Appendix D: Clinical evidence tables

Study (subsidiary papers)	Barrett 2013[2] (Barrett 2019[3])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=87)
Countries and setting	Conducted in USA
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 month follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients were to require a non-cemented, primary (THA) total hip arthroplasty for non-inflammatory degenerative joint disease.
Exclusion criteria	N/A
Age, gender and ethnicity	Age - Mean (SD): DA - 61.4 (9.2), PA - 63.2 (7.7) . Gender (M:F): 48 male, 39 female . Ethnicity: N/A
Further population details	1. Age: Working age (study defined)
Indirectness of population	No indirectness
Interventions	(n=43) Intervention 1: Direct anterior approach. Direct anterior approach - Utilises a modern fracture table with the patient placed supine, both feet in boots for proper positioning. An anterior skin incision, 10 - 14cm long, is used. An inter-muscular plane is utilised to access the anterior hip capsule. The hip capsule is opened anteriorly, a femoral neck osteotomy is performed based on pre-operative templating, and the femoral head removed. Acetabular retractors are placed and reaming of the acetabulum commenced. This is done under direct visualisation with C-arm confirmation for positioning. The femoral side is then visualised with the aid of the fracture table. A hydraulic trochanteric hook elevates the proximal femur. Broaching of the femoral canal is started and proceeds up to the appropriate size. A trial reduction is performed and the length and offset are checked manually and with C-arm confirmation. The trial components are removed and the prostheses are placed with press-fit fixation. Routine closure is performed. . Duration N/A. Concurrent medication/care: Standard pre-operative and post operative treatment protocols, including multimodal pain and management and rapid rehabilitation, were utilised for all subjects. . Indirectness: No indirectness

ISBN 978-1-4731-3722-6

Study (subsidiary papers)	Barrett 2013[2] (Barrett 2019[3])
	(n=44) Intervention 2: Posterior approach. Posterolateral approach - Uses a standard OR table with the patient placed in the lateral decubitus position. A 10-14cm skin incision is utilised over the posterior-lateral corner of the hip. The gluteus maximus muscle is split in line with its fibers and the short external rotators and psoterior capsule are opened. The hip is dislocated posteriorly and a femoral neck osteotomy is performed. The acetabular and femoral components are inserted in the same manner as is done with the DAA with press fit fixation utilised. The PA is well described in all major texts on orthopedic surgery. . Duration N/A. Concurrent medication/care: Standard pre-operative and post operative treatment protocols, including multimodal pain and management and rapid rehabilitation, were utilised for all subjects. . Indirectness: No indirectness
Funding	Funding not stated

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH

Protocol outcome 1: Quality of life at later than 2 years
- Actual outcome: SF-36 scale at 3 years at 3 years ; Group 1: mean 10 (SD 7.5); n=40, Group 2: mean 11 (SD 6.5); n=44
Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 2: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: Harris Hip Score at 6 weeks at 6 weeks ; Group 1: mean 89.5 (SD 8.1); n=43, Group 2: mean 81.4 (SD 9.8); n=44
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0
- Actual outcome: Hip disability and arthritis outcome score (HOOS) - symptoms at 6 weeks at 6 weeks ; Group 1: mean 79.4 (SD 12.3); n=43, Group 2: mean 79.9 (SD 11.6); n=44
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0
- Actual outcome: Hip disability and arthritis outcome score (HOOS) - quality of life at 6 weeks at 6 weeks; Group 1: mean 62.6 (SD 19.8); n=43, Group 2: mean 54.7 (SD 20.5); n=44
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 3: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: Harris Hip Score at 12 months at 12 months; Group 1: mean 97.5 (SD 5.7); n=43, Group 2: mean 97.3 (SD 5.5); n=44
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low,

ISBN 978-1-4731-3722-6

Study (subsidiary papers)	Barrett 2013[2] (Barrett 2019[3])
Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 - Actual outcome: Hip disability and arthritis outcome score (HOOS) - symptoms at 12 months at 12 months ; Group 1: mean 92.9 (SD 13.2); n=43, Group 2: mean 92.1 (SD 8.7); n=44 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 - Actual outcome: Hip disability and arthritis outcome score (HOOS) - quality of life at 12 months at 12 months; Group 1: mean 81.3 (SD 21.8); n=43, Group 2: mean 85.3 (SD 17.5); n=44 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 4: Patient Reported Outcome Measures (PROMs) at later than 2 years - Actual outcome: Harris Hip Score at 5 years at 5 years ; Group 1: mean 96.9 (SD 8.44); n=39, Group 2: mean 97.1 (SD 9.95); n=40 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: DAA - 56.7 - 10.42 PA - 53.8 - 10.19 ; Group 1 Number missing: 3, Reason: death unrelated to procedure, lost after 1 year follow up ; Group 2 Number missing: 3, Reason: death unrelated to procedure, lost after 1 year follow up - Actual outcome: UCLA Activity Score at 5 years at 5 years ; Group 1: mean 6.33 (SD 1.639); n=36, Group 2: mean 6.26 (SD 1.888); n=39 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 3, Reason: death unrelated to procedure, lost after 1 year follow up ; Group 2 Number missing: 3, Reason: death unrelated to procedure, lost after 1 year follow up - Actual outcome: Hip disability and arthritis outcome score (HOOS) at 6.2 years at 6.2 years ; Group 1: mean 95.7 (SD 7.7); n=39, Group 2: mean 92.9 (SD 14.1); n=39 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 3, Reason: death unrelated to procedure, lost to follow up; Group 2 Number missing: 3, Reason: death unrelated to procedure, lost to follow up Protocol outcome 5: Revision rate of of joint replacement at time to event - Actual outcome: Revisions at 12 months; Group 1: 0/43, Group 2: 1/44 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 6: Length of stay at in hospital - Actual outcome: Length of stay (days) at N/A; MD; 0.74, Units: SE- 0.350027, Comments: Mean DA - 2.28 PA - 3.02; Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

ISBN 978-1-4731-3722-6

Study (subsidiary papers)	Barrett 2013[2] (Barrett 2019[3])
Protocol outcome 7: Reoperation/dislocation rate at N/A - Actual outcome: Dislocations at 12 months; Group 1: 0/43, Group 2: 1/44 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 8: Surgery time at N/A - Actual outcome: Surgery time (mins) at N/A; Group 1: mean 84.3 (SD 12.4); n=43, Group 2: mean 60.5 (SD 12.4); n=44 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Intraoperative complications (for example nerve damage) at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Brismar 2018[9]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=100)
Countries and setting	Conducted in Sweden; Setting: The study was conducted at the orthopaedic department, Karolinska University Hospital, Sweden.
Line of therapy	1st line
Duration of study	Follow up (post intervention): 5 years
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients with hip osteoarthritis referred for hip arthroplasty were, after consent, informed and asked for participation in the study.
Exclusion criteria	Exclusion criteria were dementia, neuromuscular disorders, alcohol/drug abuse, and previous hip surgery on the affected side.
Age, gender and ethnicity	Age - Median (IQR): DA - 66 (58 to 74), DL - 67 (60 to 76). Gender (M:F): 65 female, 35 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=50) Intervention 1: Direct anterior approach. Direct anterior approach - was carried out with the patient supine on a standard operating table allowing angulation at the level of the hip. The skin was incised at a point 2 finger breadths lateral to the anterior sciatic spine and extended 8–10 cm distally. The tensor fascia lata and gluteus medius muscles were retracted laterally and the sartorius and rectus muscles medially exposing the capsule. A special offset acetabular reamer and an offset broach handle were used.. Duration N/A. Concurrent medication/care: All patients had uncemented implants. 92 patients received spinal anaesthesia (47 DA and 45 DL) and 8 general anaesthesia (3 DA and 5 DL). 2 surgeons performed all procedures. All patients were treated postoperatively according to the same pain management protocol including a regular long-acting morphine analog the first day (oxycodone 10 mg 2 times daily), regular paracetamol (1 g 4 times daily) and short-duration morphine (oxycodone or morphine) on demand. The long-acting dose was adjusted with regard to the previous day's morphine consumption. The total sum of equipotent doses of oral morphine consumed 3 days postoperatively was estimated (10 mg oral oxycodone = 20 mg oral morphine, 10 mg iv morphine = 30 mg oral morphine). Patients were asked to keep track of how many days after discharge from hospital they continued to use morphine.. Indirectness: No indirectness

ISBN 978-1-4731-3722-6

	(n=50) Intervention 2: Anterolateral approach. Direct lateral approach - This was performed with the patient in a lateral decubitus position. Access to the joint was gained through a 10–20 cm long skin incision centered over the greater trochanter, splitting the fascia lata/gluteus maximus and detachment of the caudal 2/3 of the gluteus medius and the entire gluteus minimus tendon insertions. Finally, the capsule was excised anteriorly. The muscle tendons were reattached to the trochanter by osteosuture's following implantation.. Duration N/A. Concurrent medication/care: All patients had uncemented implants. 92 patients received spinal anaesthesia (47 DA and 45 DL) and 8 general anaesthesia (3 DA and 5 DL). 2 surgeons performed all procedures. All patients were treated postoperatively according to the same pain management protocol including a regular long-acting morphine analog the first day (oxycodone 10 mg 2 times daily), regular paracetamol (1 g 4 times daily) and short-duration morphine (oxycodone or morphine) on demand. The long-acting dose was adjusted with regard to the previous day's morphine consumption. The total sum of equipotent doses of oral morphine consumed 3 days postoperatively was estimated (10 mg oral oxycodone = 20 mg oral morphine, 10 mg iv morphine = 30 mg oral morphine). Patients were asked to keep track of how many days after discharge from hospital they continued to use morphine.. Indirectness: No indirectness
Funding	Study funded by industry (Stryker unconditionally sponsored the study.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus ANTEROLATERAL APPROACH

Protocol outcome 1: Revision rate of of joint replacement at time to event
- Actual outcome: Revision at 5 years; Group 1: 1/45, Group 2: 0/42; Comments: this patient also had a dislocation and so is included in that outcome too
Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions

Protocol outcome 2: Deep surgical site Infection at before JR is revised
- Actual outcome: Deep infection at 5 years; Group 1: 1/45, Group 2: 0/42
Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions

Protocol outcome 3: Reoperation/dislocation rate at N/A
- Actual outcome: Dislocation at 5 years; Group 1: 4/45, Group 2: 0/42
Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions

ISBN 978-1-4731-3722-6

	Protocol outcome 4: Intraoperative complications (for example nerve damage) at before JR is revised - Actual outcome: DVT at 3 months; Group 1: 1/50, Group 2: 1/49 Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions - Actual outcome: Hyperesthesia at 5 years; Group 1: 0/45, Group 2: 1/42; Comments: hyperesthesia from the femoral cutaneous nerve of the opposite, un operated leg, probably originating from pressure from the table support during surgery. Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions Protocol outcome 5: Pain at later than 6 weeks up to 1 year - Actual outcome: Pain >30 measured by VAS - at rest at 8 weeks; Group 1: 3/50, Group 2: 3/49; Comments: high is bad Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions - Actual outcome: Pain >30 measured by VAS - during activity at 8 weeks; Group 1: 3/50, Group 2: 6/49 Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions Protocol outcome 6: Pain at later than 2 years - Actual outcome: Pain >30 measured by VAS - at rest at 5 years; Group 1: 1/45, Group 2: 1/42 Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions - Actual outcome: Pain >30 measured by VAS - during activity at 5 years; Group 1: 2/45, Group 2: 2/42 Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died, revised, declined FU, unable to answer questions; Group 2 Number missing: 9, Reason: missed FU, died, declined FU, unable to answer questions
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6

