up to 1 month post op	2% (3/150)	1% (2/150)	NS based on OR=1.51 (95% CI: 0.25 to 9.17)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain	1 month	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	Pain	VAS pain score	1 month	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	ADV	Hematoma	data collected up to 1 month post op	2% (3/150)	3% (4/150)	NS based on OR=0.74 (95% CI: 0.16 to 3.39)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	ADV	neuralgia	data collected up to 1 month post op	6% (9/150)	4% (6/150)	NS based on OR=1.53 (95% CI: 0.53 to 4.42)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	ADV	Seroma	data collected up to 1 month post op	8% (12/150)	9% (13/150)	NS based on OR=0.92 (95% CI: 0.4 to 2.08)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EMS	ADV	urinary retention	data collected up to 1 month post op	0% (0/150)	1% (2/150)	NS based on OR=0.2 (95% CI: 0.01 to 4.15)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	RC	Recurrences	data collected up to 1 month post op	0% (0/150)	0% (0/150)	NS based on OR=1 (95% CI: 0.02 to 50.73)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	HOSP	Hospital stay (days)	NR	1.1 (Range: 1 to 3) (N=150)	1.1 (Range: 1 to 3) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	RTW	Resumption of work (days)	NR	9 (Range: 5 to 20) (N=150)	7 (Range: 5 to 12) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	6 hours	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	12 hours	2 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	24 hours	6 (SD: NR) (N=150)	4 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	48 hours	7 (SD: NR) (N=150)	5 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain score	24 to 72 hours post op	5 to 7 (SD: NR) (N=150)	4 to 5 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	72 hours	5 (SD: NR) (N=150)	4 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	Vas pain	7 days	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain score	7 days	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	15 days	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	Persistent pain	data collected up to 1 month post op	2% (3/150)	2% (3/150)	NS based on OR=1 (95% CI: 0.2 to 5.04)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain	1 month	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	Pain	VAS pain score	1 month	1 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	ADV	Hematoma	data collected up to 1 month post op	2% (3/150)	2% (3/150)	NS based on OR=1 (95% CI: 0.2 to 5.04)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	ADV	neuralgia	data collected up to 1 month post op	6% (9/150)	4% (6/150)	NS based on OR=1.53 (95% CI: 0.53 to 4.42)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	ADV	Seroma	data collected up to 1 month post op	8% (12/150)	10% (15/150)	NS based on OR=0.78 (95% CI: 0.35 to 1.73)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with EndoANCHOR	ADV	urinary retention	data collected up to 1 month post op	0% (0/150)	0% (0/150)	NS based on OR=1 (95% CI: 0.02 to 50.73)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	RC	Recurrences	data collected up to 1 month post op	0% (0/150)	0% (0/150)	NS based on OR=1 (95% CI: 0.02 to 50.73)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	HOSP	Hospital stay (days)	NR	1.1 (Range: 1 to 3) (N=150)	1 (Range: 1 to 3) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	RTW	Resumption of work (days)	NR	9 (Range: 5 to 20) (N=150)	5 (Range: 3 to 8) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	6 hours	2 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	12 hours	2 (SD: NR) (N=150)	1 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	24 hours	6 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	48 hours	7 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	24 to 72 hours post op	5 to 7 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	72 hours	5 (SD: NR) (N=150)	2 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	Vas pain	7 days	2 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	7 days	2 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	15 days	2 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	Persistent pain	data collected up to 1 month post op	2% (3/150)	0% (0/150)	NS based on OR=7.14 (95% CI: 0.37 to 139.49)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Olmi et al., 2007[778] (continued)	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain	1 month	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	Pain	VAS pain score	1 month	1 (SD: NR) (N=150)	0 (SD: NR) (N=150)	NR	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	ADV	Hematoma	data collected up to 1 month post op	2% (3/150)	0% (0/150)	NS based on OR=7.14 (95% CI: 0.37 to 139.49)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	ADV	neuralgia	data collected up to 1 month post op	6% (9/150)	0% (0/150)	p<0.05 based on OR=20.21 (95% CI: 1.17 to 350.45)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	ADV	Seroma	data collected up to 1 month post op	8% (12/150)	3% (5/150)	NS based on OR=2.52 (95% CI: 0.87 to 7.34)[@]	
	TAPP mesh fixed with Protrak vs. TAPP mesh fixed with Tissucol	ADV	urinary retention	data collected up to 1 month post op	0% (0/150)	0% (0/150)	NS based on OR=1 (95% CI: 0.02 to 50.73)[@]	
Paajanen, 2002[780]	Absorbable sutures vs. nonabsorbable sutures	RC	Hernia recurrence	NR	1% (1/81)	1% (1/81)	NS based on OR=1 (95% CI: 0.06 to 16.27)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Paajanen, 2002[780] (continued)	Absorbable sutures vs. nonabsorbable sutures	SFN	Satisfied with operation (higher % is better)	Mean follow-up: 2.1 years	90% (73/81)	95% (77/81)	NS based on OR=0.47 (95% CI: 0.14 to 1.64)[@]	
	Absorbable sutures vs. nonabsorbable sutures	Pain	Mild radiating pain into testicles	Mean follow-up: 2.1 years	10% (8/81)	14% (11/81)	NS based on OR=0.7 (95% CI: 0.26 to 1.84)[@]	
	Absorbable sutures vs. nonabsorbable sutures	Pain	Pain causes limitations in work/ leisure time activities	Mean follow-up: 2.1 years	7% (6/81)	10% (8/81)	NS based on OR=0.73 (95% CI: 0.24 to 2.21)[@]	
	Absorbable sutures vs. nonabsorbable sutures	Pain	Pain within the last month	Mean follow-up: 2.1 years	26% (21/81)	23% (19/81)	NS based on OR=1.14 (95% CI: 0.56 to 2.33)[@]	
	Absorbable sutures vs. nonabsorbable sutures	Pain	Pain-relieving drugs	Mean follow-up: 2.1 years	0% (0/81)	4% (3/81)	NS based on OR=0.14 (95% CI: 0.01 to 2.71)[@]	
	Absorbable sutures vs. nonabsorbable sutures	ADV	Some wound healing problems (mild hemmorrhage/ pain, etc.)	Mean follow-up: 2.1 years	12% (10/81)	11% (9/81)	NS based on OR=1.13 (95% CI: 0.43 to 2.94)[@]	
	Absorbable sutures vs. nonabsorbable sutures	ADV	Wound hematoma	NR	2% (2/81)	0% (0/81)	NS based on OR=5.13 (95% CI: 0.24 to 108.46)[@]	
	Absorbable sutures vs. nonabsorbable sutures	ADV	Wound infection	NR	1% (1/81)	0% (0/81)	NS based on OR=3.04 (95% CI: 0.12 to 75.67)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Parshad et al., 2005[785]	Staples vs. no staples	RC	Hernia recurrence	mean follow-up 25.76 months	0% (0/25)	0% (0/23)	NS based on OR=0.92 (95% CI: 0.02 to 48.34)[@]	one patient died after 2 years due to myocardial infarction; another patient was lost during early follow-up (after 3 months)
	Staples vs. no staples	HOSP	Post op stay (days)	NA	1.64 (SD: 0.95) (N=25)	1.12 (SD: 0.6) (N=25)	p=0.027	
	Staples vs. no staples	RTDA	Return to activity (days)	NA	2.68 (SD: 1.63) (N=25)	2.12 (SD: 1.51) (N=25)	p=0.112	
	Staples vs. no staples	Pain	Pain score	day 0	2.92 (SD: 2.38) (N=25)	2.28 (SD: 1.81) (N=25)	p=0.348	
	Staples vs. no staples	Pain	Pain score	day 1	1.52 (SD: 1.64) (N=25)	1 (SD: 1.12) (N=25)	p=0.387	
	Staples vs. no staples	Pain	Pain score	day 7	0.32 (SD: 0.69) (N=25)	0.2 (SD: 0.65) (N=25)	p=0.438	
	Staples vs. no staples	Pain	Duration of analgesics (wks)	NA	1.16 (SD: 0.37) (N=25)	1.08 (SD: 0.28) (N=25)	p=0.389	
	Staples vs. no staples	ADV	Contralateral hernia development	2 years after initial operation	4% (1/25)	0% (0/23)	NS based on OR=2.88 (95% CI: 0.11 to 74.24)[@]	one patient died after 2 years due to myocardial infarction; another patient was lost during early follow-up (after 3 months)
	Staples vs. no staples	ADV	Seroma	NR	4% (1/25)	12% (3/25)	NS based on OR=0.31 (95% CI: 0.03 to 3.16)[@]	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Parshad et al., 2005[785] (continued)	Staples vs. no staples	ADV	Subcutaneous emphysems	NR	4% (1/25)	4% (1/25)	NS based on OR=1 (95% CI: 0.06 to 16.93)[@]	
Sevonius et al., 2009[535,805-813]	Long-term absorbable sutures vs. short-term absorbable sutures	RC	Hernia recurrence	NR but likely Range: 0-7 years	Compared to nonabsorbable sutures: relative risk 1.12 (95% CI: 0.81 to 1.55)	Compared to nonabsorbable sutures: relative risk 2.23 (95%CI 1.67 to 2.99)	Group 2: p<0.05 vs. Lichtenstein, but Group 1: NS from Lichtenstein, according to 95% CIs	Relative risk greater than 1.0 favors the nonabsorbable group. Adjusted for sex, emergency/ elective repair, primary/ recurrent, anatomic location of hernia, diameter of hernia, and whether the patient had post-operative complica-tions

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Nonabsorbable sutures vs. long-term absorbable sutures	RC	Hernia recurrence	between 0 and 7 years	This was the reference operation	Compared to nonabsorbable sutures: relative risk 1.12 (95% CI: 0.81 to 1.55)	NS according to the 95% CI	Relative risk greater than 1.0 favors the nonabsorbable group. Adjusted for sex, emergency/ elective repair, primary/ recurrent, anatomic location of hernia, diameter of hernia, and whether the patient had post-operative complica-tions

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Sevonius et al., 2009[535,805-813] (continued)	Nonabsorbable sutures vs. short-term absorbable sutures	RC	Hernia recurrence	between 0 and 7 years	This was the reference operation	Compared to nonabsorbable sutures: relative risk 2.23 (95%CI: 1.67 to 2.99)	p<0.05 according to the 95% CI	Relative risk greater than 1.0 favors the nonabsorbable group. Adjusted for sex, emergency/ elective repair, primary/ recurrent, anatomic location of hernia, diameter of hernia, and whether the patient had post-operative complica-tions