ISBN 978-1-4731-3722-6

weeks or earlier

ISBN 978-1-4731-3722-6

Study	Catma 2017[10]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=68)
Countries and setting	Conducted in Turkey
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	All patients underwent THR surgery due to the Crowe type 4 developmental dysplasia of hip DDH.
Exclusion criteria	Not stated
Age, gender and ethnicity	Age - Mean (SD): 51.1 (9.4). Gender (M:F): 61 female, 7 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=34) Intervention 1: Posterior approach. Posterior approach - In group I, the posterior approach was familiar with modification of the Gibson–Moore approach. After a posterior curve skin incision, external rotator muscles and tendons were revealed and hanged with a suture. Elongated joint capsule was exposed and femoral head was revealed with external rotation of the femur.. Duration N/A. Concurrent medication/care: All the surgical procedures were done under general anaesthesia. Distal split and proximal HA-coated femoral stem were used for all patients. Based on their toleration level, all patients were allowed weight bearing the day after surgery with two crutches. Patients were discharged after tolerating mobilization within few days of surgery.. Indirectness: No indirectness (n=34) Intervention 2: Anterolateral approach. Anterolateral approach - after an anterolateral incision, the space between tensor fascia and gluteus medius muscles was used to reach joint capsule and femoral head. Femoral head was removed and femur was reamed in each group. Femur was rasped with proper size. A transverse osteotomy 1–2 cm distal to the minor trochanter was applied and proximal part of the femur was retracted, by following the prolonged joint capsule the real acetabulum was identified. Hydroxyapatite (HA)-coated cementless acetabular cup placed with 10–20 degrees of anteversion and 35–45 degrees of inclination after reaming the real acetabulum. Amount of shortening was determined by moving the proximal part of the femur distally and overlapping part of distal femur was osteotomied. The osteotomied part was used as a strut bone graft by splitting into two parts and fixing over the osteotomied

ISBN 978-1-4731-3722-6

	site with cables.. Duration N/A. Concurrent medication/care: All the surgical procedures were done under general anaesthesia. Distal split and proximal HA-coated femoral stem were used for all patients. Based on their toleration level, all patients were allowed weight bearing the day after surgery with two crutches. Patients were discharged after tolerating mobilization within few days of surgery.. Indirectness: No indirectness
Funding	No funding (The author(s) received no financial support for the research, authorship and/or publication of this article.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: POSTERIOR APPROACH versus ANTEROLATERAL APPROACH

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: PROMs (Harris hip score) - at 6 months at 6 months; Group 1: mean 82.7 (SD 7.7); n=34, Group 2: mean 81.1 (SD 5.7); n=34
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 2: Reoperation/dislocation rate at N/A
- Actual outcome: Dislocations at 6 months; Group 1: 2/34, Group 2: 3/34
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0
- Actual outcome: Reoperation at 6 months; Group 1: 1/34, Group 2: 0/34; Comments: also had a dislocation
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 3: Surgery time at N/A
- Actual outcome: Operation time (minutes) at N/A; Group 1: mean 98.1 (SD 13.1); n=34, Group 2: mean 96.4 (SD 15.1); n=34
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Intraoperative complications (for example nerve damage) at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Cheng 2017[12]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=73)
Countries and setting	Conducted in Australia; Setting:
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 weeks follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	The inclusion criteria for the study were unilateral symptomatic hip osteoarthritis, Dorr's femur classification A/B, American Society of Anesthesiologists (ASA) score 3 or less, a body mass index (BMI) less than 35 kg/m², and age between 40 to 75 years.
Exclusion criteria	Participants were excluded if they had Dorr's femur classification C, previous hip surgery (excluding arthroscopy), anticipated complex primary THA, previous joint arthroplasty, were unwilling to accept randomisation and blinding, or had severe pathology that would affect postoperative participation such as neurologic, psychiatric, or other confounding pre-existing musculoskeletal disorders.
Recruitment/selection of patients	Recruited from the health service's outpatient clinic and elective surgical waiting list.
Age, gender and ethnicity	Age - Median (IQR): Anterior group - 59 (54 to 69), posterior - 62.5 (55 to 69). Gender (M:F): 33 male, 40 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=37) Intervention 1: Direct anterior approach. Direct anterior approach - The anterior incision begins 3 cm posterior and distal to the anterior superior iliac spine, extending distally approximately 10cm over the tensor fascia lata. Heuter's interval was then identified and developed to gain access to the hip joint. A capsulotomy and femoral neck osteotomy was performed. This was followed by the retrieval of the femoral head and repositioning of retractors to expose the acetabulum. Sequential reaming and acetabular component implantation was conducted and verified under fluoroscopy. Femoral preparation was undertaken with the leg extended externally rotated, and adducted. A superior capsulotomy was performed to aid in femoral exposure. Femoral broaching and trials were performed with fluoroscopic assistance. Definitive implantation of the remaining prosthesis was undertaken with rotation capsular and wound closure. . Duration N/A. Concurrent medication/care: Similar intraoperative local infiltration anesthetic protocols were utilised in both DAA and PA groups based on a modification of Kerr's technique. A concoction of 0.2% ropivocaine with 30

ISBN 978-1-4731-3722-6

	mg ketorolac and 1% adrenaline was used. Ketorolac was not used in patients with evidence of renal impairment. Continuous infusion pumps were employed on the ward up to 24 hours postoperatively. All participants received prophylactic antibiotics in accordance with the health service's protocols. All patients were mobilized the day after surgery. Routine hip precautions (avoidance of combined hip flexion >90• and internal rotation past the neutral plane) were instituted for the PA group. The DAA group did not have restrictions to hip movement. The target day of discharge for home or transfer to rehabilitation was the third postoperative day. This was assessed daily by physiotherapists and physicians supporting the orthopedic team. Patients not meeting the discharge requirements were transferred to a rehabilitation facility. . Indirectness: No indirectness (n=38) Intervention 2: Posterior approach. Posterior approach - surgery was performed with the patient adopting a lateral position on a standard surgical table. The curvilinear incision 10 to 15 cm long centers over the posterior third of the greater trochanter. Dissection through the fascia in line with the fibers of the gluteus maximus was conducted to reach the short external rotators. With the piriformis muscle identified, the short external rotators and hip capsule were tagged and reflected. Subsequent hip joint dislocation was followed by a femoral neck osteotomy at the templated level. Acetabular and femoral preparations were then performed in a routine manner. Definitive implants were trialed and inserted under direct vision. An enhanced intraosseous short rotator and capsular repair was performed for all cases. . Duration N/A. Concurrent medication/care: Similar intraoperative local infiltration anesthetic protocols were utilised in both DAA and PA groups based on a modification of Kerr's technique. A concoction of 0.2% ropivocaine with 30 mg ketorolac and 1% adrenaline was used. Ketorolac was not used in patients with evidence of renal impairment. Continuous infusion pumps were employed on the ward up to 24 hours postoperatively. All participants received prophylactic antibiotics in accordance with the health service's protocols. All patients were mobilized the day after surgery. Routine hip precautions (avoidance of combined hip flexion >90• and internal rotation past the neutral plane) were instituted for the PA group. The DAA group did not have restrictions to hip movement. The target day of discharge for home or transfer to rehabilitation was the third postoperative day. This was assessed daily by physiotherapists and physicians supporting the orthopedic team. Patients not meeting the discharge requirements were transferred to a rehabilitation facility. . Indirectness: No indirectness
Funding	Other (The authors also acknowledge the generous donations from the Bulley Fellowship and Box Hill Golf Club for this research.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH

Protocol outcome 1: Quality of life at 6 weeks or earlier
- Actual outcome: EQ-5D - 2 weeks at 2 weeks; Group 1: mean 0.6 (SD 0.24); n=35, Group 2: mean 0.5 (SD 0.25); n=38
Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low,

ISBN 978-1-4731-3722-6

Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture

Protocol outcome 2: Quality of life at later than 6 weeks up to 1 year
- Actual outcome: EQ-5D - 12 weeks at 12 weeks; Group 1: mean 0.9 (SD 0.12); n=35, Group 2: mean 0.9 (SD 0.12); n=38
Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture

Protocol outcome 3: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: WOMAC total score - 2 weeks at 2 weeks; Group 1: mean 40.3 (SD 18.31); n=35, Group 2: mean 44.5 (SD 17.82); n=38
Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture
- Actual outcome: OHS score - 2 weeks at 2 weeks; Group 1: mean 28.5 (SD 9.49); n=35, Group 2: mean 26.8 (SD 9.25); n=38
Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture

Protocol outcome 4: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: WOMAC total score - 12 weeks at 12 weeks; Group 1: mean 9.1 (SD 12.47); n=35, Group 2: mean 12.8 (SD 12.27); n=38
Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture
- Actual outcome: OHS score - 12 weeks at 12 weeks; Group 1: mean 43.8 (SD 5.29); n=35, Group 2: mean 42.8 (SD 5.18); n=38
Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture

Protocol outcome 5: Revision rate of of joint replacement at time to event
- Actual outcome: Revisions at 12 weeks; Group 1: 1/35, Group 2: 1/38
Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture

Protocol outcome 6: Reoperation/dislocation rate at N/A
- Actual outcome: Dislocations at 12 weeks; Group 1: 1/35, Group 2: 1/38
Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low,

ISBN 978-1-4731-3722-6

Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture Protocol outcome 7: Intraoperative complications (for example nerve damage) at before JR is revised - Actual outcome: Lateral cutaneous nerve of the thigh neuropraxia at 12 weeks; Group 1: 29/35, Group 2: 0/38 Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: excluded due to emergency requiring cessation of surgery and equipment failure requiring conversion to PA; Group 2 Number missing: 1, Reason: required a revision due to fracture	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Christensen 2015[13]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=56)
Countries and setting	Conducted in USA
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 weeks follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	N/A
Exclusion criteria	Patients were excluded if they were <18 or >85 years of age, had been diagnosed with inflammatory or rheumatoid arthritis, had a BMI >40kg/m², or had previously undergone any prior ipsilateral hip surgery including arthroscopic procedures. Furthermore, patients were excluded if they demonstrated characteristics that led the surgeon to believe the patient would clearly benefit from one particular technique over the other.
Age, gender and ethnicity	Age - Mean (SD): DAA - 64.3 (9.1), PA - 65.2 (9.1). Gender (M:F): 24 male, 27 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=32) Intervention 1: Direct anterior approach. Direct anterior approach - No further details given. Patients were not given any postoperative restrictions. . Duration N/A. Concurrent medication/care: Regardless of approach, general anaesthesia was used in conjunction with a peri-articular injection. All procedures were performed with a short tapered wedge shaped femoral component. All patients received a porous-coated hemispherical titanium acetabular component. (n=24) Intervention 2: Posterior approach. Posterior approach - No further details given. Patients were given standard postoperative precautions to prevent dislocations. . Duration N/A. Concurrent medication/care: Regardless of approach, general anaesthesia was used in conjunction with a peri-articular injection. All procedures were performed with a short tapered wedge shaped femoral component. All patients received a porous-coated hemispherical titanium acetabular component. . Indirectness: No indirectness
Funding	Other author(s) funded by industry (One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either indirect or direct, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict

ISBN 978-1-4731-3722-6

	of interest with this work.)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH Protocol outcome 1: Length of stay at in hospital - Actual outcome: Length of stay (days) at N/A; Group 1: mean 1.4 (SD 0.6); n=28, Group 2: mean 2 (SD 1.1); n=23 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: removed due to complications, did not complete follow up ; Group 2 Number missing: 1, Reason: chose not to participate	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

Study	**D'arrigo 2009[15]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=169)
Countries and setting	Conducted in Italy
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 weeks
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable:
Inclusion criteria	Inclusion criteria to enter the study group (groups A–C) were: body mass index (BMI)≤30, diagnosis of primary osteoarthritis, age ≤75 years.

ISBN 978-1-4731-3722-6

Exclusion criteria	Exclusion criteria were: BMI≥30, fractures, tumours, severe deformities, rheumatoid arthritis, age ≥75 years.
Age, gender and ethnicity	Age - Mean (SD): Group A - 66.3 (10.4), B - 64 (8), C - 66 (7.5) . Gender (M:F): 37 male, 23 female. Ethnicity: N/A
Further population details	1. Age:
Extra comments	Group A - modified Hardinge approach, Group B - anterior, Group C - anterolateral, Group D - lateral direct Hardinge approach (control group)
Indirectness of population	No indirectness
Interventions	(n=20) Intervention 1: Direct anterior approach. Anterior tissue sparing surgery (TSS) approach - An anterior TSS approach utilising the interval between the tensor fasciae latae, gluteus medius and minimus muscle laterally and the sartorius and rectus femoris muscle medially, was used. . Duration N/A. Concurrent medication/care: All patients in groups A, B and C had a diagnosis of primary osteoarthritis. In group D the diagnosis was of primary osteoarthritis in 140 patients and of femoral head osteonecrosis in nine patients. In all cases a specialized dedicated surgical instrumentation was used. An epidural anaesthesia was used in all cases. All patients received the same standardised post-operative care. Mechanical foot pumps and pharmacological antithrombotic prophylaxis were used. Patients received antibiotics for 24 h post-operation. The drain was pulled on the first postoperative day by the resident on rounds the morning after surgery. No specific protocol was used to measure drain output. All patients received patient control epidural anaesthesia (PCEA) for initial pain control. Patients were switched to oral narcotics on the 2nd or 3rd post-operative day. The major goals of therapy were to enable patients to independently transfer, walk with a walker and negotiate stairs. The same physical therapist supervised the care of all patients. Physical therapy began the day after surgery. Patients were either discharged home or transferred to a rehabilitation facility based on their medical condition, progress in therapy, and home support system. Indirectness: No indirectness (n=20) Intervention 2: Anterolateral approach. Modified Hardinge approach - the anterior third of the gluteus medius and the underlying minimus is reflected anteriorly. The length of the skin incision to be made was measured and marked using a sterile ruler and marker pen after draping. The only difference from the modified Hardinge approach (control group) was the length of the skin incision (≤8 cm instead of 12–15 cm).. Duration N/A. Concurrent medication/care: All patients in groups A, B and C had a diagnosis of primary osteoarthritis. In group D the diagnosis was of primary osteoarthritis in 140 patients and of femoral head osteonecrosis in nine patients. In all cases a specialized dedicated surgical instrumentation was used. An epidural anaesthesia was used in all cases. All patients received the same standardised post-operative care. Mechanical foot pumps and pharmacological antithrombotic prophylaxis were used. Patients received antibiotics for 24 h post-operation. The drain was pulled on the first postoperative day by the resident on rounds the morning after surgery. No specific protocol was used to measure drain output. All patients received patient control epidural anaesthesia (PCEA) for initial

ISBN 978-1-4731-3722-6

	pain control. Patients were switched to oral narcotics on the 2nd or 3rd post-operative day. The major goals of therapy were to enable patients to independently transfer, walk with a walker and negotiate stairs. The same physical therapist supervised the care of all patients. Physical therapy began the day after surgery. Patients were either discharged home or transferred to a rehabilitation facility based on their medical condition, progress in therapy, and home support system. Indirectness: No indirectness (n=20) Intervention 3: Anterolateral approach. An antero-lateral TSS approach utilising the intermuscular plane between gluteus medius and tensor fascia latae was used. . Duration N/A. Concurrent medication/care: All patients in groups A, B and C had a diagnosis of primary osteoarthritis. In group D the diagnosis was of primary osteoarthritis in 140 patients and of femoral head osteonecrosis in nine patients. In all cases a specialized dedicated surgical instrumentation was used. An epidural anaesthesia was used in all cases. All patients received the same standardised post-operative care. Mechanical foot pumps and pharmacological antithrombotic prophylaxis were used. Patients received antibiotics for 24 h post-operation. The drain was pulled on the first postoperative day by the resident on rounds the morning after surgery. No specific protocol was used to measure drain output. All patients received patient control epidural anaesthesia (PCEA) for initial pain control. Patients were switched to oral narcotics on the 2nd or 3rd post-operative day. The major goals of therapy were to enable patients to independently transfer, walk with a walker and negotiate stairs. The same physical therapist supervised the care of all patients. Physical therapy began the day after surgery. Patients were either discharged home or transferred to a rehabilitation facility based on their medical condition, progress in therapy, and home support system. Indirectness: No indirectness
Funding	Funding not stated

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus ANTEROLATERAL APPROACH - A

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: HHS at 6 weeks at 6 weeks; Group 1: mean 93.1 (SD 7.8); n=10, Group 2: mean 88.3 (SD 8); n=20
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0
- Actual outcome: WOMAC at 6 weeks at 6 weeks; Group 1: mean 23.3 (SD 9.9); n=10, Group 2: mean 27.7 (SD 13.6); n=20
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 2: Length of stay in hospital
- Actual outcome: Length of hospital stay (days) at N/A; Group 1: mean 8 (SD 3.7); n=10, Group 2: mean 10 (SD 4.6); n=20
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low,

ISBN 978-1-4731-3722-6

Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 3: Intraoperative complications (for example nerve damage) at before JR is revised
- Actual outcome: Blood loss (ml) at N/A; Group 1: mean 1344 (SD 710); n=10, Group 2: mean 1219 (SD 786.5); n=20
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 4: Surgery time at N/A
- Actual outcome: Surgical time (minutes) at N/A; Group 1: mean 121 (SD 23.6); n=10, Group 2: mean 102 (SD 10.6); n=20
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus ANTEROLATERAL APPROACH - C

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: HHS at 6 weeks at 6 weeks; Group 1: mean 93.1 (SD 7.8); n=10, Group 2: mean 93.8 (SD 7.4); n=20
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0
- Actual outcome: WOMAC at 6 weeks at 6 weeks; Group 1: mean 23.3 (SD 9.9); n=10, Group 2: mean 28 (SD 8.5); n=20
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 2: Length of stay in hospital
- Actual outcome: Length of hospital stay (days) at N/A; Group 1: mean 8 (SD 3.7); n=10, Group 2: mean 9 (SD 3.6); n=20
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 3: Intraoperative complications (for example nerve damage) at before JR is revised
- Actual outcome: Blood loss (ml) at N/A; Group 1: mean 1344 (SD 710); n=10, Group 2: mean 1279 (SD 694.9); n=20
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcome 4: Surgery time at N/A
- Actual outcome: Surgical time (minutes) at N/A; Group 1: mean 121 (SD 23.6); n=10, Group 2: mean 110 (SD 6.3); n=20
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

ISBN 978-1-4731-3722-6

Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Reoperation/dislocation rate at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	De anta-diaz 2016[16]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=99)
Countries and setting	Conducted in Spain
Line of therapy	1st line
Duration of study	Intervention + follow up:
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	The inclusion criteria were aged 55 or older, diagnosis of primary osteoarthritis, and asymptomatic opposite hip.
Exclusion criteria	The exclusion criteria included prior hip surgery, arthroplasty to treat a facture, inflammatory arthropathies, autoimmune disease, immunosuppressive treatment, or cancer.
Age, gender and ethnicity	Age - Mean (SD): lateral - 63.5 (12.5), anterior - 64.8 (10.1) . Gender (M:F): 52 male, 47 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=50) Intervention 1: Anterolateral approach. Direct lateral approach - approach as described by Hardinge was used. Briefly, the gluteus medius and minimus were incised and detached ventrally from the greater trochanter. The incision was not extended more than 3 cm above greater trochanter to prevent injury to superior gluteal nerve. After implantation, the tendons were reattached with transperiosteal sutures. . Duration N/A. Concurrent medication/care: According to standard protocol, all patients had antibiotic prophylaxis with cefazoline for 24 hours (started 30 mins prior to skin incision), and thromboembolic prophylaxis with low-molecular-weight heparin fro 30 days. All patients were allowed to stand on the second post-operative day, and were instructed to weight bearing as tolerated with the use of a walker. . Indirectness: No indirectness (n=49) Intervention 2: Direct anterior approach. Direct Anterior approach - Arthrotomy was performed by retracting the muscles rectus femoris and iliopsoas medially and gluteus medius laterally. . Duration N/A. Concurrent medication/care: According to standard protocol, all patients had antibiotic prophylaxis with cefazoline for 24 hours (started 30 mins prior to skin incision), and thromboembolic prophylaxis with low-molecular-weight heparin fro 30 days. All patients were allowed to stand on the second post-operative day,

ISBN 978-1-4731-3722-6

	and were instructed to weight bearing as tolerated with the use of a walker. . Indirectness: No indirectness
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ANTEROLATERAL APPROACH versus DIRECT ANTERIOR APPROACH Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year - Actual outcome: Harris score at 1 year at 1 year ; Group 1: mean 94.5 (SD 9.7); n=50, Group 2: mean 96.2 (SD 10.1); n=49 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: excluded from analysis due to intra-operative trochanteric fracture; Group 2 Number missing: 2, Reason: excluded from analysis due to early wound infection Protocol outcome 2: Surgery time at N/A - Actual outcome: Surgery time (minutes) at N/A; Group 1: mean 82.2 (SD 15.2); n=50, Group 2: mean 78.2 (SD 16.2); n=49 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: excluded from analysis due to intra-operative trochanteric fracture; Group 2 Number missing: 2, Reason: excluded from analysis due to early wound infection	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Ji 2012[41]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=205)
Countries and setting	Conducted in South Korea
Line of therapy	1st line
Duration of study	Intervention + follow up: mean 37.9 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Primary total hip arthroplasties.
Exclusion criteria	Fused hips and hips with a unilateral Crowe type IV developmental dislocation were excluded because they necessitated extensile approaches and/or other prostheses.
Age, gender and ethnicity	Age - Mean (SD): posterior - 51 (14.5), lateral - 52 (15.1) . Gender (M:F): 112 male, 84 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=105) Intervention 1: Posterior approach. Posterior approach - Patient was transferred to the lateral decubitus position and the hip was flexed by 30 degrees. A straight skin incision was made over the center of the greater trochanter, equidistant cephalad and caudad to the centre of the trochanter. The length of skin incision ranged from 16 to 22 cm. After implantation of the prosthesis, we repaired the capsule and short external rotators. 2 to 3 drill holes 1.5cm to 2 cm apart were made in the trochanteric crest of the greater trochanter from the anterior to the posterior direction . . Duration N/A. Concurrent medication/care: Patients were instructed to walk with partial weight bearing with the aid of 2 crutches for 4 weeks after surgery. . Indirectness: No indirectness (n=100) Intervention 2: Anterolateral approach. Modified lateral approach - the patient was transferred to the lateral decubitus position and the hip was flexed by 30 degrees. A straight lateral skin incision was made over the center of the greater trochanter midway between the anterior and posterior dimensions of the greater trochanter. The length of the skin incision was similar to that of the posterior approach. . Duration N/A. Concurrent medication/care: Patients were instructed to walk with partial weight bearing with the aid of 2 crutches for 4 weeks after surgery. . Indirectness: No indirectness
Funding	Funding not stated

ISBN 978-1-4731-3722-6

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: POSTERIOR APPROACH versus ANTEROLATERAL APPROACH

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at later than 2 years
- Actual outcome: Harris Hip score at 37.9 months at 37.9 months; Group 1: mean 91 (SD 6.7); n=99, Group 2: mean 92.3 (SD 5.5); n=97
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died or lost to follow up; Group 2 Number missing: 3, Reason: died or lost to follow up

Protocol outcome 2: Revision rate of of joint replacement at time to event
- Actual outcome: Revisions at 37.9 months; Group 1: 1/99, Group 2: 1/97
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died or lost to follow up; Group 2 Number missing: 3, Reason: died or lost to follow up

Protocol outcome 3: Reoperation/dislocation rate at N/A
- Actual outcome: Dislocations at 37.9 months; Group 1: 0/99, Group 2: 3/97
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died or lost to follow up; Group 2 Number missing: 3, Reason: died or lost to follow up

Protocol outcome 4: Surgery time at N/A
- Actual outcome: Operation time (minutes) at N/A; Group 1: mean 105 (SD 25.7); n=99, Group 2: mean 132 (SD 37.5); n=97
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: died or lost to follow up; Group 2 Number missing: 3, Reason: died or lost to follow up

Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Intraoperative complications (for example nerve damage) at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study (subsidiary papers)	Lorenzen 2013[52] (Tjur 2018[110])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=38)
Countries and setting	Conducted in Denmark
Line of therapy	1st line
Duration of study	Intervention + follow up: up to 72 hours after surgery
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Primary osteoarthritis or secondary osteoarthritis due to mild or moderate acetabular dysplasia. Acceptable bone mineral density on a pre-operative DXA scan, age 30-60 years at the time of inclusion, no vascular or neuromuscular disease in the operated leg, no fracture sequelae, no avascular necrosis of the femoral head, no wish to become pregnant, no alcohol abuse, no daily intake of non-steroid anti-inflammatory drugs, no daily intake of K-vitamin antagonists or loop diuretics.
Exclusion criteria	N/A
Age, gender and ethnicity	Age - Mean (range): posterior - 45 (36-60), lateral - 53 (35-61). Gender (M:F): 13 female, 11 male . Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=18) Intervention 1: Posterior approach. Posterior approach - No further details given. . Duration N/A. Concurrent medication/care: In all cases, the ReCap Total Hip System was used. The implant is made of a chrome-cobalt alloy and consists of a cementless acetabular cup coated with a Titanium Porous Plasma Spray Coating and a cemented femoral resurfacing component fixed to the bone with Simplex bone cement by Stryker. All surgical procedures were performed by one of the two senior surgeon, and standard equipment supplied by the manufacturer was used. The patients stayed in the hospital 2-3 days after surgery, and they all received similar post-operative rehabilitation. All patients were mobilised within 6 hours after surgery and were allowed to put full weight on the affected hip. . Indirectness: No indirectness (n=20) Intervention 2: Anterolateral approach. Antero-lateral approach - No further details given. . Duration N/A. Concurrent medication/care: In all cases, the ReCap Total Hip System was used. The implant is made of a chrome-cobalt alloy and consists of a cementless acetabular cup coated with a Titanium Porous Plasma Spray Coating and a cemented femoral resurfacing component fixed to the bone with Simplex bone cement

ISBN 978-1-4731-3722-6

	by Stryker. All surgical procedures were performed by one of the two senior surgeon, and standard equipment supplied by the manufacturer was used. The patients stayed in the hospital 2-3 days after surgery, and they all received similar post-operative rehabilitation. All patients were mobilised within 6 hours after surgery and were allowed to put full weight on the affected hip. . Indirectness: No indirectness
Funding	Academic or government funding (The Danish Rheumatism Association supported the study.)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: POSTERIOR APPROACH versus ANTEROLATERAL APPROACH Protocol outcome 1: Pain at later than 6 weeks up to 1 year - Actual outcome: Pain using VAS scale at 12 months at 12 months; Group 1: mean -43.08 (SD 19.75); n=12, Group 2: mean -50.36 (SD 20.29); n=10; Comments: change score baseline to 12 months Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: 2 unable to participate at 12 months; Group 2 Number missing: 1, Reason: 1 unable to participate at 12 months	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Mayr 2009[56]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=33)
Countries and setting	Conducted in Austria
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 weeks follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	All patients had unilateral hip disease.
Exclusion criteria	Co-morbidities of the lower extremity, such as osteoarthritis or misalignment at other joints which might affect gait, were the exclusion criteria.
Age, gender and ethnicity	Age - Mean (range): DA - 65 (55 -84), AL - 69 (59 -78). Gender (M:F): 20 female, 14 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=16) Intervention 1: Direct anterior approach. Direct anterior - with the patient in supine position, a 7cm skin incision was made distally and laterally to the anterior superior iliac spine. The anterior aspect of the capsule of the hip was bluntly exposed by holding apart the rectus femoris muscle medially and the gluteus minimus muscle laterally. . Duration N/A. Concurrent medication/care: The same standard rehabilitation protocol was recommended to the patients in both groups. Patients were instructed to walk with two crutches during the first 6 weeks after surgery. For the following 6 weeks, patients were instructed to use one crutch on the contralateral side. . Indirectness: No indirectness (n=17) Intervention 2: Anterolateral approach. Anterolateral approach - The patient was placed in the supine position. After skin incision over the greater trochanter, the iliotibial band was split. The ventral third of vastus lateralis muscle and the gluteal muscle was detached from the bone in one coherent layer using diathermy. The exposed capsule was then opened, and the femoral head was dislocated. . Duration N/A. Concurrent medication/care: The same standard rehabilitation protocol was recommended to the patients in both groups. Patients were instructed to walk with two crutches during the first 6 weeks after surgery. For the following 6 weeks, patients were instructed to use one crutch on the contralateral side. . Indirectness: No indirectness

ISBN 978-1-4731-3722-6

Funding	Funding not stated
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Meneghini 2008[59]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=23)
Countries and setting	Conducted in USA
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 weeks postoperatively
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Primary diagnosis of degenerative rheumatoid, or posttraumatic arthritis or arthritis secondary to developmental dysplasia classified as Crowe II or less, age greater than 18 and less than 75 years, body mass index of 30 or less, no previous hip surgery, implants, arthrodesis or infection, and no neurological, musculoskeletal or medial conditions that would prevent the ability to comply with early weight-bearing and early functional recovery in the postoperative period. Patients with contralateral hip disease were not excluded, provided the contralateral hip did not preclude the ability to comply with the rapid rehabilitation protocol.
Exclusion criteria	N/A
Age, gender and ethnicity	Age - Mean (range): 54 (38 to 74). Gender (M:F): N/A. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=8) Intervention 1: Posterior approach. Mini posterior approach - was performed similar to that described by Dorr et al. . Duration N/A. Concurrent medication/care: All patients received one preoperative physical therapy session to orient patients to the postoperative PT protocol and expectations. All patients were full weight bearing and received an identical postoperative rehabilitation protocol, including inpatient PT the afternoon of surgery. (n=7) Intervention 2: Anterolateral approach. Mini-anterolateral approach - performed as described by Berger and is a modification of the Hardinge approach with evaluation and subsequent repair of the anterior one third of the gluteus medius and minimus tendons. . Duration N/A. Concurrent medication/care: All patients received one preoperative physical therapy session to orient patients to the postoperative PT protocol and expectations. All patients were full weight bearing and received an identical postoperative rehabilitation protocol, including inpatient PT the afternoon of surgery. . Indirectness: No indirectness

ISBN 978-1-4731-3722-6

Funding	Academic or government funding (Benefits or funds were received in partial or total support of the research material described in this article. Theses benefits or support were received from the following sources: Orthopaedic Research and Education Foundation.)
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

Study	**Mjaaland 2015[64]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=164)
Countries and setting	Conducted in Norway
Line of therapy	1st line
Duration of study	Intervention + follow up: 4 days
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall:
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients with end-stage clinical osteoarthritis of the hip, verified on plain radiograms, were considered candidates. Further inclusion criteria were age between 20 and 80 years and willingness to offer written consent to participate in the study.
Exclusion criteria	Exclusion criteria was previous surgery of the hip, BMI>35 kg/m2, and dementia/psychiatric illness preventing follow-up, as was an explicit request regarding approach.

ISBN 978-1-4731-3722-6

Age, gender and ethnicity	Age - Mean (SD): anterior - 67.2 (8.6), lateral - 65.6 (8.6). Gender (M:F): 55 male, 109 female. Ethnicity: Not stated
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=83) Intervention 1: Direct anterior approach. Minimally invasive anterior approach - Direct anterior approach was performed with the patient supine. No traction was used. . Duration N/A. Concurrent medication/care: Surgery was performed using spinal anaesthesiaanaesthesia and local infiltration analgesia (LIA) with Ropivacain (NaropinTM) 300mg, Ketorolac (ToradolTM) 30mg, Triamcinolon (LederspanTM) 40mg, and adrenaline 0.5mg in saline solution to a volume of 150ml. All patients were given Cefalotin 2 g i.v. prior to surgery and further three doses after surgery. Tranexamic acid of 500mg were given intravenously at the onset of surgery and 500mg at the time of closure. In all patients, a cemented cup (Marathon, DePuy, Warsaw, IN), uncemented stem (Corail, DePuy), and ceramic head with a diameter of 32mm (Biolox forte, Ceramtec, Plochingen Germany) were used. Patients started physiotherapy on the first postoperative day allowing full weight bearing. Postoperative pain-regime included for all patients a daily dose of paracetamol of 4 g for the duration of admission and a total dose of ibuprofen of 4g with a daily dose of 1200mg. Tramadol was used from the first postoperative day in range of 200–400mg daily. If needed, patients were given oxycodone or ketobemidone. All analgesic use was recorded and converted to morphine equivalents (ME).. Indirectness: No indirectness (n=80) Intervention 2: Anterolateral approach. Direct lateral approach - Direct lateral approach was performed with the patient in lateral decubitus. . Duration N/A. Concurrent medication/care: Surgery was performed using spinal anaesthesiaanaesthesia and local infiltration analgesia (LIA) with Ropivacain (NaropinTM) 300mg, Ketorolac (ToradolTM) 30mg, Triamcinolon (LederspanTM) 40mg, and adrenaline 0.5mg in saline solution to a volume of 150ml. All patients were given Cefalotin 2 g i.v. prior to surgery and further three doses after surgery. Tranexamic acid of 500mg were given intravenously at the onset of surgery and 500mg at the time of closure. In all patients, a cemented cup (Marathon, DePuy, Warsaw, IN), uncemented stem (Corail, DePuy), and ceramic head with a diameter of 32mm (Biolox forte, Ceramtec, Plochingen Germany) were used. Patients started physiotherapy on the first postoperative day allowing full weight bearing. Postoperative pain-regime included for all patients a daily dose of paracetamol of 4 g for the duration of admission and a total dose of ibuprofen of 4g with a daily dose of 1200mg. Tramadol was used from the first postoperative day in range of 200–400mg daily. If needed, patients were given oxycodone or ketobemidone. All analgesic use was recorded and converted to morphine equivalents (ME).. Indirectness: No indirectness
Funding	No funding (No financial support or grant was received for the study.)

ISBN 978-1-4731-3722-6

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus ANTEROLATERAL APPROACH Protocol outcome 1: Surgery time at N/A - Actual outcome: Average surgery time (minutes) at N/A; MD; 15 (95%CI 11 to 19, Comments: mean (range) anterior - 77 (52 to 136) lateral - 62 (47 to 90)); Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: 1 withdrew due to cancer diagnosis ; Group 2 Number missing: 0 - Actual outcome: Average surgery time (minutes) at N/A; Group 1: mean 77 (SD 13.064); n=83, Group 2: mean 62 (SD 13.064); n=80 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: 1 withdrew due to cancer diagnosis ; Group 2 Number missing: 0 Protocol outcome 2: Pain at 6 weeks or earlier - Actual outcome: Pain at 4 days at 4 days; Group 1: mean 1.8 (SD 1.8); n=83, Group 2: mean 2.9 (SD 1.9); n=80 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: 1 withdrew due to cancer diagnosis ; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Nistor 2017[74]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=70)
Countries and setting	Conducted in Romania; Setting:
Line of therapy	1st line
Duration of study	Intervention + follow up: 8 days follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients aged between 35 and 85 that were diagnosed with end stage primary degenerative hip arthritis verified on plain radiographs, and elected to undergo a primary total cementless hip arthroplasty.
Exclusion criteria	Diagnosis of secondary arthritis, femur fractures, previous hip operations, presence of a contralateral joint implant, any muscle diseases, recent heart attacks or rhabdomyolysis and any type of mental or physical disability.
Age, gender and ethnicity	Age - Median (IQR): DA - 67 (53.5 to 72.5), LA - 64 (54.4 to 67.5). Gender (M: F): 42 female, 28 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=35) Intervention 1: Direct anterior approach. Direct anterior approach - a modified Smith-Peterson approach. Patients in a supine position, on a standard operating table that could be flexed so that hip hyperextension could be achieved. Both legs were completely draped separately to facilitate proximal femoral exposure. An 8 cm skin incision was made over the body of the tensor fascia lata muscle and then lengthened as needed for a proper exposure. . Duration N/A. Concurrent medication/care: All patients received the same implant. All participants received only spinal anaesthesia, with an intravenous analgesia during the intervention at the anaesthesiologists' discretion. Antibiotic prophylaxis was administered for 48 hours. . Indirectness: No indirectness (n=35) Intervention 2: Anterolateral approach. Direct lateral approach - Hardinge approach. With the patient on a standard operating table, in a supine position, skin incision was initiated 3cm proximal to the tip of the greater trochanter and was continued 5 cm distally. The 8cm incision that resulted was then lengthened if needed for better exposure. Fascia lata was then split and the gluteus medius and vastus lateralis were divided. . Duration N/A. Concurrent medication/care: All patients received the same implant. All participants