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Smith et al., 1999[816]	No staples vs. staples	RC	Recurrences	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	0% (0/263)	1% (3/273)	p=0.09	N=number of hernias, not patients. There were 253 patients in Group A and 249 patients in Group B. Group A: 169 patients had physical examination and 62 had telephone follow up (total = 231; 3 patients died, 19 lost to follow-up). Group B: 156 patients had physical examination and 51 patients had telephone follow-up (total = 207; 6 patients died, 36 patients lost to follow-up).
	No staples vs. staples	RTW	Return to work	NA	12 (Range: 1 to 56) (N=263)	13 (Range: 1 to 66) (N=273)	NR	N is hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Smith et al., 1999[816] (continued)	No staples vs. staples	ADV	Bruising/ seroma	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	13% (35/263)	9% (24/273)	p=0.13	N is hernias
	No staples vs. staples	ADV	Lateral port hernia	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	0% (0/263)	1% (2/273)	NS based on OR=0.21 (95% CI: 0.01 to 4.31)[@]	N is hernias
	No staples vs. staples	ADV	Mesh infection	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	0% (0/263)	0% (1/273)	p=0.96	N is hernias
	No staples vs. staples	ADV	Umbilical hernia	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	0% (1/263)	1% (3/273)	NS based on OR=0.34 (95% CI: 0.04 to 3.32)[@]	N is hernias
	No staples vs. staples	ADV	urinary retention	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	1% (2/263)	1% (3/273)	NS based on OR=0.69 (95% CI: 0.11 to 4.16)[@]	N is hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Smith et al., 1999[816] (continued)	No staples vs. staples	ADV	Wound infection	Median follow-up: 16 months, Mean: 17 months; Range: 3 to 39	2% (4/263)	1% (4/273)	NS based on OR=1.04 (95% CI: 0.26 to 4.2)[@]	N is hernias
Taylor et al., 2008[823]	Tacks vs. nonfixation	RC	Hernia recurrence	NR	1 (NS NR)	0 (NS NR)	NC	
	Tacks vs. nonfixation	Pain	Any new pain	NR	38% (NS NR)	23% (NS NR)	NC	
	Tacks vs. nonfixation	Pain	Pain score ≥2	NR	22% (NS NR)	15% (NS NR)	NC	
	Tacks vs. nonfixation	Pain	Pain score ≥3	NR	16% (NS NR)	8% (NS NR)	NC	
	Tacks vs. nonfixation	Pain	Pain score ≥4	NR	2% (NS NR)	0% (NS NR)	NC	
	Tacks vs. nonfixation	ADV	Morbidity	NR	11.3% (NS NR)	10.8% (NS NR)	NC	
Testini et al., 2010[824]	human fibrin glue vs. N-butyl-2-cyanoacrylate	RC	Hernia recurrence	Long term	0% (0/52)	0% (0/56)	NS based on OR=1.08 (95% CI: 0.02 to 55.22)[@]	N is hernias
	human fibrin glue vs. N-butyl-2-cyanoacrylate	HOSP	Length of postoperative hospital stay (hours)	NA	30.8 (SD: 12.96) (N=49)	32 (SD: 13.18) (N=54)	p=0.70	
	human fibrin glue vs. N-butyl-2-cyanoacrylate	RTW	Time to return to work (days)	NA	20.3 (SD: 3.94) (N=49)	19.8 (SD: 3.63) (N=54)	p=0.60	
	human fibrin glue vs. N-butyl-2-cyanoacrylate	Pain	Chronic pain	Long term	0% (0/52)	0% (0/56)	NS based on OR=1.08 (95% CI: 0.02 to 55.22)[@]	N is hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Testini et al., 2010[824] (continued)	human fibrin glue vs. N-butyl-2-cyanoacrylate	Pain	Post operative pain	short term	4% (2/52)	4% (2/54)	NS based on OR=1.04 (95% CI: 0.14 to 7.67)[@]	N is hernias
	human fibrin glue vs. N-butyl-2-cyanoacrylate	ADV	Intraoperative morbidity	NA	0% (0/49)	0% (0/54)	NS based on OR=1.1 (95% CI: 0.02 to 56.55)[@]	
	human fibrin glue vs. N-butyl-2-cyanoacrylate	ADV	Hematoma	short term	4% (2/52)	2% (1/54)	NS based on OR=2.12 (95% CI: 0.19 to 24.11)[@]	N is hernias
	human fibrin glue vs. N-butyl-2-cyanoacrylate	ADV	Local numbness	short term	2% (1/52)	4% (2/54)	NS based on OR=0.51 (95% CI: 0.04 to 5.8)[@]	N is hernias
	human fibrin glue vs. N-butyl-2-cyanoacrylate	ADV	Sensation of extraneous body	Long term	0% (0/52)	2% (1/56)	NS based on OR=0.35 (95% CI: 0.01 to 8.84)[@]	N is hernias
	human fibrin glue vs. N-butyl-2-cyanoacrylate	ADV	Seroma, wound infection, urinary retention	short term	0% (0/52)	0% (0/54)	NS based on OR=1.04 (95% CI: 0.02 to 53.29)[@]	N is hernias
	sutures vs. human fibrin glue	RC	Hernia recurrence	Long term	0% (0/59)	0% (0/52)	NS based on OR=0.88 (95% CI: 0.02 to 45.26)[@]	N is hernias
	sutures vs. human fibrin glue	HOSP	Length of postoperative hospital stay (hours)	NA	32.6 (SD: 13.39) (N=53)	30.8 (SD: 12.96) (N=49)	p=0.70	
	sutures vs. human fibrin glue	RTW	Time to return to work (days)	NA	20.4 (SD: 3.38) (N=53)	20.3 (SD: 3.94) (N=49)	p=0.60	
	sutures vs. human fibrin glue	Pain	Chronic pain	Long term	3% (2/59)	0% (0/52)	NS based on OR=4.57 (95% CI: 0.21 to 97.3)[@]	N is hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Testini et al., 2010[824] (continued)	sutures vs. human fibrin glue	Pain	Post operative pain	short term	12% (7/59)	4% (2/52)	NS based on OR=3.37 (95% CI: 0.67 to 16.98)[@]	N is hernias
	sutures vs. human fibrin glue	ADV	Intraoperative morbidity	NA	0% (0/53)	0% (0/49)	NS based on OR=0.93 (95% CI: 0.02 to 47.53)[@]	
	sutures vs. human fibrin glue	ADV	Hematoma	short term	7% (4/59)	4% (2/52)	NS based on OR=1.82 (95% CI: 0.32 to 10.36)[@]	N is hernias
	sutures vs. human fibrin glue	ADV	Local numbness	short term	8% (5/59)	2% (1/52)	NS based on OR=4.72 (95% CI: 0.53 to 41.81)[@]	N is hernias
	sutures vs. human fibrin glue	ADV	Sensation of extraneous body	Long term	8% (5/59)	0% (0/52)	NS based on OR=10.6 (95% CI: 0.57 to 196.43)[@]	N is hernias
	sutures vs. human fibrin glue	ADV	Seroma, wound infection, urinary retention	short term	0% (0/59)	0% (0/52)	NS based on OR=0.88 (95% CI: 0.02 to 45.26)[@]	N is hernias
	sutures vs. N-butyl-2-cyanoacrylate	RC	Hernia recurrence	Long term	0% (0/59)	0% (0/56)	NS based on OR=0.95 (95% CI: 0.02 to 48.67)[@]	N is hernias
	sutures vs. N-butyl-2-cyanoacrylate	HOSP	Length of postoperative hospital stay (hours)	NA	32.6 (SD: 13.39) (N=53)	32 (SD: 13.18) (N=54)	p=0.70	
	sutures vs. N-butyl-2-cyanoacrylate	RTW	Time to return to work (days)	NA	20.4 (SD: 3.38) (N=53)	19.8 (SD: 3.63) (N=54)	p=0.60	
	sutures vs. N-butyl-2-cyanoacrylate	Pain	Chronic pain	Long term	3% (2/59)	0% (0/56)	NS based on OR=4.91 (95% CI: 0.23 to 104.63)[@]	N is hernias
	sutures vs. N-butyl-2-cyanoacrylate	Pain	Post operative pain	short term	12% (7/59)	4% (2/54)	NS based on OR=3.5 (95% CI: 0.69 to 17.65)[@]	N is hernias

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Testini et al., 2010[824] (continued)	sutures vs. N-butyl-2-cyanoacrylate	ADV	Intraoperative morbidity	NA	0% (0/53)	0% (0/54)	NS based on OR=1.02 (95% CI: 0.02 to 52.28)[@]	
	sutures vs. N-butyl-2-cyanoacrylate	ADV	Hematoma	short term	7% (4/59)	2% (1/54)	NS based on OR=3.85 (95% CI: 0.42 to 35.62)[@]	N is hernias
	sutures vs. N-butyl-2-cyanoacrylate	ADV	Local numbness	short term	8% (5/59)	4% (2/54)	NS based on OR=2.41 (95% CI: 0.45 to 12.96)[@]	N is hernias
	sutures vs. N-butyl-2-cyanoacrylate	ADV	Sensation of extraneous body	Long term	8% (5/59)	2% (1/56)	NS based on OR=5.09 (95% CI: 0.58 to 45.04)[@]	N is hernias
	sutures vs. N-butyl-2-cyanoacrylate	ADV	Seroma, wound infection, urinary retention	short term	0% (0/59)	0% (0/54)	NS based on OR=0.92 (95% CI: 0.02 to 46.97)[@]	N is hernias

Table Note:
[@] Calculated by evidence reviewer

Key Question 7 Tables

Table 67. Key Question 7: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Bittner et al., 2002[631-635]	Germany	Marienhospital Stuttgart	1	Nonrandomized comparative study	Compared recurrence rates between surgeons with varying experience, and also compared recurrence rates between those operated earlier vs. later in the series	6,479	4/1993 - 3/2002	Non-specialist teaching hospital	NR
Bobrzynski et al., 2001[638]	Poland	Jagiellonian University (Krakow) and District Hospital in Szczecin	2	Nonrandomized comparative study	Compared recurrence rates between those operated earlier vs. later in the series	368	1/1993 to ?	Hospital	NR
Champault et al., 1997[651-654]	France	Paris University Hospital	1	RCT	Stoppa vs. TEP	50	7/1991 - 3/1995	University hospital	NR
Cheah et al., 2004[659]	Singapore	National University Hospital	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	141	1997-2003	University hospital	NR
Davies et al., 1995[666,667]	United Kingdom	Addenbrooke's Hospital, Cambridge	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	265	10/1991 to ?	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Dirksen et al., 1998[671,672]	The Netherlands	University Hospital Maastricht	1	RCT	Compared recurrence rates between surgeons with varying experience	88	11/1993 to ?	University hospital	University Hospital Maastricht Fund for Outstanding and Competitive Clinical Research
Dulucq et al., 2009[677]	France	Institute of laparoscopic Surgery	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	2,356	6/1990 to 5/2005	Specialist laparoscopy	NR
Edwards et al., 2000[678]	USA	NR	NR	Case series	Compared recurrence rates between those operated earlier vs. later in the series	133	3/1992 - 6/1994	NR	NR
Feliu-Pala et al., 2001[684]	Spain	Hospital general d'Igualada (Barcelona) and Hospital Virgen Macarena (Seville)	2	Case series	Compared recurrence rates between those operated earlier vs. later in the series	981	11/1993 - 10/2000	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Felix et al., 1998[685]	USA	Center for Hernia Repair (Fresno, CA), 600 Medical Drive (Wentzville, MO), 2123 Auburn St. (Cincinnati, OH), Minimally Invasive Surgery Training Institute (Baltimore, MD), Georgia Baptist Medical Center (Atlanta, GA), 1604 Hospital Parkway (Bedford, TX), Emory University (Marietta, GA)	7	Nonrandomized comparative study	Compared recurrence rates between centers with varying experience	7,661	1/1990 to 12/1996	Specialized hernia centers	NR
Ferzli et al., 1995[686]	USA	NR	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	249	9/1991 to 5/1994	University hospital	NR
Geis et al., 1993[699]	USA	Lutheran general Hospital Chicago (IL) and Christ Hospital Cincinnati (OH)	2	Case series	Compared recurrence rates between those operated earlier vs. later in the series	364	NR	Non-university hospital	Supported in part by the Lutheran general Medical Group
Kanakala et al., 2010[714]	United Kingdom	Northumbria Healthcare Foundation Trust	1	Nonrandomized comparative study	Compared recurrence rates between surgeons with varying experience	124	2002 to ?	laparoscopic skills workshop	NR
Kapiris et al., 2001[715]	United Kingdom	Hull Royal Infirmary and Stepping Hill Hospital	2	Case series	Compared recurrence rates between those operated earlier vs. later in the series	3,017	5/1992 to 7/1999	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Kieturakis et al., 1994[719]	USA	NR	2	Case series	Compared recurrence rates between those operated earlier vs. later in the series	113	1991 to ?	NR	NR
Lal et al., 2004[730]	India	Maulana Azad Medical College	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	56	4/2000 - 9/2002	University hospital	NR
Lamb et al., 2006[731,732]	United Kingdom	Royal Infirmary and Western general Hospital in Edinburgh	2	Case series	Compared recurrence rates between those operated earlier vs. later in the series	1,283	1/1993 to 12/2004	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Langeveld et al., 2010[736]	The Netherlands	Six hospitals in the Netherlands; specific hospitals not reported	6	RCT	Lichtenstein vs. TEP	670	8/2000 to 3/2004	5 non-university hospital and one university hospital	Erasmus Medical Center Healthcare Efficiency research program. "The Healthcare Efficiency research program did not play a role in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication"
Lau et al., 2002[737]	China	University of Hong Kong Medical Center	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	120	NR	University hospital	NR
Liem et al., 1997[741-747]	The Netherlands	Four hospitals in the Netherlands	4	RCT	TEP vs. non-mesh open repair	120	2/1994 - 6/1995	Three non-university hospitals and one university hospital	Dutch Ministry of Health, Welfare, and Sports

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Lovisetto et al., 2007[748]	Italy	1st Department of Surgery, Sesto San Giovanni (Milano)	1	Nonrandomized comparative study	Compared recurrence rates between surgeons with varying experience, and also compared recurrence rates between those operated earlier vs. later in the series	1,694	3/1992 to 3/2004		NR
MRC et al., 1999[747,753-760]	United Kingdom and Ireland	26 hospitals in the UK and Ireland	26	RCT	Lichtenstein/Stoppa/ non-mesh vs. TAPP/TEP	928	1/1994 to 3/1997	general nonspecialist hospitals	Medical Research Council
Neumayer et al., 2004[762-768]	USA	14 VA medical centers	14	RCT	Lichtenstein vs. TAPP/TEP	2,164	1/1999 to 11/2001	Non-university hospitals	Cooperative Studies Program of the Department of Veterans Affairs Office of Research and Development
Pikoulis et al., 2002[790]	Greece	ASCLEPEION Voulas and University Medical School in Athens	2	Nonrandomized comparative study	Compared recurrence rates between those operated earlier vs. later in the series	237	8/1995 to 9/1999	Hospital	NR
Ramshaw et al., 2001[795]	USA	Atlanta Medical Center (Atlanta GA)	1	Nonrandomized comparative study	Compared recurrence rates between those operated earlier vs. later in the series	1,224	5/1991 - 4/1997	Non-university hospital	NR
Ridings et al., 2000[796]	United Kingdom	Royal Shrewsbury Hospital	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	"Over 1700" hernias	1992 - ?	Hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Schultz et al., 2000[804]	Germany	Klinik fur Allgemein und Unfallchirurgie	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	1,952	12/1992 - 11/1999	Hospital	NR
Staarink et al., 2008[817]	The Netherlands	Ikazia Hospital Rotterdam	1	Nonrandomized comparative study	Compared recurrence rates between surgeons with varying experience	178	1/1995 to 1/1996	Non-university hospital	NR
Swadia et al., 2011[821]	India	Swadia Institute of Minimally Invasive Surgery	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	884 (estimated based on 1539 hernias treated by TEP)	1/2000 to 12/2008	Specialized laparoscopy center	Funding source not reported, however the publication stated that "The author declares that he has no conflict of interest regarding this study."
Tamme et al., 2003[822]	Germany	Department of Surgery and Center for Minimally Invasive Surgery, Hanover Hospital	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	3,868	5/1994 - 12/2001	Specialized center	NR
Voitk et al., 1998[828]	Canada	Salvation Army Scarborough Grace Hospital	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	98	3/1992 - 5/1996	Secondary care community hospital	NR

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Zendejas et al., 2011[836]	USA	Mayo Clinic, Rochester, MN	1	Case series	Compared recurrence rates between those operated earlier vs. later in the series	976	9/1995 to 12/2009	Teaching hospital	National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH), and the NIH Roadmap for Medical Research

Table Note:
Six of the above studies (Dirksen et al., 1998[671,672], Ferzli et al., 1995[686], Liem et al., 1997[741-747], Pikoulis et al., 2002[790], Ramshaw et al., 2001[795], and Swadia et al., 2011[821]) reported data on excluded treatments such as non-mesh surgery, and we only included the surgical experience data pertaining to the laparoscopic mesh groups that were enrolled.