ISBN 978-1-4731-3722-6

	received only spinal anaesthesia, with an intravenous analgesia during the intervention at the anaesthesiologists' discretion. Antibiotic prophylaxis was administered for 48 hours. . Indirectness: No indirectness
Funding	No funding (There are no funding sources in support of this research.)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus ANTEROLATERAL APPROACH Protocol outcome 1: Deep surgical site Infection at before JR is revised - Actual outcome: Superficial haematoma at 8 days ; Group 1: 1/35, Group 2: 2/35 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 2: Intraoperative complications (for example nerve damage) at before JR is revised - Actual outcome: Lateral femoral cutaneous nerve injury at 8 days ; Group 1: 2/35, Group 2: 0/35 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of joint replacement at time to event; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Parvizi 2016[81]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=84)
Countries and setting	Conducted in USA
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	All patients with end-stage arthritis of the hip needing THA were approached and consented. Patients needed to be between the ages of 18 and 75 years, have the underlying diagnosis of osteoarthritis, able to read and comprehend English, and to sign the consent form to participate.
Exclusion criteria	Patients with cognitive impairment or severe psychiatric illness that would preclude participation in the protocol mandated procedures were excluded.
Age, gender and ethnicity	Age - --: . Gender (M:F): 32 male, 52 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=44) Intervention 1: Direct anterior approach. Direct anterior approach - performed in the supine position on a regular operating table that could be flexed at the hip for the DA patients. The initial incision length was 5cm, and the incision was lengthened as dictated by the need for surgical exposure. Involved exposure of tensor fascia lata and division of its perimysium. A double osteotomy of the neck was performed and a wedge of bone from the femoral neck was removed to allow easy extraction of the remaining head. . Duration N/A. Concurrent medication/care: All patients received a social service consultant, who was also blinded to the surgical approach. The only difference between the two groups was the location of the incision, which was placed laterally over the greater trochanter for the DL patients, and more anteriorly for the DA patients. . Indirectness: No indirectness (n=40) Intervention 2: Anterolateral approach. Direct lateral - performed by placement of the incision over the greater trochanter and division of the underlying fascia lata. The abductor mechanism was divided and the anterior one half retracted anteriorly. Following capsulotomy, the hip was dislocated and the femoral neck was cut. Acetabular and femoral preparation was conducted in a conventional manner. . Duration N/A. Concurrent medication/care: All patients received a social service consultant, who was also blinded to the

ISBN 978-1-4731-3722-6

	surgical approach. The only difference between the two groups was the location of the incision, which was placed laterally over the greater trochanter for the DL patients, and more anteriorly for the DA patients. . Indirectness: No indirectness
Funding	Study funded by industry (Zimmer provided financial support for this study.)
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Reichert 2018[87]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=148)
Countries and setting	Conducted in Germany
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 months Follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients with primary osteoarthritis scheduled for cemented or non-cemented THA were enrolled following defined inclusion and exclusion criteria.
Exclusion criteria	Exclusion criteria were an age < 40 or > 80 years, a Body-Mass-Index (BMI) > 35 kg/m2; hip dysplasia or a congenital disorder of the hip, former osteotomies of hip, knee or pelvis; an impairment of the contralateral side or osteoarthritis of the ipsilateral knee, osteoporosis, degenerative spine disease, or a severe systemic disease (ASA-Score ≥ 4, malignant or cardiovascular disease).
Age, gender and ethnicity	Age - Mean (SD): anterior - 63.2 (8.2), lateral - 61.9 (7.8) . Gender (M:F): 64 female, 84 male. Ethnicity: Not stated
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=71) Intervention 1: Anterolateral approach. Posterior - direct transgluteal lateral approach. . Duration N/A. Concurrent medication/care: For all patients participating in the trial we applied established standardized treatment protocols, which included a multimodal pain management and rapid rehabilitation. . Indirectness: No indirectness (n=77) Intervention 2: Direct anterior approach. Anterior - minimally invasive single-incision direct anterior (DAA). Duration N/A. Concurrent medication/care: For all patients participating in the trial we applied established standardized treatment protocols, which included a multimodal pain management and rapid rehabilitation. . Indirectness: No indirectness
Funding	Academic or government funding (The study was financially supported by the Deutsche Arthrose-Hilfe (Grant P178-A49-Eulert-EP2nöth3-hüfte-opII-156 k-2008-12 and P235-A284-Rudert-EP2-nöth1-hüfte-op-II-67 k-2001-12). The funding body was not involved in collection, analysis, and interpretation of data and in

ISBN 978-1-4731-3722-6

	writing the manuscript.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus ANTEROLATERAL APPROACH

Protocol outcome 1: Quality of life at 6 weeks or earlier
- Actual outcome: SF-36 scale - physical sub scale at 6 weeks at 6 weeks; Group 1: mean 39.1 (SD 9.7); n=77, Group 2: mean 34.8 (SD 9.8); n=71
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria
- Actual outcome: SF-36 scale - mental sub scale at 6 weeks at 6 weeks; Group 1: mean 58.1 (SD 8.7); n=77, Group 2: mean 59.3 (SD 6.6); n=71
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria

Protocol outcome 2: Quality of life at later than 6 weeks up to 1 year
- Actual outcome: SF-36 scale - physical sub scale at 12 months at 12 months; Group 1: mean 47.5 (SD 9.9); n=77, Group 2: mean 42.9 (SD 11.9); n=71
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria
- Actual outcome: SF-36 scale - mental sub scale at 12 months at 12 months; Group 1: mean 55 (SD 9.8); n=77, Group 2: mean 56.2 (SD 6.9); n=71
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria

Protocol outcome 3: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: Harris Hip score - 6 weeks at 6 weeks; Group 1: mean 81.6 (SD 12.1); n=77, Group 2: mean 82.4 (SD 12); n=71
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria

Protocol outcome 4: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: Harris Hip score - 12 months at 12 months; Group 1: mean 92.4 (SD 8.6); n=77, Group 2: mean 91.4 (SD 9.1); n=71
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria

Protocol outcome 5: Reoperation/dislocation rate at N/A

ISBN 978-1-4731-3722-6

- Actual outcome: Dislocation at 12 months; Group 1: 0/77, Group 2: 1/71 Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: lost to follow up, diagnosed with malignant disease; Group 2 Number missing: 21, Reason: moved away, lack of time, not meeting criteria	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Reininga 2013[88]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=75)
Countries and setting	Conducted in Netherlands
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients between the ages of 18 and 75 who were admitted for primary cementless unilateral THA due to primary or secondary osteoarthritis (OA) were selected.
Exclusion criteria	Exclusion criteria were a history of previous surgery to the affected hip, inflammatory polyarthritis where the severity of multiple joint disease was likely to compromise postoperative mobility, and a BMI > 32 kg/m2. This latter criteria was applied because in obese patients an extensive procedure is needed to gain access to the hip due to the surrounding adipose tissue.
Age, gender and ethnicity	Age - Mean (SD): anterior - 60.3 (7.7), posterolateral - 60.5 (9.5). Gender (M:F): 56 female, 19 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=40) Intervention 1: Posterior approach. Posterolateral approach - For the conventional technique, a standard posterolateral approach was used. The same acetabular cup (Trident1 Cup with X3 or Ceramic inlay; Stryker Corp.) and femoral component (ABG II; Stryker Corp.) were used in the MISCAS and CON groups.. Duration N/A. Concurrent medication/care: The anesthetic, analgesic, and postoperative physical therapy protocols were identical in both groups. Discharge criteria were also identical. No physical therapy following discharge was prescribed, in accordance with the guidelines of the Dutch Orthopaedic Association.. Indirectness: No indirectness (n=35) Intervention 2: Direct anterior approach. Minimally invasive anterior approach - Patients in the MISCAS group had surgery using the MIS single-incision anterior approach. Advantage of the anterior approach is the possibility of using the intermuscular plane between the m. tensor fascia latae and the m. sartorius, avoiding muscle damage by cutting or detaching muscles. To optimize placement of the acetabular and femoral components, a computer navigation system (Stryker1 Navigation System iNstride Hip; Stryker

ISBN 978-1-4731-3722-6

	Corp., Kalamazoo, MI) was used. . Duration N/A. Concurrent medication/care: The anesthetic, analgesic, and postoperative physical therapy protocols were identical in both groups. Discharge criteria were also identical. No physical therapy following discharge was prescribed, in accordance with the guidelines of the Dutch Orthopaedic Association.. Indirectness: No indirectness
Funding	Academic or government funding (Grant sponsors: ZonMw; The Netherlands Organization for Health Research and Development; Grant number: 94527001)
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Restrepo 2010[90]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=122)
Countries and setting	Conducted in USA
Line of therapy	1st line
Duration of study	Intervention + follow up: 2 years follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	The inclusion criteria were as follows: patients between 18 and 75 years, any sex or race, an underlying diagnosis of osteoarthritis, and agreement to provide the consent to participate in the study.
Exclusion criteria	Patients with a body mass index greater than 30kg/m² or those with cognitive impairment or severe psychiatric illness that would preclude participation in the protocol-mandated procedures were excluded.
Age, gender and ethnicity	Age - Other: Anterior - 62.02 (35 to 84.5), lateral - 59.91 (40.1 to 76.1). Gender (M:F): 39 male, 60 female. Ethnicity:
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=63) Intervention 1: Direct anterior approach. Direct anterior - surgery performed in the supine position on regular operating table that could be flexed at the hip. The initial incision length was 8cm, but, in every case the incision was lengthened, as dictated by the need for proper surgical exposure. The only difference between the 2 groups was the location of the incision. Involved exposure of tensor fascia lata and division of its perimysium. . Duration N/A. Concurrent medication/care: All patients received a social service consultation to discuss social circumstances and confirm the preoperatively determined disposition plan based on the degree of home support, the layout of their home and the physical ability of the patient. Appropriate prophylaxis for infection and thromboembolism was administered to all the patients according to protocol. All patients received spinal anaesthesia. . Indirectness: No indirectness (n=59) Intervention 2: Anterolateral approach. Direct lateral approach - performed using a modified Hardinge technique, with patient in supine position, which included placement of the incision over the greater trochanter and division of the underlying fascia lata. The abductor mechanism was divided approximately in the anterior two thirds of the gluteus medius, the approach was extended into the anterior aspect of the vastus lateralis, and the anterior portion retracted anteriorly. . Duration N/A. Concurrent medication/care: All

ISBN 978-1-4731-3722-6

	patients received a social service consultation to discuss social circumstances and confirm the preoperatively determined disposition plan based on the degree of home support, the layout of their home and the physical ability of the patient. Appropriate prophylaxis for infection and thromboembolism was administered to all the patients according to protocol. All patients received spinal anaesthesia. . Indirectness: No indirectness
Funding	Study funded by industry (Benefits or funds were received in partial or total support of the research material described in this article. These benefits or support were received from the following sources: J P consultant for Stryker Orthopaedics.)
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Rosenlund 2016[95]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=47)
Countries and setting	Conducted in Denmark
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Aged 45 to 70 years, diagnosed with unilateral primary hip osteoarthritis or secondary osteoarthritis due to mild hip dysplasia, scheduled for primary cementless total hip arthroplasty.
Exclusion criteria	Symptoms in several joints (hip, knee or ankle) with expected total joint arthroplasty within one year, prior total joint arthroplasty in any joint or major lower limb surgery still causing symptoms, BMI > 35 kg/m², any physical disability preventing the patient from walking freely without walking aids, any neurological disease compromising walking ability, any severe medical condition compromising physical function, severe dementia, inability to read and understand Danish written and oral instructions.
Age, gender and ethnicity	Age - Mean (SD): lateral - 60.5 (6.6), posterior - 61 (6.7). Gender (M:F): 34 male, 13 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=23) Intervention 1: Posterior approach. Posterior approach - performed through an incision over the posterior part of the greater trochanter through the fascia, followed by blunt dissection of the gluteus maximus. Then detachment of the external rotators and incision of the hip capsule were performed. The hip was dislocated by internal rotation and flexion. During closure of the wound, capsular repair and re-insertion of the external rotators were performed if possible. . Duration N/A. Concurrent medication/care: Both groups received an identical post-operative rehabilitation programme. Patients were mobilised immediately with full weight-bearing and no movement restrictions. . Indirectness: No indirectness (n=24) Intervention 2: Anterolateral approach. Direct lateral approach - modified direct lateral approach used. Performed through a mid-line incision over the greater trochanter and involved detachment of the anterior one-third of the gluteus medius insertion and gluteus minimus insertion at the tip of the greater trochanter. Excision of the hip capsule was performed on the anterior side of the joint, from the basis of the collum femoris on the acetabular rim. The hip was dislocated by external rotation, adduction and flexion. During

ISBN 978-1-4731-3722-6

	closure of the wound, re-insertion of the detached parts of the gluteus medius and minimus was performed using a heavy absorbable suture to reapproximate the divided gluteus minimus and the anterior flap of gluteus medius. No capsular repair was performed. . Duration N/A. Concurrent medication/care: Both groups received an identical post-operative rehabilitation programme. Patients were mobilised immediately with full weight-bearing and no movement restrictions. . Indirectness: No indirectness
Funding	Academic or government funding (This trial was supported by the Danish Rheumatism Association, University of Southern Denmark, Region of Zealand, Region of Southern Denmark, Bevica)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: POSTERIOR APPROACH versus ANTEROLATERAL APPROACH Protocol outcome 1: Revision rate of of joint replacement at time to event - Actual outcome: Revision at 12 months; Group 1: 2/23, Group 2: 0/24 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 5, Reason: Peri-prosthetic fracture, dislocation, cemented cup, pelvic fracture ; Group 2 Number missing: 1, Reason: Parkinson disease Protocol outcome 2: Reoperation/dislocation rate at N/A - Actual outcome: Dislocation at 12 months; Group 1: 1/23, Group 2: 0/24 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 5, Reason: Peri-prosthetic fracture, dislocation, cemented cup, pelvic fracture ; Group 2 Number missing: 1, Reason: Parkinson disease	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Rykov 2017[97]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=46)
Countries and setting	Conducted in Netherlands
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 weeks follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients with primary or secondary symptomatic osteoarthritis of the hip aged 18-70 were included in the study.
Exclusion criteria	A history of previous surgery of the ipsilateral hip, peripheral neuropathy, (inflammatory) arthritis, a history of cerebrovascular disease or cognitive impairments.
Age, gender and ethnicity	Age - Mean (SD): DAA - 62.8 (6.1), PLA - 60.2 (8.1) . Gender (M:F): 19 male, 27 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=23) Intervention 1: Direct anterior approach. Direct anterior approach - patient placed in supine decubitus position. The skin incision is made over and in the direction of the lateral part of the femoral head and neck. After division of skin and subcutis, the interval between the tensor fasciae latae muscle and the sartorius muscle is identified and the overlying fascia is opened. . Duration N/A. Concurrent medication/care: All patients were treated according to the hospitals' standardised fast-track protocol. . Indirectness: No indirectness (n=23) Intervention 2: Posterior approach. Posterolateral approach - patient placed in lateral decubitus position. The skin incision is made over the greater trochanter to cranial, with a slight curve to posterior. After transection of the subcutis the fasciae latae and the gluteus maximus muscles are split. Next, the short external rotators - namely, the piriformis, the inferior and superior gemellus and the obturator internus muscles- are cut at the level of their insertion at the greater trochanter, making this approach not minimally invasive. . Duration N/A. Concurrent medication/care: All patients were treated according to the hospitals' standardised fast-track protocol. . Indirectness: No indirectness

ISBN 978-1-4731-3722-6

Funding	No funding
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH Protocol outcome 1: Deep surgical site Infection at before JR is revised - Actual outcome: Deep infection at N/A; Group 1: 2/23, Group 2: 1/23 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 3, Reason: deep infection, forgotten lab visit ; Group 2 Number missing: 5, Reason: deep infection, another surgical procedure, forgotten lab visit Protocol outcome 2: Length of stay at in hospital - Actual outcome: Length of stay (days) at N/A; Group 1: mean 1.5 (SD 0.7); n=23, Group 2: mean 1.5 (SD 0.7); n=23 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 3, Reason: deep infection, forgotten lab visit ; Group 2 Number missing: 5, Reason: deep infection, another surgical procedure, forgotten lab visit Protocol outcome 3: Intraoperative complications (for example nerve damage) at before JR is revised - Actual outcome: Blood loss (mL) at N/A; Group 1: mean 325.7 (SD 99.74); n=23, Group 2: mean 273.7 (SD 181); n=23 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 3, Reason: deep infection, forgotten lab visit ; Group 2 Number missing: 5, Reason: deep infection, another surgical procedure, forgotten lab visit Protocol outcome 4: Surgery time at N/A - Actual outcome: Operative time (minutes) at N/A; Group 1: mean 71 (SD 7); n=23, Group 2: mean 62 (SD 7); n=23 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 3, Reason: deep infection, forgotten lab visit ; Group 2 Number missing: 5, Reason: deep infection, another surgical procedure, forgotten lab visit	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Superficial surgical site infection at before JR is revised; Reoperation/dislocation rate at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Taunton 2014[108]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=54)
Countries and setting	Conducted in USA
Line of therapy	1st line
Duration of study	Intervention + follow up: 12 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Aged between 25 to 80 years and elected to undergo primary total hip arthroplasty for primary degenerative arthritis of the hip. Also, the patient was able to comply with the requirements of the study including pre-operative and post-operative evaluations and questionnaires.
Exclusion criteria	An inability or unwillingness to comply with the postoperative rehabilitation or follow-up protocols, previous THA, inflammatory arthritis, osteomyelitis or a previous intra-articular infection, severe developmental dysplasia of the hip, known metal allergy, offset greater than 50mm, acetabular deformity requiring advanced reconstructive techniques, Charcot arthropathy, Pagets disease or chronic narcotic dependence.
Age, gender and ethnicity	Age - Mean (SD): DA - 62.05, MPA - 66.4. Gender (M:F): 25 men, 29 women. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=27) Intervention 1: Direct anterior approach. Direct anterior approach - patient in a supine position on an orthopedic table. An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2cm lateral from the anterior superior iliac spine and extending 10cm. The interval of the tensor fascia lata and sartorius is developed. A measured resection of the femoral neck is performed. Acetabular reaming is performed and the acetabular component is inserted. . Duration N/A. Concurrent medication/care: All patients were encouraged to move from bed to chair on the day of surgery and being walking with weight-bearing as tolerated on the morning after surgery. Two sessions of supervised physical therapy were planned on each hospital day. THe same femoral component design and the same acetabular component design were used in every case. . Indirectness: No indirectness (n=27) Intervention 2: Posterior approach. Mini-posterior approach - Patient positioned in the lateral decubitus position. A 10cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted

ISBN 978-1-4731-3722-6

	posteriorly and is detached with the short external rotators from the psoterior aspect of the greater trochanter extending down to and often including the quadratus muscle. . Duration N/A. Concurrent medication/care: All patients were encouraged to move from bed to chair on the day of surgery and being walking with weight-bearing as tolerated on the morning after surgery. Two sessions of supervised physical therapy were planned on each hospital day. THe same femoral component design and the same acetabular component design were used in every case. . Indirectness: No indirectness
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH Protocol outcome 1: Function at 6 weeks or earlier - Actual outcome: Mean time to ambulation with no assistive device (days) at N/A; Group 1: mean 22.8 (SD 11.5); n=27, Group 2: mean 35.1 (SD 24.6); n=27 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

Study	**Taunton 2018[109]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=170)
Countries and setting	Conducted in USA
Line of therapy	Part of comparison
Duration of study	Intervention + follow up: 1 year

ISBN 978-1-4731-3722-6

Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Male or female patients between the ages of 20 and 100 years with unilateral OA who were surgical Candidates for THA. The study participants were required to be able to give informed consent.
Exclusion criteria	•Significant proximal femoral deformity (post-SCFE, Perthes, DDH), acetabular dysplasia (any Crowe), inflammatory arthritis, septic arthritis, osteomyelitis, prior infection of the hip, significant leg length discrepancy (> 4 cm), osteoporosis, arthrodesis of the affected hip The presence of infections, highly communicable diseases, eg, AIDS,active tuberculosis, venereal disease, hepatitis Significant neurologic or musculoskeletal disorders or disease that may adversely affect normal gait or weightbearing Presence of previous prosthetic hip replacement device (any type)• Active metastatic disease• Active major psychiatric illnessActive drug or alcohol abuse• BMI > 40 kg/m2 • Patients who are known to be pregnant • Actively failing contralateral hip replacement
Recruitment/selection of patients	Patients having a consultation appointment for unilateral hip osteoarthritis (OA) were identified as potential study recruits by study coordinators. The 101 patients randomized and included in this study were recruited from the practices of the four participating surgeons.
Age, gender and ethnicity	Age - Mean (SD): direct anterior approach; 65 (10) miniposterior approach; 64 (11). Gender (M:F): 49 female, 52 male. Ethnicity: N/A
Further population details	1. Age: Non-working age (study defined) (65 (10) for DAA 64 (11) for MPA).
Indirectness of population	No indirectness
Interventions	(n=56) Intervention 1: Direct anterior approach. For the DAA technique, a specialized table with fluoroscopy was utilized. with capsulotomy and repair. Before initiation of this study, the surgeon in the DAA arm of the trial had performed > 500 THAs with the DAA technique. . Duration 1 year . Concurrent medication/care: All patients received 1 g tranexamic acid at incision and at closure. Every patient received the same formal preoperative class educating them on perioperative expectations. Patients received the same comprehensive multimodal pain management approach, including an indwelling psoas

ISBN 978-1-4731-3722-6

	nerve catheter for 36 hours postoperatively, and an oral pain regimen, including scheduled acetaminophen with tramadol and short-acting opioid medication on an as-needed basis. Both treatment groups had identical postoperative care. Patients were treated on the same ward and seen by the Same physical therapy (PT) team; no specific hip precautions were given to either group. Structured PT began the day after surgery and continued during the hospitalization. Patients were encouraged to sit up at the bedside The evening of their surgery. On postoperative Day 1, the patients began ambulation with the assistance of PT With a walker or crutches as well as active ROM. Weight bearing was progressed as tolerated. A home therapy program was given to the patient although formal PT did not continue on an outpatient basis. The patients were instructed to progress ambulation from a walker when they were able to walk stable without pain and then to continue with a crutch or cane until they were able to walk without a limp. The patients were encouraged to maximize independent ambulation and increase daily distance ambulated.All patients received a phone call at2 weeks to discuss progression of activities,m pain control, and any postoperative issues or complications. At that time, the patients were also mailed the activity monitors for 3 days. The first postoperative visit was at 8 weeks and the second was at 1 year. . Indirectness: No indirectness (n=60) Intervention 2: Posterior approach. For the MPA technique, the hip capsule and external rotators were incised as one layer and repaired formally at conclusion of THA Before initiation of this study, all of the surgeons in the MPA arm of the trial had performed > 500 THAs with the MPA technique. . Duration 1 year. Concurrent medication/care: All patients received 1 g tranexamic acid at incision and at closure. Every patient received the same formal preoperative class educating them on perioperative expectations. Patients received the same comprehensive multimodal pain management approach, including an indwelling psoas nerve catheter for 36 hours postoperatively, and an oral pain regimen, including scheduled acetaminophen with tramadol and short-acting opioid medication on an as-needed basis. Both treatment groups had identical postoperative care. Patients were treated on the same ward and seen by the Same physical therapy (PT) team; no specific hip precautions were given to either group. Structured PT began the day after surgery and continued during the hospitalization. Patients were encouraged to sit up at the bedside The evening of their surgery. On postoperative Day 1, the patients began ambulation with the assistance of PT With a walker or crutches as well as active ROM. Weight bearing was progressed as tolerated. A home therapy program was given to the patient although formal PT did not continue on an outpatient basis. The patients were instructed to progress ambulation from a walker when they were able to walk stable without pain and then to continue with a crutch or cane until they were able to walk without a limp. The patients were encouraged to maximize independent ambulation and increase daily distance ambulated.All patients received a phone call at2 weeks to discuss progression of activities,m pain control, and any postoperative issues or complications. At that time, the patients were also mailed the activity monitors for 3 days. The first postoperative visit was at 8 weeks and the second was at 1 year. . Indirectness: No indirectness