Table 68. Key Question 7: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Bittner et al., 2002[631-635]																
Bobrzynski et al., 2001[638]																
Champault et al., 1997[651-654]					x		x		x						x	
Cheah et al., 2004[659]					x											
Davies et al., 1995[666,667]																
Dirksen et al., 1998[671,672]			x													
Dulucq et al., 2009[677]					x											
Edwards et al., 2000[678]																
Feliu-Pala et al., 2001[684]					x									x		
Felix et al., 1998[685]																
Ferzli et al., 1995[686]																
Geis et al., 1993[699]																
Kanakala et al., 2010[714]			x													
Kapiris et al., 2001[715]																

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Kieturakis et al., 1994[719]																
Lal et al., 2004[730]																
Lamb et al., 2006[731,732]																
Langeveld et al., 2010[736]														x		
Lau et al., 2002[737]				x												
Liem et al., 1997[741-747]				x												
Lovisetto et al., 2007[748]																
MRC et al., 1999[747,753-760]					x									x		
Neumayer et al., 2004[762-768]							x									
Pikoulis et al., 2002[790]																
Ramshaw et al., 2001[795]																
Ridings et al., 2000[796]																
Schultz et al., 2000[804]					x											
Staarink et al., 2008[817]				x												

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Swadia et al., 2010[821]					x		x									
Tamme et al., 2003[822]																
Voitk et al., 1998[828]																
Zendejas et al., 2011[836,840]																

Table 69. Key Question 7: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Bittner et al., 2002[631-635]	Adults														
Bobrzynski et al., 2001[638]	Adults														
Champault et al., 1997[651-654]	40-75	x			x		x	x			x	x			
Cheah et al., 2004[659]	Adults						x								
Davies et al., 1995[666,667]	Adults						x								
Dirksen et al., 1998[671,672]	20-80				x	4+				x	x			x	
Dulucq et al., 2009[677]	Adults														
Edwards et al., 2000[678]	Adults														
Feliu-Pala et al., 2001[684]	21+						x			x	x				
Felix et al., 1998[685]	Adults														
Ferzli et al., 1995[686]	Adults														
Geis et al., 1993[699]	Adults														
Kanakala et al., 2010[714]	Adults														

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Kapiris et al., 2001[715]	Adults														
Kieturakis et al., 1994[719]	Adults														
Lal et al., 2004[730]	Adults				x										
Lamb et al., 2006[731,732]	Adults														
Langeveld et al., 2010[736]	18+									x					
Lau et al., 2002[737]	Adults														
Liem et al., 1997[741-747]	20+				x		x			x					
Lovisetto et al., 2007[748]	Adults														
MRC et al., 1999[747,753-760]	Adults						x			x	x				
Neumayer et al., 2004[762-768]	18+	x			x	4+	x	x							
Pikoulis et al., 2002[790]	Adults				x		x			x					
Ramshaw et al., 2001[795]	Adults														
Ridings et al., 2000[796]	Adults														
Schultz et al., 2000[804]	Adults				x										

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Staarink et al., 2008[817]	Adults														
Swadia et al., 2010[821]	18+				x		x								
Tamme et al., 2003[822]	Adults				x						x		x		
Voitk et al., 1998[828]	Adults														
Zendejas et al., 2011[836,840]	Adults														

Table 70. Key Question 7: Patient enrollment criteria, other

Study	Other enrollment criteria
Bittner et al., 2002[631-635]	Included all hernia repairs in their database, “completely unselected”
Bobrzynski et al., 2001[638]	No other criteria
Champault et al., 1997[651-654]	Excluded poor cardiorespiratory status, cirrhosis, coagulopathy, glaucoma, pelvic irradiation, body mass index more than 30 (however this stated criterion was not applied uniformly because 31% of patients (31/100) had a body mass index greater than 30). Appendectomy was not an exclusion
Cheah et al., 2004[659]	No other criteria
Davies et al., 1995[666,667]	Within the first 300 TAPP repairs at a single hospital, but excluded from laparoscopy those with extreme obesity or multiple lower abdominal scars.
Dirksen et al., 1998[671,672]	Excluded patients needing other operations simultaneously
Dulucq et al., 2009[677]	No other criteria
Edwards et al., 2000[678]	No other criteria
Feliu-Pala et al., 2001[684]	No other criteria
Felix et al., 1998[685]	Center had performed at least 500 laparoscopic hernioplasties during that period and 2) had detailed records of the procedures, and 3) had long-term follow-up of the patients
Ferzli et al., 1995[686]	No other criteria
Geis et al., 1993[699]	No other criteria
Kanakala et al., 2010[714]	Either operated on by a trainee in a laparoscopic skills training course, or was operated on by an experienced consultant and was matched on age sex and ASA score to someone in the first group, and required the patient to be suitable for day case surgery.
Kapiris et al., 2001[715]	No other criteria
Kieturakis et al., 1994[719]	No other criteria
Lal et al., 2004[730]	No other criteria
Lamb et al., 2006[731,732]	No other criteria
Langeveld et al., 2010[736]	Excluded those with communicative or cognitive limitation that prevented informed consent, medical history of prostatectomy, abdominal bladder operation.
Lau et al., 2002[737]	No other criteria
Liem et al., 1997[741-747]	Included only those already scheduled to receive general anesthesia. Excluded second or more recurrence, additional surgical operation during the hernia repair, severe local inflammation, or radiotherapy, pregnant for more than 12 weeks, previous participaiton in the study with the contralateral hernia, mentally incompetent, unable to speak Dutch.
Lovisetto et al., 2007[748]	No other criteria
MRC et al., 1999[747,753-760]	Excluded those who had a previous midline or paramedian incision, incarcerated hernia

Study	Other enrollment criteria
Neumayer et al., 2004[762-768]	Excluded hernia undetected on physical examination, presence of bowel obstruction/strangulation/peritonitis/perforation, contraindications to pelvic laparoscopy such as previous pelvic surgical procedures, previous mesh hernia repair, life expectancy less than two years, participation in another clinical trial.
Pikoulis et al., 2002[790]	Excluded those with a 2nd or more recurrence
Ramshaw et al., 2001[795]	No other criteria
Ridings et al., 2000[796]	No other criteria
Schultz et al., 2000[804]	Excluded lack of patient consent, resection of an intestinal segment necessary because of incarceration
Staarink et al., 2008[817]	Excluded prior inguinal surgery, required conversion to TAPP from the planned TEP, patients “not cooperating” (this was not explained further by the authors), patients in whom no physical exam was performed due to mesh migration
Swadia et al., 2010[821]	In the initial three years of the 9-year enrollment period, they excluded those with previous lower abdominal and pelvic surgeries, and irreducible hernias, but such patients were included in the last 6 years.
Tamme et al., 2003[822]	No other criteria
Voitk et al., 1998[828]	Included those within the first 120 elective TAPP patients performed by a single surgeon, and suitable for laparoscopy (which resulted in 98 included patients).
Zendejas et al., 2011[836,840]	Included all patients who underwent a laparoscopic TEP inguinal hernia repair by surgical trainees supervised by a single staff surgeon

Table 71. Key Question 7: Treatment details

Study	Treatment A (this question only involves laparoscopic procedures)
Bittner et al., 2002[631-635]	TAPP, general anesthesia. 15 surgeons with varying experience, but most operations performed by the three senior surgeons. Trainees currently performed 44.9% of the operations in 2001. recurrent hernia repairs performed only by senior surgeons. large polypropylene mesh (initially was 8x12 cm, later 10x15 cm). B shaped clips (reduced to a maximum of 4-6; 2 at Cooper's ligament, two at the rectus medial to the epigastric vessels, and two on the fascia transversalis craniolateral to the epigastric vessels) with strict avoidance of clips in the area distal to the ileopubic tract. Since the 2000th procedure, only unslitted mesh has been used. Later publication: 20 surgeons, who provided data on anywhere between 2 and 4,733 TAPPs each (median 161; NR the numbers performed before the study period).
Bobrzynski et al., 2001[638]	TEP and TAPP, results provided separately. TEP: Two surgeons; they had "many years of experience"; study did not report whether this experience involve TEP or other hernia repairs or other laparoscopic procedures, but they had performed at least 50 prior non-hernia operations using laparoscopic equipment. working space created using blunt dissection without a balloon. mesh 10x15 cm positioned over the groin area and secured with clips. No slit for the spermatic cord. TAPP: First 2 years five months of TAPP involved limited dissection and a small mesh covering only existing visible defects in the groin. After that, a larger area of dissection and a larger mesh was used (10x15 cm). Mesh always placed under the spermatic duct; mesh with an incision on its longer edge.
Champault et al., 1997[651-654]	TEP, prior experience with TEP of this surgeon was 50 cases (to confirm feasibility and serve as a training period for the members of the surgical team). general anesthesia, direct inflation of the Retzius space using carbon dioxide with a Veress needle. One mesh if unilateral, two if . mesh was polypropylene (Ethicon) slit on the lower edge to allow passage of the spermatic cord, mesh not fixed. First 11 patients had 11x6 cm mesh, last 89 patients had 15x13 cm mesh.
Cheah et al., 2004[659]	TEP. Study did not report surgeon(s)' prior experience performing TEPs. general anesthesia. Rectus muscle retracted to expose the posterior rectus. Balloon dissection (AutoSuture, Tyco) and CO2 insufflation to at most 12 mmHg. Hernia sac reduced from the inguinal wall. Indirect sac reduced and separated from the spermatic cord, but if the sac was too long, it was divded and the peritoneal side ligated. Rolled polypropylene mesh 8x12cm placed horizontally, covering the inguinal wall from the midline of the pubis to lateral to the deep inguinal ring. mesh anchored with tacks (Protack, AutoSuture) to Cooper's ligament, but no tacking near the iliac vessels or laterally near the iliohypogastric nerve, the genitofemoral nerve, and the lateral femoral cutaneous nerve of the thigh. Sometimes a larger 10x15 cm mesh was used and not anchored. Repairs always employed two meshes.
Davies et al., 1995[666,667]	TAPP, these were the first 300 TAPPs they had performed, thus the surgeon(s) had no prior experience performing TAPP. 72% of operations were carried out with the consultant as the main surgeon; the other 28% by senior registrars once trained. general anesthesia. Pneumoperitoneum using CO2 of up to 4 liters at a pressure of 12 mmHg using either a Veress nedle or an open blunt cannulation technique. Gradual evolving of the technique over the 300 procedures described in this paper. Peritoneal flap raised off the posterior surface of the transversalis fascia and extended posteriorly and caudally to expose an adequate length of testicular vessels and cvas (5-6cm). Hernial sac identified and either inverted or transected. DIrect defect is closed by stapling or suturing a flap of transversalis fascia across it. Prolene mesh (Ethicon) 9x12cm and fixed over the defect with either staples or sutures (2/0 Vicryl on a 30 mm curved needle). Peritoneum closed over the mesh with either staples or a further continuous Vicryl suture. "The technique has developed steadily over the 300 cases."

Study	Treatment A (this question only involves laparoscopic procedures)
Dirksen et al., 1998[671,672]	TAPP, 3 lap. surgeons, or by residents assisted by lap. surgeons (did not report how many residents, or how many surgeries they performed before or during the study, but residents performed 32 of the 114 laparoscopic repairs in the study) The lap. surgeons all had at least 20 prior lap. repairs before the study. Carbon dioxide pneumoperitoneum established with a Verres needle. Direct sac reduced, indirect sac reduced and dissected off the vas deferens and the testicular vessels. large indirect sacs were transsected. Polypropylene mesh 10x15 cm with rounded edges positioned over the inguino-femoral area and teh defect . mesh not anchored. Peritoneum colsed with running absorbable sutures.
Dulucq et al., 2009[677]	97% TEP (3008/3100), 3% TAPP (92/3100). general anesthesia. TEP procedure performed as follows. Veress needle for CO2 insufflation to 15 mmHg.; once 1.5 L enters the space, the pressure is reduced to a maximum of 12 mmHg. Preperitoneal space is widened by alternate sharp and blunt dissection. Hernia sac gradually dissected and freed from the internal inguinal ring; direct hernia easily reduced by simple traction; femoral hernias reduced by gentle traction with fenestrated forceps. 14x10 cm mesh (Microval, Ethicon, France) is rolled and reinforces the myopectineal orifice. Inferior and lateral edge of the mesh is placed on the anterior surface of the psoas muscle; the inferior and medial edge is placed under Cooper's ligament. Inferior edge of the mesh covers the iliac vessels and the spermatic cord;the superior edge follows the contour of the abdominal wall during release of the pneumoperitoneum. Early patients in the series involved securing the mesh with tackers or sutures, but later patients did not.
Edwards et al., 2000[678]	TAPP, 3 surgeons, all had minimal or no previous clinical experience with laparoscopic hernia repair in the role of primary surgeon, but all had "significant" experience with open hernia repair, lap. cholecystectomy, and had attended at least a recognized lap. hernia repair training center before the study. Two of the 3 surgeons had performed <10 inguinal hernia repairs with the plug and patch technique, and the third had no prior clinical experience as the primary surgeon for lap. hernia repair. Anesthesia method not reported. Creation of transverse incision in the peritoneum anterior to the hernia defect. Peritoneal flap is created and reflected posteriorly. Hernia sacs dissected completely free from the cord structures or transected. 7x12 cm polypropylene mesh (Surgi-Pro), positioned to adequately cover the inguinal floor with good overlap of the hernia defect. mesh is secured with staples (Endo-Hernia, US SUrgical) superiorly, laterally, and medially to the pubic tubercle and the Cooper ligament. No staples lateral to the cord structures and inferior to the ileopubic tract. Unslitted mesh. Peritoneal flap reapproximated with staples.
Feliu-Pala et al., 2001[684]	TEP, four surgeons, all had previous experience with TAPP and the preperitoneal open approach. general anesthesia in 88.3%, spinal anesthesia in 11.7%. Balloon dissection, entire posterior wall and cord dissection. 14x15 cm polypropylene mesh covering the inguinal floor; mesh was fixed (method not reported)
Felix et al., 1998[685]	Overall 51% TAPP, 49% TEP, but this ratio ranged from 0% to 100% across the seven centers. Anesthesia could have been general, regional, or local, according to surgeon preference. Regardless of surgeon or center, the following surgical aspects were uniform: 1) posterior wall or floor of the groin was completely dissected, 2) polypropylene mesh anchored to the posterior wall with either staples (Ethicon or US Surgical), 3) mesh anchored to Cooper's ligament, the transversalis fascia medially, and above the ileopubic tract laterally, 4) mesh was cut to cover all three potential hernia sites (indirect, direct, femoral), 5) mesh completely covered by peritoneum. The following surgical aspects varied by center: 1) number of anchors, 2) Number of layers of mesh (one or two), 3) Whether to slit the mesh for the cord structures, 4) Treatment of inferior epigastric vessels (covered by mesh, or dissected out and placed over the mesh, or ligated), 5) Specific method of extraperitoneal dissection (manually, or with a balloon dissector).