ISBN 978-1-4731-3722-6

Funding	Other (One of the authors (MJT) is a consultant and has received royalties from DJO Global (Austin, TX, USA). One of the authors (RTT), or a member of his immediate family, has or may receive payments or benefits, in any 1 year, an amount in excess of USD 10,000 from DePuy Orthopaedics (Warsaw, IN, USA). One of the authors (RJS), or a member of his immediate family, has or may receive payments or benefits, in any 1 year, an amount in excess of USD 10,000 from Zimmer Biomet (Warsaw, IN, USA). One of the authors (MWP), ora member of his immediate family, has or may receive payments or benefits, in any 1 year, an amount in excess of USD 10,000 from DePuy Orthopaedics and Stryker Orthopaedics (Mahwah, NJ, USA)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH

Protocol outcome 1: Quality of life at later than 6 weeks up to 1 year
- Actual outcome: SF-12 scores at 1 year - Physical
at 1 year ; Group 1: mean 49 (SD 10); n=52, Group 2: mean 50 (SD 7); n=49
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: DAA - 30 (7) MPA 31 (7); Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study
- Actual outcome: SF-12 scores at 1 year - Mental
at 1 year ; Group 1: mean 54 (SD 7); n=52, Group 2: mean 54 (SD 4); n=49
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: DAA 54 (10) MPA 53 (8); Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study

Protocol outcome 2: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: Harris hip scores at 1 year at 1 year ; Group 1: mean 97 (SD 4); n=52, Group 2: mean 95 (SD 7); n=49; Comments: The Harris hip score (HHS) is a clinician-based outcome tool that is frequently used for the evaluation of patients after THA. The indication for THA is particularly pain and impaired physical function, which are the two dominating domains in the HHs However, there are ceiling effects that severely limit its validity.

Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study
- Actual outcome: HOOS - Pain at 1 year at 1 year ; Group 1: mean 69 (SD 9); n=52, Group 2: mean 67 (SD 11); n=49

ISBN 978-1-4731-3722-6

Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: DAA -16 (17) MPA 16 (12)
; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study
- Actual outcome: HOOS - symptoms at 1 year
at 1 year ; Group 1: mean 69 (SD 8); n=52, Group 2: mean 64 (SD 13); n=49
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: DAA 20 (18) (-20 to 65) MPA 16 (16) (-15 to 65)
; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study
- Actual outcome: HOOS - Quality of life at 1 year at 1 year ; Group 1: mean 61 (SD 18); n=52, Group 2: mean 56 (SD 20); n=49
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: DAA -5 (16) MPA -1 (16); Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study

Protocol outcome 3: Length of stay at in hospital
- Actual outcome: Length of stay
at 1 year ; Group 1: mean 57 hours (SD 15); n=52, Group 2: mean 59 hours (SD 19); n=49
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study

Protocol outcome 4: Reoperation/dislocation rate at N/A
- Actual outcome: Dislocation at 1 year
at 1 year; Group 1: 1/52, Group 2: 1/49
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study

Protocol outcome 5: Intraoperative complications (for example nerve damage) at before JR is revised
- Actual outcome: Intraoperative Complications - calcar fractures at 1 year
at 1 year ; Group 1: 0/52, Group 2: 2/49
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study

Protocol outcome 6: Surgery time at N/A
- Actual outcome: Surgery time (mins)
at N/A; Group 1: mean 70 (SD 16); n=52, Group 2: mean 61 (SD 18); n=49; Comments: MINUTES (SECONDS)
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low,

ISBN 978-1-4731-3722-6

Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: withdrew from study ; Group 2 Number missing: 11, Reason: withdrew from study	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Witzleb 2009[115]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=60)
Countries and setting	Conducted in Germany; Setting:
Line of therapy	1st line
Duration of study	Intervention + follow up:
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	All patients between 45 and 65 years of age, who suffered from unilateral osteoarthritis of the hip and were admitted to our department for a primary cementless THR between October 2003 and February 2006, were screened for study inclusion.
Exclusion criteria	Exclusion criteria were age (older than 65 or younger than 45 years), known or suspected osteopenia or osteoporosis, deep infection or tumor illness of the hip, rheumatoid arthritis or higher grade developmental dysplasia of the hip (DDH Crowe stage II or higher), Charnley class B and C patients, previous operation or fracture of the joint, body mass index (BMI) over 40 kg/m2, psychiatric illness and drug or alcohol abuse. In addition, all patients who underwent Arthroplasty with other implants than stemmed THR (i.e. surface replacement) were excluded.
Age, gender and ethnicity	Age - Median (range): posterior - 55 (47 to 64), lateral - 58 (46 to 64). Gender (M:F): 31 female, 29 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=30) Intervention 1: Posterior approach. Posterior - posterior approach entailed a curved incision centered on the greater trochanter in lateral decubitus position of the patient. The fascia lata was incised in line of the skin incision and the fibres of the gluteus maximus were split by blunt dissection. The short external rotators were then detached close to their femoral insertion leaving one centimetre of muscle tissue of the quadratus femoris at the dorsal aspect of the greater trochanter for re-attachment. The posterior hip capsule was incised and preserved. After implantation, the posterior capsule was re-attached on the greater trochanter together with the short external rotators and the wound was closed in layers. . Duration N/A. Concurrent medication/care: Preoperatively, all patients received one dose of an intravenous cephalosporin. All patients were implanted with a cementless press-fit cup, cementless straight stem and a 28mm metal-on-metal (in cases of metal allergy ceramic-on-ceramic) articulation. Low molecular heparin (0.2-0.6 ml fraxiparine per

ISBN 978-1-4731-3722-6

	day, weight-adapted, GlaxoSmithKline GmbH, Germany) was used for thrombo prophylaxis until re-mobilization, at least for three weeks. 150mg diclophenac per day was used for two weeks in order to prevent the formation of heterotopic bone. Walking training was started on the first postoperative day, with full weight-bearing allowed. All patients underwent a standardized physiotherapy program until hospital discharge at the seventh postoperative day. Following discharge, all patients trained walking under full weight-bearing with two crutches and received physiotherapy at an individual basis. During the first four weeks, hip flexion was limited to 90° and forced internal as well as external rotation was not allowed. Four weeks after surgery all patients were admitted to a cooperative rehabilitation department, where they underwent a standardized rehabilitation program for three weeks. . Indirectness: No indirectness (n=30) Intervention 2: Anterolateral approach. Direct lateral - entailed a longitudinal skin incision centered over the greater trochanter in supine position. The tractus iliotibialis and the gluteal fascia were divided in the line of the skin incision. The anterior part of the gluteus medius and minimus insertion was incised down to the bone, prolonged distally through the vastus lateralis in a curved line to spare some tendinous tissue at the greater trochanter for reattachment. The anterior hip capsule was excised. After implantation, the tendinous tissue was re-attached at the greater trochanter and the wound was closed in layers. . Duration N/A. Concurrent medication/care: Preoperatively, all patients received one dose of an intravenous cephalosporin. All patients were implanted with a cementless press-fit cup, cementless straight stem and a 28mm metal-on-metal (in cases of metal allergy ceramic-on-ceramic) articulation. Low molecular heparin (0.2-0.6 ml fraxiparine per day, weight-adapted, GlaxoSmithKline GmbH, Germany) was used for thrombo prophylaxis until re-mobilization, at least for three weeks. 150mg diclophenac per day was used for two weeks in order to prevent the formation of heterotopic bone. Walking training was started on the first postoperative day, with full weight-bearing allowed. All patients underwent a standardized physiotherapy program until hospital discharge at the seventh postoperative day. Following discharge, all patients trained walking under full weight-bearing with two crutches and received physiotherapy at an individual basis. During the first four weeks, hip flexion was limited to 90° and forced internal as well as external rotation was not allowed. Four weeks after surgery all patients were admitted to a cooperative rehabilitation department, where they underwent a standardized rehabilitation program for three weeks. . Indirectness: No indirectness
Funding	No funding (The investigation was not granted.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: POSTERIOR APPROACH versus ANTEROLATERAL APPROACH

Protocol outcome 1: Superficial surgical site infection at before JR is revised
- Actual outcome: Superficial wound infection at 12 weeks; Group 1: 0/30, Group 2: 2/30
Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0, Reason: N/A; Group 2 Number missing: 0, Reason: N/A

ISBN 978-1-4731-3722-6

Protocol outcome 2: Reoperation/dislocation rate at N/A - Actual outcome: Dislocations at 12 weeks; Group 1: 1/30, Group 2: 0/30 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0, Reason: N/A; Group 2 Number missing: 0, Reason: N/A	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Length of stay at in hospital; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Xie 2017[118]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=92)
Countries and setting	Conducted in China
Line of therapy	1st line
Duration of study	Intervention + follow up: 1 year follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients, who suffered from unilateral primary hip osteoarthritis, were recruited.
Exclusion criteria	Our exclusion criteria were femoral neck fracture, severe acetabular defect, metastatic disease, and overweight patients with a body mass index over 40.
Age, gender and ethnicity	Age - Mean (SD): SP - 66.60 (11.88), control - 64.47 (12.09). Gender (M:F): 31 female, 61 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=46) Intervention 1: SuperPATH approach. SuperPATH approach - (lateral position) The hip was in a 45° of flexion and 10–15° of internal rotation. A 6–8-cm incision superior to the greater trochanter was made. The gluteal fascia was incised, and the gluteus maximus was separated in line with fibers. The interval between the gluteus minimus and piriformis was exposed by using a Zelpi retractor. One blunt Hohmann retractor was placed anteriorly under the gluteus medius to protect the muscle, and the leg was elevated to reduce the tension on the external rotators making it easier to place another Hohmann retractor beneath the piriformis to protect the sciatic nerve. A Cobb elevator was used to push the posterior part of the gluteus minimus muscle anteriorly and expose the hip joint capsule. The hip joint capsule was then cut according to the incision from the base of the greater trochanter to 1 cm proximal to the acetabular rim. The capsule was elevated as a flap anterior and posterior to improve visualization, and the blunt Hohmann retractor was then moved to the intracapsular position. Starting in the anterior portion of the piriformis fossa, the femur was reamed and broached without dislocation. Occasionally, in osteoarthritis patients, huge osteophytes need to be removed by osteotome to expose the starting point. An entry reamer was used to open the canal, and a canal feeler was used to confirm the position in the canal. A calcar punch was used to knock out the femoral neck and head in order to insert the broaches. Consecutive broaches were used until the appropriate broach was placed, and depth relative to the greater trochanter was compared to the preoperative plan. The femoral