Study	Treatment A (this question only involves laparoscopic procedures)
Ferzli et al., 1995[686]	TEP. Did not report surgeons' prior experience with TEP. Either general or epidural anesthesia (unreported %'s). The method of creating the cavity changed throughout the series. It started under direct vision using an operating scope through which instruments were passed to bluntly or sharply penetrate peritoneal fat; the second method involved a bloon dissector; the third involve blunt digital dissection (last 149 cases). Co2 insufflation to 9-10 mmHg, but some operations involved a gasless technique o f Laprofan fan retractor and Laprolife to elevate the anterior wall (ORIGIN Medsystems). mesh placed (size or type not reported) from the anterior superior iliac spine to the pubic symphysis, and anchored with staples to Cooper's ligament, the midline, and the abdominal wall musculature laterally. For the last 149 patients, none of the following were used: irrigation setups, operative scopes, balloon dissectors, disposable endoclips, endoshears.
Geis et al., 1993[699]	TAPP. general anesthesia. Carbon dioxide insufflation. Peritoneum transected curvilinearly along the roof of the inguinal space and retracted inferiorly along with preperitoneal areolar tissue. Direct sac reduced by traction on the apex of the sac. For 56% of indirect hernias, the sac was shallow and reducible without traction on cord structures. In the other 44% of indirect hernias, the sac was deep and was transected at the level of the internal ring. Rectangular polypropylene mesh (size or manufacturer not reported) placed to cover the indirect inguinal space, the direct inguinal space, and the femoral space, regardless of hernia type. mesh was neither rolled nor folded. 62% of meshes were incised laterally and a keyhole opening constructed. Inferior tongue of the mesh placed under the cord structures along the inguinal liament; superior tongue of mesh placed of the superior portion of the inguinal space; lateral tongues of the mesh were overlapped. mesh fixed with sutures (first 50 cases) or staples (subsequent 314 cases) to the pubic tubercle, the edge of the inguinal ligament, Cooper's ligament, the transversalis arch, the conjoint tendon, and the transversus abdominus muscle. If inferior epigastric vessels were deemed to be at a distance sephalad to the floor of the inguinal canal, the superior tongue of the mesh was instead placed between the inferior epigastric vessels and the floor of the inguinal canal (to avoid tenting of the mesh).
Kanakala et al., 2010[714]	Specific lap. procedure not reported. Half the patients were operated on by a trainee, and the other half by experienced consultants. Trainees receive a series of lectures and interactive sessions followed by video demonstrations, and at least two hours of practice on a simulator (ProMIS, Boston, MA) the day before the first patient. All trainees were supervised during the operation. These supervisors were the same surgeons who were the experienced consultants operating on the other half of the patients.
Kapiris et al., 2001[715]	TAPP. general anesthesia. Polypropylene mesh. Five phases of evolution in the technique. Phase 1 (325 repairs): trocars 10x12x5, mesh 11x6cm, stapled mesh, stapled peritoneum. Phase 2 (227 repairs): trocars 10x12x5, mesh 13x8cm, stapled mesh, stapled peritoneum. Phase 3 (865 repairs): trocars 10x12x5, mesh 15x19 cm, stapled mesh, sutured peritoneum. Phase 4 (2,097repairs): trocars 10x5x5, mesh 15x10cm, unstapled mesh, sutured peritoneum. Phase 5 (16 repairs): trocars 10x5x5, mesh 15x10 cm, stapled mesh, sutured peritoneum. For later suturing of peritoneum, Vicryl sutures were used. If hernias, a second mesh is used.
Kieturakis et al., 1994[719]	TEP, nothing reported about surgeons' prior TEP experience. 70% general anesthesia and 30% regional anesthesia. Balloon dissection (Spacemaker Balloon Dissector, general Surgical Innovations, Palo Alto CA) to create extraperitoneal cavity, pressure 50 to 100 mmHg (not filled with CO2 but rather saline), then balloon is removed, and the resulting cavoty is inflated to 8-10 mmHg. If indirect hernial sac and small, attempt is made to reduce it into the abdominopelvic cavity, but if sac is too long, either an instrument or circumferential suture is used and content reduced. 8x10 cm polypropylene mesh to cover the mycopectineal orifice, stapled to Cooper's ligament medially and to the abdominal wall anterolaterally (3-4 staples). No staples over or laterally to or posterior to the iliac vessels. Second piece used if contralateral hernia.
Lal et al., 2004[730]	TEP, Prior to the study, the surgeon was "well experienced in laparoscopic surgeries other than hernia"; number of prior surgeries not reported. First 5 cases were Stoppa procedure (15x15 cm polypropylene mesh) in order to gain familiarity with the anatomy. general anesthesia. There was no assistance from another surgeon experienced in lap. surgery. Preperitoneal space developed frome the symphysis pubis medially to the psoas muscle laterally and the hernial sacs are reduced. 12x15 cm Prolene mesh placed to the preperitoneal space and fixed to the pubic bone using one or two tacks (Origin)

Study	Treatment A (this question only involves laparoscopic procedures)
Lamb et al., 2006[731,732]	TEP, did not report the total number of surgeons, but "the majority" of procedures were performed by 8 consultants, and the rest were supervised by them. Anesthesia method not reported. Polypropylene mesh 10x15 cm (specific meshes not reported, but they were "heavyweight") placed so that the deep inguinal ring and the posterior wall of the inguinal canal are covered by at least 3 cm of mesh in all directions. Fixation method (if used) was not reported.
Langeveld et al., 2010[736]	TEP, and all surgeons were either experience with both TEP and Lichtenstein, or they were supervised by an experienced surgeons (did not report the percentage of surgeons who needed supervision). For TEP, either the surgeon or the supervisor had to have a minimum of 100 laparoscopic interventions and a minimum of 30 endoscopic corrections of inguinal hernia (did not report whether these had to be TEPs). general anesthesia. INsufflation with carbon dioxide through a blunt tip trocar (pressure, 12-15 mm Hg). 12x15cm polypropylene mesh (Prolene or Marlex) placed over the myopectineal oprifice of Fruchaud. No routine mesh fixation, but if it was done, it was fixed to Coopers ligament with tackers.
Lau et al., 2002[737]	TEP, single surgeon who had performed 14 prior TAPPs. general anesthesia. Division of the anterior rectus sheath exposed the rectus muscle, which was retracted laterally. CO2 insufflation wo 10 mmHg. Extraperitoneal space dissected and created by endo-scissors with diathermy; not balloon dissection. Hernial sac dissected and reduced; for direct hernias, the attenuated transversalis fascia was usally inverted and stapled to the rectus muscle. Parietalization of the spermatic cord for 4cm. Prolene mesh 10x14 cm (Ethicon) anchored in place with an endo-stapler (Multifire Endo Hernia, US Surgical).
Liem et al., 1997[741-747]	TEP, 23 surgeons, who had "ample experience" with other laparoscopiuc procedures and acquired experience with this particular procedure under the supervision of experienced surgeons before they were allowed to participate in the trial. 99% had general anesthesia, 1% had spinal anesthesia. Balloon dissection (Origin Medsystems, Inc. Menlo Park CA) to develop the preperitoneal space. Extensive lateral dissection with isolation and manipulation of the structures of the spermatic cord. Polypropylene mesh 10x15cm (either Marlex or Prolene) placed over the myopectineal orifice. mesh was not split and also was not fixed.
Lovisetto et al., 2007[748]	TAPP. There was a 12 year follow-up period. The first two years was a single surgeon when TAPP was "experimental." Years 3-6 involved two surgeons, and years 7-12 involved five "skilled" surgeons (did not report the number of prior procedures performed by each surgeon). The last three surgeons were trained by the first two. Few specifics about the TAPP were reported, but the following surgical aspects were gradually phased in over the 12 year period: use of Veress needle, use of trocars, closure of the abdominal wall, opening/detachment of the peritoneal wall, freeing of Cooper's ligament, preparation of the spermatic cord, and positioning of the mesh
MRC et al., 1999[747,753-760]	77% TEP (321/419 initiated procedures), 23% TAPP (98/419 initiated procedures), depending on surgeon's preference. 27 surgeons. "All surgeons had previous experience of at least ten laparoscopic hernia repairs. Surgeons who felt that they were still learning the technique were visited by an experienced surgeon who gave them additional training and observed each surgeon doing the hernia repair." 65% of surgeons were consultants (i.e., most experienced), 34% were senior trainees (i.e., moderate experience), 2% were junior trainees (i.e., least experienced). general anesthesia, unless the patient requested otherwise (did not report the number who requested otherwise). Recommended mesh 15cm x10cm polypropylene, but other meshes may have been used. Whether to fix the mesh was based on surgeon preference.
Neumayer et al., 2004[762-768]	90% TEP, 10% TAPP. TAPP was the method of Fitzgibbons; TEP was the method of Smith. 99.1% had general anesthesia; 0.7% had regional anesthesia; 0.2% had local anesthesia. Specific meshes not reported, but there was a minimum mesh size (not reported) and a minimum overlap beyond a direct defect. 78 surgeons; 26% (20) had at least 250 prior laparoscopic repairs (did not report whether these were always the same as those performed in the study), and the other 74% (58) had more than 25 but fewer than 250 prior laparoscopic hernia repairs (did not report the average number). Surgeons submitted a videotape of a previously performed laparoscopic hernia procedure that was reviewed by a surgeon on the study committee. Attending surgeon was present through the procedure if he/she was not the one performing the procedure. Techniques were agreed upon beforehand and clarified with videos from the American College of Surgery.

Study	Treatment A (this question only involves laparoscopic procedures)
Pikoulis et al., 2002[790]	TAPP, performed by "senior specialists." Did not report the prior number of TAPPs performed by these specialists. general anesthesia. Peritoneum incised in a U shape from the medial umbilical ligament to the iliopubic tract. Peritoneal flap reflected upwards and downwards to expose Cooper's ligament and the conjoined tendon. For 176 of 197 indirect hernias, the sac was dissected off the spermatic cord. For 21 huge scrotal hernias, sac was amputated at the level of the inguinal canal. 6x10 cm polypropylene mesh placed over the entire floor and fixed with clips. Mostly the epigastric vessels and the cord structures were not dissected from the groin wall and so were covered entirely by the mesh. Peritoneal incision closed with clips.
Ramshaw et al., 2001[795]	TEP. Surgeons had no prior experience with TEP, but one or more of them (unreported) had performed 300 prior TAPPs. 509 (82%) had general anesthesia, and 115 (18%) had epidural anesthesia; this was mostly based on patient preference. The first 300 repairs were standardized, and then they made seeral minor modifcations ove the next 624 repairs. The finally decided upon repair had the following characteristics. Fascia is divided sharply just lateral to the linea alba. Distension balloon advanced to the pubis, and insufflation CO2 to a maximum of 10-12 mmHg. Direct hernia reduced to expose the fascial planes. Plane is developed using blunt dissection between the inferior epigastric vessels anteriorly and the cord structures posteriorly. Cord structures are retracted medially and toward the laparoscope to clear the cord tissue from the lateral abdominal wall and to reduce any lipomas of the cord. Indirect hernia is reduced. Contralateral reduction accomplished similarly. Once entire pelvic floor is visualized, mesh placement is begun, starting with a small 6x3 inch (7.6x15.2 cm) polypropylene mesh, but a larger piece may be used. Keyhole slit in the anterior portion of the mesh, then it is folded and sutured into place. Anterior mesh flaps are placed superiorly to the transversus arch. mesh is overlapped laterally, and a racker is used to close the defect in the mesh anteriolaterally. mesh is fixed laterally to the transversus arch and the anterior aspect of the iliopubic tract. Medial mesh is fixed to the superior aspect of Cooper's ligament and to the transversus arch.
Ridings et al., 2000[796]	TAPP, typically general anesthesia (did not report %). Veress needle to form pneumoperitoneum. Peritoneum incised transversely from the region of the medial umbilical ligament laterall and anterior to the hernial defect. "After 140 patients, we began to transilluminate the abdominal wall with the telescope light prior to port insertion." Peritoneal flaps are developed. Direct sacs and small indirect sacs are fully reduced, whereas larger indirect sacs are part dissected and having freed the cord structures posteriorly, they are circumcised. First 100 patients involve a 6x5 cm mesh that was not fixed to the pubic symphysis. In 1993 a larger mesh was then used (12x7 cm), and in 1996 still larger 15x10 cm mesh. mesh medial border made adjacent to the symphysis pubis and the posterior part is placed well behind the internal ring. mesh stapled in place, staples in the pubic bone and Cooper's ligament. More staples into the muscle layers anteriorly but none into the ileopubic tract or posterior to it. For hernia, the same procedure is done, using a second mesh. Peritoneum is reconstituted by stapling.
Schultz et al., 2000[804]	TAPP, Until 1997 there were 3 surgeons, and since then a fourth has been added. Did not report prior experience of these 4 surgeons. general anesthesia. 12x15cm polypropylene mesh, fixed with staples or clips. If peritoneum cannot be dissected from the cord structures, the mesh is split and placed behind them. Mesh completely covered by peritoneum.
Staarink et al., 2008[817]	TEP, Three surgeons, all "experienced" in endoscopic surgery, but authors did not report their prior experience with the study procedure. general anesthesia. Polypropylene mesh 10x15 cm (Marlex mesh, CR Bard), no "fixation materials" were used, but the mesh was anchored to the abdominal wall simply by intraabdominal pressure

Study	Treatment A (this question only involves laparoscopic procedures)
Swadia et al., 2010[821]	85% TEP 15% Lichtenstein, general anesthesia. To create the extraperitoneal space, the tough anterior layer of transversalis fascia is broken by the finger and the loose areolar plane entered; finger is swept sideways on both the sides to create the space. Then a retractor lifts the abdominal wall. Balloon fitted with a sphygmomanometer bulb inflated for three minutes. CO2 insufflation. TO complete visualization, a sweeping movement of a blunt instrument is used. Direct sac is reduced by teasing apart the psuedosac from the peritoneum. Retropubic space is dissected until the obturator vessels and nerve are exposed. Blunt dissection to separate the peritoneum from the anterior abdominal wall up to the anterior superior iliac spine and also from the surface of the iliopsoas muscle. Indirect sac is dissected downwards in a stepwise fashion, brought down until the vas turns medially. 15x15 rolled polypropylene mesh unfurled and spread to conform to the shape of anterior abdominal wall superiorly and tucked in the cave of Retzius inferiorly. Proximally it lies on the spermatic cord, vessels and peritoneal fold. Single tack applied with Protack on Cooper's ligament. Slow desufflation with gradual withdrawal of the scope so the mesh position is confirmed.
Tamme et al., 2003[822]	TEP, 16 surgeons, which included 6 who were surgeons in training and were being supervised. Did not report the prior TEP experience of the 10 who were unsupervised. general anesthesia. Blunt dissection of the anterior rectus fascia, which is incised transversely over a distance of 2 cm on the side of the hernia. DIssection balloon advanced along the midline to the pubis. Carbon dioxide insufflation to 10 mmHg. Peritoneal sac separately from teh transverse abdominal muscle inferiorly and posteriorly to the arcuate line. Sac is dissected. If the defect is large, the adequacy of the peritoneal closure is carefully checked laparoscopically after placement of the mesh. Enlarged transversalis fascia is gathered and fixed to the ipsilateral Cooper's ligament with sutures. Selective nerve dissection in the "triangle of nerves" only in the case of bleeding requiring electrocoagulation. mesh not slit; polypropylene at least 10-15 cm, mesh weight 82 g/m^2, or *more recently* a weight of 40 g/m^2. For, two meshes were used, overlapping by 1-2 cm in the midline above the pubic symphysis. Staple fixation of the mesh is only used in excetional cases involving a highly enlarged internal ring or if inadequate extent of medial dissection because of previous surgery.
Voitk et al., 1998[828]	TAPP, one surgeon, who had never done previous lap. hernia repairs, but had done previous lap. surgery, and also had done previous open hernia repair. Anesthesia method not reported. Peritoneum of the inguinal floor was reflected posteriorly, usually incorporating the hernial sac but occasionally leaving behind large indirect sacs. Prolene mesh (size not reported) fixed to Cooper's ligament, the pubic tubercle, and transversalis fascia, covering the inguinal floor and hernia defect, and peritoneal flap was replaced over the mesh where possible. Staples using the articulating stapler(Ethicon Endo-Surgery) for the first 67 cases, the AUto-Suture Endo Universal (US Surgical) for the next 26, and Origin tacker (Guidant) for the last 7.
Zendejas et al., 2011[836,840]	TEP. All procedures supervised by a single staff surgeon. Operating surgeon were interns (46%), PGY-2s (10%, PGY-3s (2%), PGY-4s (3), and chief residents (39%). General anesthesia. Extraperitoneal space developed with balloon insufflator. Dissection beginning on symptomatic side. Groove between the cord structures and the reduced hernia sac and contents is created to allow for optimal mesh placement. Polypropylene mesh usually 3.5x5 inches, covering all potential hernia defects. Mesh secured with spiral tacks along the Cooper ligament and the anterior abdominal wall above the iliopubic tract. Contralateral hernia repaired when found.

Table 72. Key Question 7: Baseline characteristics

Study	Characteristic	Group A	Group B	Comments
Bittner et al., 2002[631-635]	% bilateral	24% (1571/6479)		
	% incarcerated	1% (92/8050)		N is hernias
	% irreducible	3% (280/8050)		N is hernias
	% Nyhus type 1	0% (0/8050)		N is hernias
	% Nyhus type 2	24% (1915/8050)		N is hernias
	% Nyhus type 3a	33% (2625/8050)		N is hernias
	% Nyhus type 3b	27% (2141/8050)		N is hernias
	% Nyhus type 3c	3% (223/8050)		N is hernias
	% Nyhus type 4	14% (1146/8050)		N is hernias
	% recurrent	14% (1146/8050)		N is hernias
	% scrotal	5% (440/8050)		N is hernias
	% male	90% (5862/6479)		
	Age	Median: 59 (Range: 16 to 97) (N=6,479)		
	BMI (kg/m^2)	Median: 24.8 (Range: 14.0 to 39.3) (N=6,479)		
Bobrzynski et al., 2001[638]	% bilateral	12% (48/416)		N is hernias
	% direct	25% (102/416)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Bobrzynski et al., 2001[638] (continued)	% femoral	0% (1/416)		N is hernias
	% indirect	56% (231/416)		N is hernias
	% recurrent	8% (34/416)		N is hernias
	% male	99% (364/368)		
	Age	51 (Range: 21-82) (N=368)		
Champault et al., 1997[651-654]	% bilateral	41% (21/51)	49% (24/49)	
	% direct	71% (36/51)	80% (39/49)	
	% femoral	0% (0/51)	0% (0/49)	
	% indirect	29% (15/51)	20% (10/49)	
	% irreducible	0% (0/51)	0% (0/49)	
	% large inguinoscrotal hernia	0% (0/51)	0% (0/49)	
	% primary	61% (31/51)	53% (26/49)	
	% recurrent	39% (20/51)	47% (23/49)	
	% strangulated	0% (0/51)	0% (0/49)	
	% male	100% (51/51)	100% (49/49)	
	% smoking	41% (21/51)	57% (28/49)	
	% with body mass index greater than 30	33% (17/51)	29% (14/49)	

Study	Characteristic	Group A	Group B	Comments
Champault et al., 1997[651-654] (continued)	Age	57.2 (SD: 40.74) (N=51)	61.3 (SD: 43.77) (N=49)	
	% ASA score 1	27% (14/51)	24% (12/49)	
	% ASA score 2	67% (34/51)	67% (33/49)	
	% ASA score 3	6% (3/51)	8% (4/49)	
	% ASA score 4	0% (0/51)	0% (0/49)	
	% prostatism	27% (14/51)	18% (9/49)	
Cheah et al., 2004[659]	% bilateral	29% (41/141)		
	% bilateral combined indirect direct	13% (19/141)		
	% bilateral direct	7% (10/141)		
	% bilateral indirect	9% (12/141)		
	% indirect unilateral	52% (73/141)		
	% irreducible	0% (0/141)		
	% obstructed	0% (0/141)		
	% recurrent	10% (14/141)		
	% right-side	44% (62/141)		
	% male	94% (132/141)		
	Age	51 (Range: 20 to 83) (N=141)		

Study	Characteristic	Group A	Group B	Comments
Davies et al., 1995[666,667]	% bilateral	12% (35/300)		N is hernias
	% direct	39% (118/300)		N is hernias
	% indirect	61% (182/300)		N is hernias
	% left-sided	50% (151/300)		N is hernias
	% primary	90% (269/300)		N is hernias
	% recurrent	10% (31/300)		N is hernias
	% right-side	50% (149/300)		N is hernias
	% male	95% (252/265)		
	Age	54.3 (Range: 10-89) (N=265)		
	BMI (kg/m^2)	25 (Range: 19.9-33.2) (N=265)		
Dirksen et al., 1998[671,672]	% bilateral	30% (26/88)		
	% recurrent	0% (0/88)		
	% male	100% (88/88)		
	% physically active	83% (73/88)		
	% work any	65% (57/88)		
	% work moderate strenuous	28% (25/88)		
	% work not strenuous	22% (19/88)		

Study	Characteristic	Group A	Group B	Comments
Dirksen et al., 1998[671,672] (continued)	% work strenuous	15% (13/88)		
	Age	53 (SD: 15) (N=88)		
	BMI (kg/m^2)	25 (SD: 3.2) (N=88)		
Dulucq et al., 2009[677]	% bilateral	32% (744/2356)		
	% direct	32% (978/3100)		N is hernias
	% femoral	6% (190/3100)		N is hernias
	% indirect	51% (1593/3100)		N is hernias
	% recurrent	11% (339/3100)		N is hernias
	% right-side	37% (880/2356)		
	Age	61 (SD: 15) (N=2356)		
Edwards et al., 2000[678]	% bilateral	29% (39/133)		
	% femoral	0% (0/133)		
	% recurrent	17% (22/133)		
	% male	92% (122/133)		
	Age	49 (Range: 17-83) (N=133)		
Feliu-Pala et al., 2001[684]	% bilateral	25% (246/981)		

Study	Characteristic	Group A	Group B	Comments
Feliu-Pala et al., 2001[684] (continued)	% recurrent	16% (201/1227)		N is hernias
	% unilateral	75% (735/981)		
	% male	97% (953/981)		
	Age	48.1 (Range: 21-82) (N=981)		
	% ASA score 1 or 2	90% (881/981)		
	% ASA score 3	10% (100/981)		
Felix et al., 1998[685]	% bilateral	31% (2392/7661)		
	% primary	86% (8690/10053)		
	% recurrent	14% (1363/10053)		
	Age	Median: between 48-51 (Range: 12 to 93) (N=7661)		
Ferzli et al., 1995[686]	% bilateral	24% (77/326)		N is hernias
	% direct	45% (148/326)		N is hernias
	% femoral	1% (4/326)		N is hernias
	% indirect	50% (163/326)		N is hernias
	% pantaloon	3% (11/326)		N is hernias
	% recurrent	15% (37/249)		
	% male	100% (249/249)		

Study	Characteristic	Group A	Group B	Comments
Ferzli et al., 1995[686] (continued)	Age	43.2 (Range: 18 to 82) (N=249)		
	% previous abdominal surgery	14% (34/249)		
Geis et al., 1993[699]	% bilateral	12% (43/364)		
	% giant scrotal hernia	9% (41/450)		N is hernias
	% incarcerated	3% (13/450)		N is hernias
	% incarcerated acute hernia	1% (4/450)		N is hernias
	% incarcerated chronic hernia	2% (9/450)		N is hernias
	% recurrent	11% (50/450)		N is hernias
	% male	74% (269/364)		
	Age	NR (Range: 16 to 83) (N=364)		
Kanakala et al., 2010[714]	% recurrent	0% (0/62)	0	
Kapiris et al., 2001[715]	% bilateral	17% (513/3017)		
	% direct	28% (1001/3530)		N is hernias
	% femoral	1% (19/3530)		N is hernias
	% indirect	66% (2337/3530)		N is hernias
	% pantaloon	5% (173/3530)		N is hernias
	% recurrent	11% (388/3530)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Kapiris et al., 2001[715] (continued)	% right-side	44% (1327/3017)		
	% unilateral	83% (2504/3017)		
	% male	96% (2896/3017)		
	Age	Median: 57 (Range: 17-90) (N=3071)		
Kieturakis et al., 1994[719]	% bilateral	32% (36/113)		
	% direct	47% (70/150)		N is hernias
	% femoral	1% (1/150)		N is hernias
	% indirect	48% (72/150)		N is hernias
	% scrotal	2% (3/150)		N is hernias
	% sliding	1% (2/150)		N is hernias
	% spigelian	1% (2/150)		N is hernias
	% male	52% (105/203)		
	Age	NR (Range: 20-83) (N=113)		
Lal et al., 2004[730]	% bilateral	11% (6/56)		
	% direct	21% (12/56)		
Lamb et al., 2006[731,732]	% bilateral	47% (798/1682)		N is hernias
	% recurrent	16% (261/1682)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Lamb et al., 2006[731,732] (continued)	Age at first operation	61 (Range: 21.5-87) (N=1283)		
Langeveld et al., 2010[736]	% bilateral	12% (39/336)	8% (25/324)	
	% primary	87% (293/336)	91% (295/324)	
	% recurrent	9% (29/336)	6% (21/324)	
	% recurrent first	7% (23/336)	6% (18/324)	
	% recurrent, two or more prior operations	2% (6/336)	1% (3/324)	
	% scrotal	0% (0/336)	0% (0/324)	
	% unilateral	85% (284/336)	90% (292/324)	
	% male	99% (333/336)	98% (318/324)	
	Age	Median: 55 (NR) (N=336)	Median: 56 (NR) (N=324)	
	BMI (kg/m^2)	25 (NR) (N=336)	25 (NR) (N=324)	
	% comorbidity chronic obstructive pulmonary disease	8% (27/336)	4% (14/324)	
	% comorbidity diabetes	2% (6/336)	3% (9/324)	
	% corticosteroid use	7% (24/336)	4% (13/324)	
	% preoperative analgesic use	5% (16/336)	3% (11/324)	
	% preoperative sensibility abnormality	1% (2/336)	1% (2/324)	

Study	Characteristic	Group A	Group B	Comments
Langeveld et al., 2010[736] (continued)	% preoperative testis abnormality	2% (7/336)	3% (9/324)	
	% previous abdominal surgery	21% (71/336)	25% (81/324)	
	% Problem to bow and pick up	35% (118/336)	32% (104/324)	Counts calculated based on reported percentages
	% Problem to carry 5 kg for 10 meters	26% (87/336)	32% (104/324)	Counts calculated based on reported percentages
	% Problem to get dressed/undressed	9% (30/336)	9% (29/324)	Counts calculated based on reported percentages
	% Problem to get in/out of bed	3% (10/336)	7% (23/324)	Counts calculated based on reported percentages
	% Problem to walk	19% (64/336)	30% (97/324)	Counts calculated based on reported percentages
	% Problem to walk fast	66% (222/336)	67% (217/324)	Counts calculated based on reported percentages
	ASA score	1 (NR) (N=336)	1 (NR) (N=324)	
	Pain VAS	1.2 (NR) (N=336)	1.3 (NR) (N=324)	
	Quality of life: EuroQOL, VAS	Median: 80 (NR) (N=336)	Median: 85 (NR) (N=324)	
Lau et al., 2002[737]	% bilateral	0% (0/120)		
	% femoral	2% (2/120)		
	% Nyhus type 1	0% (0/120)		
	% Nyhus type 2	48% (57/120)		
	% Nyhus type 3a	23% (27/120)		

Study	Characteristic	Group A	Group B	Comments
Lau et al., 2002[737] (continued)	% Nyhus type 3b	18% (22/120)		
	% Nyhus type 3c	2% (2/120)		
	% Nyhus type 4	10% (12/120)		
	% Nyhus type 4a	4% (5/120)		
	% Nyhus type 4b	4% (5/120)		
	% Nyhus type 4c	1% (1/120)		
	% Nyhus type 4d	1% (1/120)		
	% primary direct	23% (27/120)		
	% primary indirect	66% (79/120)		
	% recurrent	10% (12/120)		
	% recurrent, one prior operation	10% (12/120)		
	% male	97% (116/120)		
	Age	63 (SD: 13.9, Range: 22-84) (N=120)		
	% previous hernia repair contralaterally	27% (32/120)		
Liem et al., 1997[741-747]	% bilateral	0% (0/487)		
	% coincidental discovery	3% (13/487)		
	% lateral hernia	44% (214/487)		

Study	Characteristic	Group A	Group B	Comments
Liem et al., 1997[741-747] (continued)	% Medial	53% (259/487)		
	% Nyhus type 1	5% (25/487)		
	% Nyhus type 2	41% (199/487)		
	% Nyhus type 3a	20% (95/487)		
	% Nyhus type 3b	23% (113/487)		
	% Nyhus type 3c	0% (0/487)		
	% Nyhus type 4	11% (54/487)		
	% Nyhus type 4a	5% (24/487)		
	% Nyhus type 4b	6% (30/487)		
	% Nyhus type 4c	0% (0/487)		
	% pantaloon	2% (8/487)		
	% primary	89% (432/487)		
	% recurrent, one prior operation	11% (55/487)		
	% recurrent, two or more prior operations	0% (0/487)		
	% right-side	50% (244/487)		
	% scrotal	5% (24/487)		
	% symptoms pain	85% (416/487)		

Study	Characteristic	Group A	Group B	Comments
Liem et al., 1997[741-747] (continued)	% symptoms swelling	93% (454/487)		
	% unknown side of hernia	3% (13/487)		
	% habitual sports activity	41% (198/487)		
	% male	95% (461/487)		
	% work paid	55% (266/487)		
	Age	55 (SD: 16) (N=487)		
	Height (cm)	178 (SD: 8) (N=487)		
	Weight (kg)	77.9 (SD: 11.8) (N=487)		
	% comorbidity chronic obstructive pulmonary disease	10% (48/487)		
	% comorbidity constipation	5% (26/487)		
	% comorbidity prostatism	8% (37/487)		
	% comorbidity strenuous activity	21% (103/487)		
	% history of contralateral hernia	6% (28/487)		
	Activities of daily living score	Median: 94 (IQR: 83-100) (N=487)		
	SF-36 bodily pain	Median: 77 (Range: 57-100) (N=134)		

Study	Characteristic	Group A	Group B	Comments
Liem et al., 1997[741-747] (continued)	SF-36 general health	Median: 75 (Range: 60-88) (N=134)		
	SF-36 mental health	Median: 84 (Range: 72-92) (N=134)		
	SF-36 physical functioning	Median: 85 (Range: 65-95) (N=134)		
	SF-36 reported health transition	Median: 50 (Range: 50-50) (N=134)		
	SF-36 role limitation, emotional	Median: 100 (Range: 100-100) (N=134)		
	SF-36 role limitation, physical	Median: 100 (Range: 25-100) (N=134)		
	SF-36 social functioning	Median: 100 (Range: 75-100) (N=134)		
	SF-36 vitality	Median: 70 (Range: 55-83) (N=134)		
Lovisetto et al., 2007[748]	% bilateral	14% (279/1973)		N is hernias
	% crural	3% (53/1973)		N is hernias
	% direct	29% (572/1973)		N is hernias
	% Elective surgery	85% (1683/1973)		N is hernias
	% emergency hernia	1% (13/1973)		N is hernias
	% femoral	1% (26/1973)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Lovisetto et al., 2007[748] (continued)	% incarcerated	2% (43/1973)		N is hernias
	% inguinoscrotal	4% (83/1973)		N is hernias
	% oblique external	59% (1169/1973)		N is hernias
	% oblique internal	8% (153/1973)		N is hernias
	% primary	87% (1725/1973)		N is hernias
	% primary crural	2% (44/1973)		N is hernias
	% primary direct	24% (473/1973)		N is hernias
	% primary femoral	1% (20/1973)		N is hernias
	% primary incarcerated	1% (28/1973)		N is hernias
	% primary inguinoscrotal	3% (60/1973)		N is hernias
	% primary oblique external	55% (1083/1973)		N is hernias
	% primary oblique internal	5% (105/1973)		N is hernias
	% recurrent	13% (248/1973)		N is hernias
	% recurrent crural	0% (9/1973)		N is hernias
	% recurrent direct	5% (99/1973)		N is hernias
	% recurrent femoral	0% (6/1973)		N is hernias
	% recurrent incarcerated	1% (15/1973)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Lovisetto et al., 2007[748] (continued)	% recurrent inguinoscrotal	1% (23/1973)		N is hernias
	% recurrent oblique external	4% (86/1973)		N is hernias
	% recurrent oblique internal	2% (48/1973)		N is hernias
	% unilateral	72% (1415/1973)		N is hernias
	% male	89% (1506/1694)		Reported as 8/1 ratio
	Age	52.5 (SD: 9.8) (N=1694)		
MRC et al., 1999[747,753-760]	% bilateral	7% (33/461)	8% (37/460)	
	% femoral	2% (9/453)	1% (4/444)	
	% incarcerated	0% (0/468)	0% (0/460)	
	% inguinoscrotal	0% (0/468)	0% (0/460)	
	% recurrent	12% (56/460)	9% (42/451)	
	% right-side	52% (241/461)	51% (233/460)	
	% male	94% (441/468)	97% (445/460)	
	Age	55.3 (SD: 16.2) (N=468)	55.7 (SD: 16.8) (N=460)	
Neumayer et al., 2004[762-768]	% bilateral	18% (175/989)	18% (178/994)	
	% duration <6 weeks	9% (89/989)	10% (97/994)	
	% duration >one year	35% (348/989)	36% (358/994)	

Study	Characteristic	Group A	Group B	Comments
Neumayer et al., 2004[762-768] (continued)	% duration 6 weeks to one year	49% (488/989)	47% (463/994)	
	% duration unknown	6% (64/989)	8% (76/994)	
	% obstructed	0% (0/989)	0% (0/994)	
	% primary	90% (893/989)	91% (906/994)	
	% recurrent	10% (96/989)	9% (88/994)	
	% strangulated	0% (0/989)	0% (0/994)	
	% unilateral	82% (814/989)	82% (816/994)	
	% alcohol >2 drinks/day	14% (136/989)	16% (159/994)	
	% male	100% (989/989)	100% (994/994)	
	% race asian	0% (1/989)	0% (2/994)	
	% race black	22% (219/989)	20% (202/994)	
	% race multiracial	3% (26/989)	3% (30/994)	
	% race unknown	1% (13/989)	1% (12/994)	
	% race white	74% (731/989)	75% (748/994)	
	% smoking	40% (400/989)	43% (426/994)	
	Age	58.6 (SD: 12.8) (N=989)	58.4 (SD: 12.7) (N=994)	
	Height (inches)	69.8 (SD: 2.8) (N=813)	69.9 (SD: 2.7) (N=808)	

Study	Characteristic	Group A	Group B	Comments
Neumayer et al., 2004[762-768] (continued)	Highest educational grade completed	12.7 (SD: 2.4) (N=813)	12.7 (SD: 2.4) (N=808)	
	Weight (pounds)	178.5 (SD: 30.6) (N=813)	177.8 (SD: 28.7) (N=808)	
	% ASA score 1	35% (343/989)	34% (334/994)	
	% ASA score 2	47% (463/989)	48% (474/994)	
	% ASA score 3	19% (183/989)	19% (186/994)	
	% comorbidity chronic cough	9% (90/989)	8% (79/994)	
	% comorbidity congestive heart failure	1% (5/989)	0% (1/994)	
	% comorbidity diabetes	6% (61/989)	5% (46/994)	
	% comorbidity hypertension	34% (339/989)	36% (354/994)	
	% comorbidity prior myocardial infarction	0% (2/989)	0% (3/994)	
	% comorbidity prostatism	18% (177/989)	17% (169/994)	
	% comorbidity severe chronic obstructive pulmonary disease	5% (48/989)	5% (50/994)	
	QOL: Health Utilities Index 2 score (scale range 0-1.0 where higher scores indicated better QOL)	0.79; Median: 0.81 (IQR: 0.71 to 0.90) (N=687)	0.77; Median: 0.78 (IQR: 0.68 to 0.88)) (N=708)	
	SF-36 bodily pain	45.2 (SD: 10.6) (N=687)	44 (SD: 10.3) (N=708)	

Study	Characteristic	Group A	Group B	Comments
Neumayer et al., 2004[762-768] (continued)	SF-36 general health	51.3 (SD: 9.4) (N=687)	50.4 (SD: 10) (N=708)	
	SF-36 mental health	49.6 (SD: 11.3) (N=687)	48.7 (SD: 11.3) (N=708)	
	SF-36 physical functioning	44.8 (SD: 10.3) (N=687)	43.2 (SD: 10.7) (N=708)	
	SF-36 role limitation, emotional	46 (SD: 12.7) (N=687)	44 (SD: 13.3) (N=708)	
	SF-36 role limitation, physical	42.7 (SD: 11.5) (N=687)	41.2 (SD: 11.5) (N=708)	
	SF-36 social functioning	47.5 (SD: 10.7) (N=687)	46 (SD: 11.3) (N=708)	
	SF-36 vitality	52.4 (SD: 10.4) (N=687)	50.9 (SD: 10.9) (N=708)	
Pikoulis et al., 2002[790]	% bilateral	22% (68/309)		N is hernias
	% direct	32% (98/309)		N is hernias
	% femoral	5% (14/309)		N is hernias
	% huge scrotal hernias	7% (21/309)		N is hernias
	% indirect	64% (197/309)		N is hernias
	% pantaloon	1% (4/309)		N is hernias
	% recurrent	20% (61/309)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Pikoulis et al., 2002[790] (continued)	% male	81% (192/237)		
	Age	52 (Range: 29-78) (N=237)		
Ramshaw et al., 2001[795]	% bilateral	22% (269/1224)		N is hernias
	% direct	38% (460/1224)		N is hernias
	% femoral	3% (32/1224)		N is hernias
	% indirect	64% (788/1224)		N is hernias
	% left-sided	23% (283/1224)		N is hernias
	% multiple ipsilateral	5% (56/1224)		N is hernias
	% primary	86% (1058/1224)		N is hernias
	% recurrent	14% (166/1224)		N is hernias
	% right-side	33% (403/1224)		N is hernias
	% male	88% (837/955)		
	Age	47.4 (Range: 13-94) (N=955)		
Ridings et al., 2000[796]	No baseline characteristics reported			
Schultz et al., 2000[804]	% bilateral	22% (548/2500)		
	% combined direct/indirect	12% (304/2500)		
	% direct	32% (790/2500)		

Study	Characteristic	Group A	Group B	Comments
Schultz et al., 2000[804] (continued)	% femoral	2% (39/2500)		
	% indirect	37% (936/2500)		
	% recurrent	17% (421/2500)		
	% right-side	30% (756/2500)		
	% male	92% (1799/1952)		
	Age	59 (Range: 19-88) (N=1952)		
Staarink et al., 2008[817]	% bilateral	0% (0/178)		
	% Nyhus type 2	51% (76/150)		N is just for the primary hernias; this characteristics was not reported for the recurrent hernias
	% Nyhus type 3a	15% (22/150)		N is just for the primary hernias; this characteristics was not reported for the recurrent hernias
	% Nyhus type 3b	27% (41/150)		N is just for the primary hernias; this characteristics was not reported for the recurrent hernias
	% Nyhus type 4	16% (28/178)		
	% Nyhus type missing	7% (11/150)		N is just for the primary hernias; this characteristics was not reported for the recurrent hernias
	% recurrent	16% (28/178)		
	% male	94% (167/178)		

Study	Characteristic	Group A	Group B	Comments
Staarink et al., 2008[817] (continued)	Age	Median: 55 (Range: 21-73) (N=178)		
Swadia et al., 2010[821]	% bilateral	67% (1218/1814)		N is all hernias
	% direct	59% (914/1539)		N is hernias treated by TEP
	% femoral	0% (5/1539)		N is hernias treated by TEP
	% indirect	39% (596/1539)		N is hernias treated by TEP
	% recurrent	2% (24/1539)		N is hernias treated by TEP
	% strangulated	0% (0/1042)		
	% unilateral	33% (596/1814)		N is all hernias
	% male	99% (1029/1042)		
	Age	51 (SD: 13) (N=1042)		
	% ASA score 4	0% (0/1042)		
Tamme et al., 2003[822]	% bilateral	35% (1336/3868)		
	% combined direct/indirect	8% (407/5203)		N is hernias
	% direct	32% (1670/5203)		N is hernias
	% femoral	3% (154/5203)		N is hernias
	% indirect	57% (2972/5203)		N is hernias
	% primary combined direct/indirect	7% (348/5203)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Tamme et al., 2003[822] (continued)	% primary direct	27% (1421/5203)		N is hernias
	% primary femoral	3% (140/5203)		N is hernias
	% primary indirect	50% (2616/5203)		N is hernias
	% recurrent	13% (678/5203)		N is hernias
	% recurrent combined direct/indirect	1% (59/5203)		N is hernias
	% recurrent direct	5% (249/5203)		N is hernias
	% recurrent femoral	0% (14/5203)		N is hernias
	% recurrent indirect	7% (356/5203)		N is hernias
	% right-side	58% (2243/3868)		
	% unilateral	65% (2531/3868)		
	% male	91% (3520/3868)		
	Age	53 (Range: 15-89) (N=3868)		
Voitk et al., 1998[828]	% bilateral	38% (38/100)		N includes two patients who had two operations
	% direct	37% (60/164)		N is hernias
	% femoral	2% (4/164)		N is hernias
	% indirect	51% (83/164)		N is hernias
	% massive sliding hernia	1% (1/164)		N is hernias

Study	Characteristic	Group A	Group B	Comments
Voitk et al., 1998[828] (continued)	% pantaloon	13% (21/164)		N is hernias
	% recurrent	9% (15/164)		N is hernias
	% recurrent, four prior operations	1% (1/164)		N is hernias
	% recurrent, one prior operation	5% (8/164)		N is hernias
	% recurrent, three prior operations	1% (2/164)		N is hernias
	% recurrent, two prior operations	2% (4/164)		N is hernias
	% right-side	33% (33/100)		N includes two patients who had two operations
	% symptoms bulge	100% (98/98)		
	% male	100% (98/98)		
	Age	57 (Range: 24-88) (N=98)		
	% ASA score 2	45% (45/100)		N includes two patients who had two operations
	% ASA score 3	18% (18/100)		N includes two patients who had two operations
	% ASA score 8	37% (37/100)		N includes two patients who had two operations
Zendejas et al., 2011[836,840]	% bilateral	52% (503/976)		
	% direct	51% (498/976)		
	% femoral	2% (20/976)		
	% indirect	41% (400/976)		

Study	Characteristic	Group A	Group B	Comments
Zendejas et al., 2011[836,840] (continued)	% pantaloon	6% (59/976)		
	% recurrent	17% (166/976)		
	% male	97% (947/976)		
	Age	54 (Range: 5-86) (N=976)		

Table 73. Key Question 7: Risk of Bias Assessments

No risk of bias table for this key question because risk of bias was not formally assessed for this key question.

Table 74. Key Question 7: Data

Study	Laparoscopic procedure	Compared stages?	Compared surgeons or centers?	Number of patients and number of hernias	Data involving surgical experience and hernia recurrence
Bittner et al., 2002[631-635]	TAPP	Yes	Yes	11,570 repairs; the total # of patients was not reported, but likely about 9,300	From the 2006 publication[632] with 11570 repairs: Pearson correlation +0.66 between recurrence and the number of previously performed TAPP repairs by that surgeon (computed by ECRI Institute); greater experience was associated with GREATER recurrence rates, which may have been because the higher-experience surgeons' patients had received surgery longer ago, and therefore had more time to experience recurrences. Authors did not report recurrence data that factored out the length of follow-up. From the 2002 publication[631] with 8050 repairs: Combining data across surgeons, the recurrence rate for the first 600 procedures was 4.8%, and for the last 7450 procedures was 0.4%. From the 2000 publication[635] with 5005 repairs: First 600 repairs: 17/600 (2.8%); Last 4,405 repairs: 16/4,405 (0.36%). From the 1998 publication[633] with 2700 repairs: First 500 hernias: 19/500 (3.8%); Next 1700 hernias 8/1700 (0.5%); Last 500 hernias 1/500 (0.2%). From the 2009 publication[634] with 264 repairs selected for being post-prostatectomy: First half of cases: 2/132 (1.5%); Latter half: 0/132 (0%). For senior surgeons, those performing <300 prior TEPs had a recurrence rate of 3.6% (estimated 32/900), whereas those performing 300+ prior TEPs had a recurrence rate of 0.4% (estimated 23/5240). For specialist traineers, the recurrence rate was 0.3% (estimated 4/1285), and for non-specialist trainees, the recurrence rate was 0.2% (estimated 1/625).

Study	Laparoscopic procedure	Compared stages?	Compared surgeons or centers?	Number of patients and number of hernias	Data involving surgical experience and hernia recurrence
Bobrzynski et al., 2001[638]	TEP	Yes	No	TEP: 368 patients and 416 hernias, but collected follow-up data on only 317 patients (NR # of hernias, but if the ratio was the same, it is an estimated 326 patients) TAPP: 742 patients and 809 repairs	TEP: First 10 repairs: 40% (4/10). All the subsequent repairs 1% (4 of an estimated 326 repairs with followup data). TAPP. 23 recurrences out of 809 repairs, and 16 of the 23 "came from a period when we used a small mesh covering only a visible defect in the groin." The other 7 of the 23 occurred after the "learning period," the total number of hernias repaired during this period was not reported.
Champault et al., 1997[651-654]	TAPP	Yes	No	In the primary publication: 50 patients and unreported number of hernias. In the 2000 publication, 541 patients and 757 hernias	All three recurrences occurred early in the series (cases 4 7 and 11 out of 50). From the 2000 publication with 757 hernias: 1993: 2 cases (denominator not reported); Five subsequent years: 3 cases (denominator not reported)
Cheah et al., 2004[659]	TEP	Yes	No	141 patients and 182 hernias	First 119 cases: 6/119 (7%). Last 63 cases: 0/63 (0%)
Davies et al., 1995[666,667]	TAPP	Yes	No	265 patients and 300 hernias	First 10 repairs: 20% (2/10); Next 90 repairs: 1% (1/90); Next 100 repairs: 1% (1/100); Next 100 repairs: 1% (1/100)
Dirksen et al., 1998[671,672]	TAPP	No	Yes	88 patients and 114 hernias	Surgeons 4/56 (7%); Residents 3/32 (9%). The surgeon data were reported as 4/82, but surgeon only operated laparoscopically on 56 patients
Dulucq et al., 2009[677]	TEP	Yes	No	2,356 patients and 3,100 hernias	First 200 repairs 2.5%; Next 1,254 repairs 0.47%; Last 902 repairs: 0/902 (0%)
Edwards et al., 2000[678]	TAPP	Yes	Yes	133 patients and 172 hernias; recurrence data reported on the 169 hernias that were not converted to open.	Recurrence data provided separately for three surgeons. Surgeon A, cases 1-30 2/30 (6%) (mean followup 30 months), cases 31-60 0/30 (0%) (mean followup 24 months); Surgeon B, cases 1-30 1/30 (3%) (mean followup 27 months), cases 31-57 0/27 (0%) (mean followup 23 months); Surgeon C, cases 1-30 8/30 (27%) (mean followup 24 months), cases 31-52 0/22 (0%) (mean followup 24 months). Surgeons A and B had had prior experience with laparoscopy herniorrhpahy, whereas Surgeon C had not. Thus for the more experienced surgeons the recurrence rate was 3/117 (3%) whereas for the less experienced surgeon it was 8/82 (10%).

Study	Laparoscopic procedure	Compared stages?	Compared surgeons or centers?	Number of patients and number of hernias	Data involving surgical experience and hernia recurrence
Feliu-Pala et al., 2001[684]	TEP	Yes	No	981 patients and 1227 hernias	First 100 patients 14% (14/100). Patients 101-500 1.5% (6/400). Patients 501-891 0.8% (3/390).
Felix et al., 1998[685]	Mixed. Overall 51% TAPP, 49% TEP, but this ratio ranged 0% to 100% across centers	No	Yes	7,661 patients and 10,053 hernias	Seven centers with different volumes. Center 1, 2,096 procedures, recurrence 0.2% (4/2,096); Center 2, 2,064 procedures, recurrence 0.4% (8/2,064); Center 3, 1,809 procedures, recurrence 0.1% (2/1,809); Center 4, 1,212 procedures, recurrence 0.3% (4/1,212); Center 5, 1,187 procedures, recurrence 0.8% (9/1,187); Center 6, 897 procedures, recurrence 0.3% (3/897); Center 7, 788 procedures, recurrence 0.5% (4/788). Correlation -0.44 (calculated by ECRI Institute) suggesting that more experienced centers had lower recurrence rates.
Ferzli et al., 1995[686]	TEP	Yes	No	249 patients and 326 hernias	First 100 cases: 4/100 (4%); Next 149 cases 0/149 (0%)
Geis et al., 1993[699]	TAPP	Yes	No	364 patients and 450 hernias	First 50 patients: 6% (3/50); Last 314 patients: 0% (0/314)
Kanakala et al., 2010[714]	Mixed. Laparoscopic; specific procedure(s) not reported	No	Yes	128 patients (number of hernias not reported). The two groups were matched for age, sex, and ASA grade.	The rate of hernia recurrence within 6 months was 4% (2/62) for experienced surgical consultants and 2% (1/62) for surgical trainees.
Kapiris et al., 2001[715]	TAPP	Yes	No	3,017 patients and 3,530 hernias	First 325 repairs: 17/325 (5%); Last 3205 repairs 5/3205 (0.16%)
Kieturakis et al., 1994[719]	TEP	Yes	No	113 patients and 150 hernias	First 20 hernias: 15% (3/20); Last 130 hernias 0% (0/130)
Lal et al., 2004[730]	TEP	Yes	No	56 patients and 56 hernias	Patients separated into case # groups 1-10, 11-20, 21-30, 31-56. The range of followup in these groups were 21-24 months, 20-22 months, 16-19 months, and 1-17 months, respectively. There were no recurrences in any patients.

Study	Laparoscopic procedure	Compared stages?	Compared surgeons or centers?	Number of patients and number of hernias	Data involving surgical experience and hernia recurrence
Lamb et al., 2006[731,732]	TEP	Yes	Yes	1,283 patients and 1,682 hernias	Actual rates not reported, but authors visually examined the survival curves of six surgeons who had had recurrences, and stated: "Typically, recurrence occurred in 10% of a surgeon's first 20 cases, 4% of the next 60 cases and falling to below 2% thereafter." Authors also stated "The proportion of bilateral/unilateral, recurrent/primary and direct/indirect hemias in the failed TEPs in each of the threephases of experience was compared as it might be expected thatmore complex hemias may have presented surgeons with increased technical difficulty in their early experience. However,no significant trends were observed." In the 2004 publications (990 hernias), authors compared three types of surgeons: consultant (most experienced); senior trainee supervised by a consultant (middle experienced); senior trainee unsupervised (least experienced). The recurrence rates were 4.1% (28/689), 3.1% (4/130), and 2.9% (5/171), respectively, which is the opposite of what would be expected.
Langeveld et al., 2010[736]	TEP	No	Yes	336 patients and 375 hernias	Surgeons with <10 prior cases: 8% (2/26); Surgeons with 10-25 prior cases: 10% (3/31); Surgeons with >25 prior cases: 1.9% (5/266).
Lau et al., 2002[737]	TEP	Yes	No	120 patients and 120 hernias	120 operations groups into first 20, next, 20 etc., for a total of six groups. There were no recurrences during followup, which ranged from one week to two years, with a mean of three months.
Liem et al., 1997[741-747]	TEP	Yes	Yes	120 patients and 120 hernias	"Among the 17 patients in the laparoscopic-surgery group who had recurrences, 10 (59 percent) were operated on by surgeons who had just begun to perform the operation independently." Thus 4 relatively inexperienced surgeons were responsible for a total of 10 recurrences. For these four surgeons: First 10 cases each: 3/40 (8%); Second 10 cases each: 4/40 (10%); Third 10 cases each: 3/40 (8%).

Study	Laparoscopic procedure	Compared stages?	Compared surgeons or centers?	Number of patients and number of hernias	Data involving surgical experience and hernia recurrence
Lovisetto et al., 2007[748]	TAPP	Yes	Yes	1,694 patients and 1,973 hernias	10 recurrences in procedures performed in the 7.75-year period 3/1992-12/1999 (number of procedures not reported, average length of follow-up not reported), as compared to two recurrence in procedures performed in the 4.17-year period 1/2000-3/2004 (number of procedures not reported, average length of follow-up not reported)
MRC et al., 1999[747,753-760]	TEP	Yes	No	Reported data on 90 hernias (N patients not reported)	First 10 cases 4/30 (13%); Second 10 cases 1/30 (3%); Third 10 cases 2/30 (7%). (Three surgeons)
Neumayer et al., 2004[762-768]	Mixed. 90% TEP, 10% TAPP	No	Yes	989 patients and 1,164 hernias	Attending surgeons (i.e., the supervisors of the actual surgeons performed the procedures) were placed into six categories of prior experience. However, for data reporting, the authors lumped the lower five categories together as “fewer than 250 prior repairs” and compared it to 250+ repairs. Primary hernia: ≥250 repairs was 5% recurrence (13/253) vs. 12.3% if <250 prior repairs performed by the attending surgeon (65/528). The postgraduate year of the resident who actually performed the surgery was recorded for 919 hernias: 116 were repaired by 1st or 2nd postgraduate year surgeons; 372 were repaired by 3rd postgraduate year surgeons; and 431 were repaired by 4th or 5th or more postgraduate year surgeons. The recurrence rates in these three groups respectively were 9.8%, 11.5%, and 10% (not statistically significant).
Pikoulis et al., 2002[790]	TAPP	Yes	No	237 patients and 309 hernias	First 50 cases: 4/50 (8%); Next 50: 1/50 (2%); Last 209 cases: 1/209 (0.5%)
Ramshaw et al., 2001[795]	TEP	Yes	No	1224 patients and 1581 hernias	First 300 TEPS: recurrence 0.3% (1/300). Next 624 TEPS: 0.3% (2/624). Prior to TEP, the authors performed 300 TAPPs, with recurrence 2% (6/300).

Study	Laparoscopic procedure	Compared stages?	Compared surgeons or centers?	Number of patients and number of hernias	Data involving surgical experience and hernia recurrence
Ridings et al., 2000[796]	TAPP	Yes	No	"Over 1700" hernias (N patients not reported, but was approximately 976 based on a unilateral rate of 57%)	First 100 cases: 9/100 (9%). Since early 1996, 0% (denominator not reported). "In the first 100 hundred patients, we experienced an unacceptable 9% recurrence rate. At this time a 6 x 5 cm mesh was inserted over the site of the hernia and stapled to the surrounding tissues. It was not fixed to the symphysis pubis or inguinal ligament. In 1993, the mesh size was increased to 12 x 7 cms and this immediately reduced the recurrence rate to 2.9% in patients operated on or before the end of 1995. Since changing to 15 x10 cm mesh in early 1996 no recurrences have been recorded although the follow up period is obviously shorter."
Schultz et al., 2000[804]	TAPP	Yes	No	1,952 patients and 2,500 hernias	First 500 cases: 11/500 (2.2%); 2nd 500: 6/500 (1.2%); 3rd 500: 3/500 (0.3%); 4th 500: 3/500 (0.3%); 5th 500: 3/500 (0.3%).
Staarink et al., 2008[817]	TEP	No	Yes	178 patients and 178 hernias	Primary hernia: Surgeons 5/124 (4%); Residents 1/26 (4%). Recurrent hernia (28 hernias): data not reported, simply that there was no statistically significant correlation between prior experience and recurrence rate, but this may have been due to low statistical power.
Swadia et al., 2011[821]	TEP	Yes	No	1,539 hernias (N patients not reported)	First 412 repairs: 8% (33/412); Next 535 repairs: 2.05% (11/535); Last 592 repairs: 0.67% (4/592)
Tamme et al., 2003[822]	TEP	Yes	No	3,868 patients and 5,203 hernias	First 825 operations recurrence rate of 15/825 or 1.8%. Last 4,378 operations recurrence rate of 14/4,378 or 0.3%.
Voitk et al., 1998[828]	TAPP	Yes	No	98 patients and 164 hernias	First 50 operations: 2/50 (4%); Next 50 operations 2/50 (4%). Overall median followup 28 months; did not report follow-up length for the first 50 vs. the second 50.
Zendejas et al., 2011[836]	TEP	Yes	No	976 patients and 1,479 hernias	First 40: 6/40 (15%); cases 41-80 1/40 (2.5%); cases 81-120 0/40 (0%); cases 121-160 0/40 (0%); cases 161-200; cases 201-240 1/40 (2.5%); cases 241-264 0/24 (0%). First 110 cases: 10/110 (9%); Next 866 cases 25/866 (2.9%)

Key Question 8 Tables

There are no evidence tables for this Key Question because no studies met the inclusion criteria.

Key Question 9 Tables

Table 75. Key Question 9: General study information

Study	Country	Specific location(s)	# centers	Study design	Specific comparison(s)	N patients enrolled	Date range of surgeries	Surgical setting	Study funding source(s)
Chan et al., 2005[657]	Hong Kong	University of Hong Kong Medical Center, Queen Mary Hospital, Hong Kong	1	RCT	Open vs. laparoscopic	83	02/2003 to 02/2004	University hospital	NR
Koivusalo et al., 2009[725]	Finland	University of Helsinki, Helsinki, Finland	1	RCT	Open vs. laparoscopic	89	10/01/2002 to 02/01/2007	University hospital	The authors indicated they had no financial relationship to disclose

Table 76. Key Question 9: Patient enrollment criteria related to hernia types

Study	Included only recurrent hernia	Included only bilateral hernia	Excluded recurrent hernia	Excluded bilateral hernia	Excluded incarcerated hernia	Excluded emergency hernia	Excluded strangulated hernia	Excluded obstructed hernia	Excluded femoral hernia	Excluded congenital hernia	Excluded sliding hernia	Excluded giant sliding hernia	Excluded giant hernia	Excluded scrotal hernia	Excluded giant scrotal hernia	Excluded asymptomatic hernia
Chan et al., 2005[657]			x		x	x	x									
Koivusalo et al., 2009[725]				x	x	x	x									

Table 77. Key Question 9: Patient enrollment criteria related to demographics and medical conditions

Study	Included ages	Excluded females	Excluded retired persons	Excluded those with a prior treatment preference	Excludes those unfit for general anesthesia	Excluded ASA score	Excluded prior lower abdominal surgery	Excluded prior mesh surgery	Excluded prior laparoscopic surgery	Excluded pregnancy	Excluded coagulation disorders	Excluded infection	Excluded ascites	Excluded advanced carcinoma	Excluded bleeding diathesis
Chan et al., 2005[657]	3 months +						x								
Koivusalo et al., 2009[725]	4 months – 16 years						x								

Table 78. Key Question 9: Patient enrollment criteria, other

Study	Other enrollment criteria
Chan et al., 2005[657]	Excluded also were patients <3 months and parental refusal of randomization.
Koivusalo et al., 2009[725]	Excluded those with a past medical history of inguinal operations

Table 79. Key Question 9: Treatment details

Study	Treatment A	Treatment B	Comments
Chan et al., 2005[657] (Lap vs. Open repair)	The laparoscopic technique included using 3-mm instead of 5-mm reusable ports, to reduce postoperative pain and improve Cosmesis. Saline was injected extraperitoneally to separate the testicular vessels and vas deferens from the peritoneum, a purse-string stitch was placed around the internal inguinal ring and a knot was tied intracorporeally to close the patent internal inguinal opening.	The open repair was similar to that described by Levitt et al., The modification was made on double-ligation of the proximal end of the sac without it being twisted, and there was no attempt to tighten the internal rings in any of the repairs.	All patients were premedicated with topical 5% Emulsified Local Analgesic cream for intravenous cannulation. General anesthesia was induced with an intravenous injection of propofol 3 mg/kg and maintained with isoflurane and nitrous oxide in 33% oxygen. 0.5% plain bupivacaine 0.1 ml/kg was infiltrated to each wound site postoperatively.
Koivusalo et al., 2009[725] (Lap vs. Open repair)	Laparoscopic repair performed transabdominally with three 5-mm ports.	Open repair as performed according to standard methods.	All operations were performed under general anesthesia. Anesthesia was induced with sevoflurane-air (8%) gas mixture or with propofol 3 to 4 mg/kg with 1% bicaine (0.5 mg/kg) and maintained with propofol (10 mg/kg per hour) together with 1% to 2% sevoflurane and with dose(s) of fentanyl 1 to 2 µg/kg. Mivacur (0.2 mg/kg) was given as muscle relaxant. Acetaminophen (60 mg/kg) was given rectally. Local anesthetic (mepivacain: 2.5 mg/kg) was infiltrated into the wound edges.

Table 80. Key Question 9: Baseline characteristics

Study	Characteristic	Group A	Group B
Chan et al., 2005[657]	% recurrent	0% (0/41)	0% (0/42)
	% bilateral	2% (1/41)	5% (2/42)
	% left-sided	41% (17/41)	40% (17/42)
	% right-side	56% (23/41)	55% (23/42)
	% age <3 years	46% (19/41)	48% (20/42)
	% male	83% (34/41)	79% (33/42)
	Age (months)	56 (SD: 45.67) (N=41)	46 (SD: 34.2) (N=42)
	Fentanyl (µg/kg/min)	0.067 (SD: 0.038) (N=41)	0.0563 (SD: 0.022) (N=42)
Koivusalo et al., 2009[725]	% bilateral	0% (0/47)	0% (0/42)
	% left-sided	34% (16/47)	45% (19/42)
	% right-side	66% (31/47)	55% (23/42)
	Time from diagnosis to operation (months)	Median: 6.8 (Range: 2-24) (N=47)	Median: 9.2 (Range: 2-6) (N=42)
	% male	77% (36/47)	71% (30/42)
	% of both parents working	60% (28/47)	74% (31/42)
	% of one parents working, 1/both (N/N)	40% (19/47)	26% (11/42)

Study	Characteristic	Group A	Group B
Koivusalo et al., 2009[725] (continued)	Age (yrs)	Median: 6 (Range: 0.65-15) (N=47)	Median: 6.1 (Range: 1.6-15) (N=42)
	Weight (kg)	Median: 24 (Range: 9.9-62) (N=47)	Median: 23 (Range: 10-64) (N=42)

Table 81. Key Question 9: Risk of bias assessments

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Chan et al., 2005[657]	Recurrence	LR (12.207 ±2.83 months), Open repair (11.786 ±2.545 months)	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	LOS, (hrs.)	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Recovery score	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	time to resume feeding (hrs.)	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	time to resume full activity (hrs.)	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Acetaminophen (dose)/patient	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Bilateral hernias found at operation	Intraoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Complications	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Wound score	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
Koivusalo et al., 2009[725]	Recurrent hernia	Before follow-up visit at 6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	LOS in the day surgical ward (minutes)	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	time to restore normal ADL after surgery (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	time to restore to normal ADL among patients aged <6 years/ aged 6 years or more (days)	NA	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Cosmesis	6 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	N	Y	Mod.
	Cosmesis	2 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	N	N	Mod.
	Patient satisfaction	6 month	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	N	Y	Mod.

Study	Outcome	Timepoint	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Risk of bias
Koivusalo et al., 2009[725] (continued)	Patient satisfaction	2 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	N	Y	N	N	Mod.
	Analgesia (Ibuprofen 20 mg/kg) dose after discharge	Day 2	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Analgesia (Ibuprofen) dose after discharge	Day 1	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Analgesia (Ibuprofen) dose after discharge	Day 3	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Objective Pain Scale (OPS) before administration of rescue analgesia	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Pain after discharge MORNING & EVENING	Days 1, 2, 3	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	N	Y	Y	Y	Mod.
	Patients requiring postoperative rescue analgesia (1 µg/kg fentanyl)	Postoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Mod.
	Contralateral inguinal hernia	Between 1 and 2 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Intraoperative fentanyl dose µg/kg	Intraoperative	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	Y	Y	Mod.
	Testicular atrophy and position	6 months	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	N	Y	Mod.
	Testicular atrophy and position	2 years	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	N	Y	Y	N	N	Mod.

Table 82. Key Question 9: Data

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Chan et al., 2005[657]	Laparoscopic vs. Open	RC	Hernia recurrence	LR (12.207 ±2.83 months), Open repair (11.786 ±2.545 months)	0% (0/41)	0% (0/42)	NS based on OR=1.02 (95% CI: 0.02 to 52.83)[@]	
	Laparoscopic vs. Open	HOSP	LOS, (hrs)	Postoperative	10.66 (SD: 5.319) (N=41)	10.3 (SD: 4.92) (N=42)	p=0.127, t- test	
	Laparoscopic vs. Open	RTDA	Recovery score (higher number is better)	Postoperative	95.37 (SD: 5.957) (N=41)	90.24 (SD: 6.044) (N=42)	p=0, chi sq	
	Laparoscopic vs. Open	RTDA	Time to resume feeding (hrs)	Postoperative	3.09 (SD: 1.479) (N=41)	2.6 (SD: 1.298) (N=42)	p=0.113, t-test	
	Laparoscopic vs. Open	RTDA	Time to resume full activity (hrs)	Postoperative	48.21 (SD: 28.683) (N=41)	57.71 (SD: 27.278) (N=42)	p=0.127, t-test	
	Laparoscopic vs. Open	Pain	Acetaminophen (dose)/ patient	Postoperative	0.54 (SD: 0.84) (N=41)	1.05 (SD: 1.248) (N=42)	p=0.032, chi sq	
	Laparoscopic vs. Open	ADV	Contralateral hernia	Postoperative	0% (0/41)	12% (5/42)	p=0.026, chi sq.	
	Laparoscopic vs. Open	ADV	Hypertrophic scar	Postoperative	2% (1/41)	5% (2/42)	p=1, chi sq	
	Laparoscopic vs. Open	ADV	Postoperative vomiting	Postoperative	0% (0/41)	2% (1/42)	p=1, chi sq	
	Laparoscopic vs. Open	ADV	Skin sensitivity to dressing	Postoperative	5% (2/41)	0% (0/42)	p=1, chi sq	
	Laparoscopic vs. Open	ADV	Stitch granuloma	Postoperative	0% (0/41)	2% (1/42)	p=1, chi sq	
	Laparoscopic vs. Open	ADV	Transient hydrocele	Postoperative	2% (1/41)	0% (0/42)	p=0.494, chi sq	
	Laparoscopic vs. Open	ADV	Wound score	Postoperative	97.56 (SD: 5.376) (N=41)	97.56 (SD: 7.696) (N=42)	p=0, chi sq	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koivusalo et al., 2009[725]	Laparoscopic vs. Open	RC	Hernia recurrence	Before follow-up visit at 6 months	4% (2/47)	2% (1/42)	NS based on OR=1.82 (95% CI 0.16 to 20.85)@	
	Laparoscopic vs. Open	HOSP	LOS in the day surgical ward (minutes)	Postoperative	Median: 300 (Range: 185-635) (N=47)	Median: 230 (Range: 145-432) (N=42)	p <0.001, Mann-Whitney test	
	Laparoscopic vs. Open	RTDA	Time to restore normal ADL after surgery (days)	NA	Mdn: 2, Mean: 2.4 (Range: 0-8, SD: 1.4) (N=47)	Median: 2, Mean: 2.5 (Range: 1-8, SD: 1.8) (N=42)	NS, Mann-Whitney test	
	Laparoscopic vs. Open	RTDA	Time to restore to normal ADL among patients aged <6 years/ aged 6 years or more (days)	NA	Median: 2 / 3 (Range: 0-4/1-8) (N=47)	Median: 2 / 3 (Range: 1-7/1-8) (N=42)	LR group (p=0.01) , OR group (p=0.02), Mann-Whitney test	
	Laparoscopic vs. Open	SFN	Cosmesis (higher number is better)	6 months	Median: 7 (Range: 3-9) (N=36)	Median: 7 (Range: 3-9) (N=30)	p=0.06, Fisher's test	
	Laparoscopic vs. Open	SFN	Patient satisfaction (higher number is better)	6 months	Median: 2 (Range: 2-3) (N=36)	Median: 2 (Range: 1-3) (N=30)	NS, Fisher's test	
	Laparoscopic vs. Open	SFN	Cosmesis (higher number is better)	2 years	Median: 7 (Range: 5-9) (N=33)	Median: 9 (Range: 5-9) (N=23)	p=0.06, Fisher's test	
	Laparoscopic vs. Open	SFN	Patient satisfaction (higher number is better)	2 years	Median: 2 (Range: 2-3) (N=33)	Median: 2 (Range: 2-3) (N=23)	NS, Fisher's test	
	Laparoscopic vs. Open	Pain	Analgesia (Ibuprofen) dose after discharge	Day 1	Median: 1 (Range: 0-3) (N=47)	Median: 1 (Range: 0-5) (N=42)	NS, Mann-Whitney test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koivusalo et al., 2009[725] (continued)	Laparoscopic vs. Open	Pain	Pain after discharge EVENING	Day 1	Median: 1 (Range: 0-2) (N=47)	Median: 1 (Range: 0-1) (N=42)	NS, Mann-Whitney test	
	Laparoscopic vs. Open	Pain	Pain after discharge MORNING	Day 1	Mdn: 1 (Range: 0-2) (N=47)	Median: 1 (Range: 0-2) (N=42)	Not significant (NS)	
	Laparoscopic vs. Open	Pain	Analgesia (Ibuprofen 20 mg/kg) dose after discharge	Day 2	Median: 0 (Range: 0-2) (N=47)	Median: 0 (Range: 0-2) (N=42)	NS, Mann-Whitney test	
	Laparoscopic vs. Open	Pain	Objective Pain Scale (OPS) before administration of rescue analgesia	Postoperative	Median: 4 (Range: 3-7) (N=47)	Median: 4 (Range: 2-6) (N=42)	NR	
	Laparoscopic vs. Open	Pain	Pain after discharge EVENING	Day 2	Median: 0 (Range: 0-2) (N=47)	Median: 0 (Range: 0-1) (N=42)	NS, Mann-Whitney test	
	Laparoscopic vs. Open	Pain	Pain after discharge MORNING	Day 2	Median: 1 (Range: 0-2) (N=47)	Median: 0 (Range: 0-1) (N=42)	p <0.05, Mann-Whitney test	
	Laparoscopic vs. Open	Pain	Patients requiring postoperative rescue analgesia (1 µg/kg fentanyl)	Postoperative	79% (37/47)	48% (20/42)	p<0.05 based on OR=4.07 (95% CI 1.61 to 10.26)@	
	Laparoscopic vs. Open	Pain	Analgesia (Ibuprofen) dose after discharge	Day 3	Median: 0 (Range: 0-2) (N=47)	Median: 0 (Range: 0-2) (N=42)	NS, Mann-Whitney test	
	Laparoscopic vs. Open	Pain	Pain after discharge EVENING	Day 3	NR (SD: NR) (N=47)	NR (SD: NR) (N=42)	NR	
	Laparoscopic vs. Open	Pain	Pain after discharge MORNING	Day 3	Median: 0 (Range: 0-1) (N=47)	Median: 0 (Range: 0-2) (N=42)	NS, Mann-Whitney test	

Study	Comparison	Category	Outcome	Timing	Group 1	Group 2	Test result	Comments
Koivusalo et al., 2009[725] (continued)	Laparoscopic vs. Open	ADV	Intraoperative fentanyl dose µg/kg	Intraoperative	Median: 3 (Range: 1.1-5) (N=47)	Median: 2.9 (Range: 1.1-5.9) (N=42)	NR	
	Laparoscopic vs. Open	ADV	Testicular atrophy and position	6 months	0% (0/36)	0% (0/30)	NS based on OR=0.84 (95% CI: 0.02 to 43.37)[@]	
	Laparoscopic vs. Open	ADV	Contralateral inguinal hernia	Between 1 and 2 years	6% (3/47)	5% (2/42)	NS based on OR=1.36 (95% CI 0.22 to 8.58)@	
	Laparoscopic vs. Open	ADV	Testicular atrophy and position	2 years	0% (0/33)	0% (0/23)	NS based on OR=0.7 (95% CI: 0.01 to 36.63)[@]	

Table Note:
[@] Calculated by evidence reviewer

Appendix D. References for Appendixes B and C

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