ISBN 978-1-4731-3722-6

	neck osteotomy was made using the superior aspect of the broach as a guide and two Schanz pins were inserted into the femoral head in order to rotate and remove the head. The femur was then displaced anteriorly by the assistant using a bone hook. The implant trial cup was placed into the acetabulum. A portal placement guide was used to allow for the placement of a reaming cannula just posterior to the trochanter in line with the planned acetabular placement. The cannula was left in place, and extraction was made using a portal placement guide. The cannula was kept close to the femur to ensure that it was well away from the sciatic nerve. The acetabulum was prepared by resecting calcified labrum and ensuring that the transverse acetabular ligament remained visible. An appropriately sized acetabular basket reamer was inserted in the acetabulum through the main incision and connected to the reamer drive shaft through the cannula, allowing reaming with preservation of the external rotators. The definitive cup and polyethylene liner were placed in a similar procedure (using a portal placement guide) with the option for alignment guides. A trial head and neck were placed, and a blunt trocar was used to push the femur with an assistant adducting the leg and rotating the femur to reduce the neck into the femoral head. C-arm fluoroscopy was used in order to ensure that the trial component position and angulation were correct. Components were then separated and removed. The definitive femoral head was inserted, and a femoral prosthesis was implanted and reduced again. The hip joint capsule was perfectly preserved and closed with a suture. Then, the gluteal fascia and skin were closed with sutures. . Duration N/A. Concurrent medication/care: All patients were followed up in the same rehabilitation unit in our hospital.. Indirectness: No indirectness (n=46) Intervention 2: Posterior approach. Posterior - (Moore approach) The patient was placed in a lateral position; the incision was started 10 cm distal to the posterior superior iliac spine and extended to the posterior margin of the greater trochanter. The length of the incision was 12–13 cm; exposure and division of the deep fascia was made in line with the skin incision. The fibers of the gluteus maximus were dissected bluntly and separated, and exposed the greater trochanter. Divisions of the distal fibers were exposed, and the external rotators were released. The muscles were retracted medially, and the capsule was exposed and split distally to the proximal along the line of the femoral neck in order to detach the distal part of the capsule from the femur the rim of the acetabulum. The standard posterior technique was followed in order to perform the femoral neck osteotomy, the hip was dislocated posteriorly, and the prosthesis was implanted. . Duration N/A. Concurrent medication/care: All patients were followed up in the same rehabilitation unit in our hospital. . Indirectness: No indirectness
Funding	Academic or government funding (This study was supported by the Health Science and Technology Special Projects Foundation of Zhenjiang, Jiangsu Province (SHW2016005).)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: SuperPATH APPROACH versus POSTERIOR APPROACH

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: Harris Hip Score at 1 week at 1 week; Group 1: mean 73.8 (SD 3.89); n=46, Group 2: mean 69 (SD 4.81); n=46

ISBN 978-1-4731-3722-6

	Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 - Actual outcome: Barthel Index at 1 week at 1 week; Group 1: mean 70.67 (SD 9.47); n=46, Group 2: mean 64.46 (SD 7.7); n=46 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 2: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year - Actual outcome: Harris Hip Score at 1 year at 1 year; Group 1: mean 92.3 (SD 1.62); n=46, Group 2: mean 91.6 (SD 2.41); n=46 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 - Actual outcome: Barthel Index at 1 year at 1 year; Group 1: mean 94.33 (SD 6.9); n=46, Group 2: mean 93.6 (SD 8.74); n=46 Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 3: Length of stay at in hospital - Actual outcome: Length of stay at 1 year; Group 1: mean 8.3 (SD 3.6); n=46, Group 2: mean 11.4 (SD 2.4); n=46 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 4: Reoperation/dislocation rate at N/A - Actual outcome: Dislocation at 1 year; Group 1: 1/46, Group 2: 2/46 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 5: Surgery time at N/A - Actual outcome: Operation time at 1 year; Group 1: mean 103.6 (SD 11.8); n=46, Group 2: mean 106.5 (SD 16.5); n=46 Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Intraoperative complications (for example nerve damage) at before JR is revised; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Yang 2010[124]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=110)
Countries and setting	Conducted in China
Line of therapy	1st line
Duration of study	Intervention + follow up: 3 year follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	N/A
Exclusion criteria	Included a history of previous surgery on the affected hip, inflammatory polyarthritis with severity to compromise postoperative mobility, pulmonary and heart insufficiency intolerant of surgery, cerebrovascular diseases accompanied by physical sequelae, BMI > 30, and Crowe III-IV of DDH.
Age, gender and ethnicity	Age - Mean (SD): PL - 55.82 (13.91), AL - 59.47 (13.24). Gender (M:F): 56 men, 54 women. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=55) Intervention 1: Anterolateral approach. Anterolateral approach - OCM approach. Each patient was positioned on the operating table in the lateral position with the affected side up. The patient's pelvis and torso were firmly secured to the operating table with a rigid stabilisation system. Skin incision was made on a line beginning at the anterior tubercle of the greater trochanter and extending along the femoral axis approximately 7cm in length. . Duration N/A. Concurrent medication/care: All surgical incisions were covered with the same size dressing. All patients were given patient-controlled analgesia with a sustained release analgesic pump. All patients were boosted with analgesic drug two times per hour at the first 3hr after surgery, four times per hour at the 4-16th hr and two times per hour at the 17-24th hr. Following surgery all patients had a standard length wound dressing, ensuring that the patients and all staff, except those directly attending to wound care, were blind to the technique used. . Indirectness: No indirectness (n=55) Intervention 2: Posterior approach. Postlateral approach - No further details given. . Duration N/A. Concurrent medication/care: All surgical incisions were covered with the same size dressing. All patients were given patient-controlled analgesia with a sustained release analgesic pump. All patients were boosted with analgesic drug two times per hour at the first 3hr after surgery, four times per hour at the 4-16th hr and two times per hour at the 17-24th hr. Following surgery all patients had a standard length wound dressing,

ISBN 978-1-4731-3722-6

	ensuring that the patients and all staff, except those directly attending to wound care, were blind to the technique used. . Indirectness: No indirectness
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ANTEROLATERAL APPROACH versus POSTERIOR APPROACH Protocol outcome 1: Intraoperative complications (for example nerve damage) at before JR is revised - Actual outcome: Blood loss (ml) at N/A; Group 1: mean 376.18 (SD 168.3); n=55, Group 2: mean 605 (SD 225.12); n=55 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 2: Surgery time at N/A - Actual outcome: Operation time (minutes) at N/A; Group 1: mean 77.55 (SD 13.39); n=55, Group 2: mean 73.67 (SD 14.51); n=55 Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Length of stay at in hospital; Reoperation/dislocation rate at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Zhao 2017[128]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=128)
Countries and setting	Conducted in China
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	All patients undergoing primary THA diagnosed with osteoarthritis of the hip, femoral head necrosis. or Crowe type 1 or 2 dysplasia were eligible.
Exclusion criteria	BMI >30kg/m², Crowe type 3 or 4 dysplasia, previous hardware, prior hip surgery, an inability to tolerate general anaesthesia, the first 100 patients performed with the DAA or an unwillingness to participate in the trial.
Age, gender and ethnicity	Age - Mean (SD): DA - 64.88 (12.13), PL - 62.18 (14.72) . Gender (M:F): 70 female, 58 male. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=64) Intervention 1: Direct anterior approach. Direct anterior approach - performed using the interval between the tensor fascia latae and the sartorius muscle. Patients treated using the DAA were positioned supine on a standard operating table with the pubic symphysis at the table break to allow anterior access during surgery. For preoperative planning, an acetabular template was placed in the anatomical hip center, and then a femoral template was placed with the prosthetic femoral head center at the height of the tip of the greater trochanter. . Duration N/A. Concurrent medication/care: Before surgery, all patients received the same multimodal anaesthesia. For 24 hours before surgery, all patients received cefazolin. During surgery, ropivacaine was infiltrated into the surgical site and delivered as a periarticular cocktail injection. Both groups adopted the same postoperative rehabilitation protocol. (n=64) Intervention 2: Posterior approach. Posterolateral approach - performed with the patient in a lateral decubitus position on a standard operating table. After skin incision through the fascia over the greater trochanter, the gluteus maximus was split, the external rotators were detached, and an incision was made in the hip capsule. The hip was dislocated by internal rotation and flexion. . Duration N/A. Concurrent medication/care: Before surgery, all patients received the same multimodal anaesthesia. For 24 hours before

ISBN 978-1-4731-3722-6

	surgery, all patients received cefazolin. During surgery, ropivacaine was infiltrated into the surgical site and delivered as a periarticular cocktail injection. Both groups adopted the same postoperative rehabilitation protocol. . Indirectness: No indirectness
Funding	No funding (This research did not receive financial support from funding agencies in the public, commercial or not-for-profit sectors.)

ISBN 978-1-4731-3722-6

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: DIRECT ANTERIOR APPROACH versus POSTERIOR APPROACH

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: Harris Hip Score at 6 months at 6 months; Group 1: mean 92.2 (SD 13.25); n=60, Group 2: mean 89.9 (SD 11.74); n=60
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: dropped out; Group 2 Number missing: 4, Reason: dropped out
- Actual outcome: University of California at Los Angeles at 6 months at 6 months; Group 1: mean 7.04 (SD 1.13); n=60, Group 2: mean 6.96 (SD 1.21); n=60
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: dropped out; Group 2 Number missing: 4, Reason: dropped out

Protocol outcome 2: Length of stay at in hospital
- Actual outcome: Length of hospital stay (days) at N/A; Group 1: mean 2.8 (SD 0.16); n=60, Group 2: mean 3.3 (SD 0.37); n=60
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: dropped out; Group 2 Number missing: 4, Reason: dropped out

Protocol outcome 3: Intraoperative complications (for example nerve damage) at before JR is revised
- Actual outcome: Intraoperative blood loss (ml) at N/A; Group 1: mean 165.89 (SD 42.6); n=60, Group 2: mean 123.84 (SD 56.83); n=60
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: dropped out; Group 2 Number missing: 4, Reason: dropped out

Protocol outcome 4: Surgery time at N/A
- Actual outcome: Operating time (minutes) at N/A; Group 1: mean 83.26 (SD 6.69); n=60, Group 2: mean 65.48 (SD 13.32); n=60
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 4, Reason: dropped out; Group 2 Number missing: 4, Reason: dropped out

Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Reoperation/dislocation rate at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ;

ISBN 978-1-4731-3722-6

Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6

Study	Zomar 2018[130]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=78)
Countries and setting	Conducted in Canada; Setting:
Line of therapy	1st line
Duration of study	Intervention + follow up: 3 months follow up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Participants were included if they were undergoing a primary, unilateral THA for osteoarthritis and were between the ages of 18 and 75 years old.
Exclusion criteria	Exclusion criteria included those with a body mass index (BMI) >40, inability to ambulate a minimum of 10 m pre-surgery, ipsilateral total knee arthroplasty or comorbidities of the lower extremities that would affect gait.
Age, gender and ethnicity	Age - Mean (SD): lateral - 59.54 (8.40), anterior - 60.78 (9.26). Gender (M:F): 41 male, 37 female. Ethnicity: N/A
Further population details	1. Age:
Indirectness of population	No indirectness
Interventions	(n=42) Intervention 1: Anterolateral approach. Direct lateral - No further details given. . Duration N/A. Concurrent medication/care: No further details given. . Indirectness: No indirectness (n=36) Intervention 2: Direct anterior approach. Direct anterior - No further details given. . Duration N/A. Concurrent medication/care: No further details given. . Indirectness: No indirectness
Funding	No funding (The author(s) received no financial support for the research, authorship, and/or publication of this article.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ANTEROLATERAL APPROACH versus DIRECT ANTERIOR APPROACH

Protocol outcome 1: Patient Reported Outcome Measures (PROMs) at 6 weeks or earlier
- Actual outcome: WOMAC scale - total score at 6 weeks at 6 weeks; Group 1: mean 74.3 (SD 13.22); n=42, Group 2: mean 71.5 (SD 13.26); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low,

ISBN 978-1-4731-3722-6

Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn
- Actual outcome: SF-12 scale - physical sub scale at 2 weeks at 2 weeks; Group 1: mean 30.37 (SD 7.84); n=42, Group 2: mean 31.05 (SD 7.8); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn
- Actual outcome: SF-12 scale - mental sub scale at 2 weeks at 2 weeks; Group 1: mean 54.09 (SD 10.11); n=42, Group 2: mean 52.52 (SD 10.14); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn

Protocol outcome 2: Patient Reported Outcome Measures (PROMs) at later than 6 weeks up to 1 year
- Actual outcome: WOMAC scale - total score at 3 months at 3 months; Group 1: mean 84.35 (SD 11.79); n=42, Group 2: mean 81.34 (SD 12.12); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn
- Actual outcome: SF-12 scale - physical sub scale at 3 months at 3 months ; Group 1: mean 46.67 (SD 8.3); n=42, Group 2: mean 45.92 (SD 8.58); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn
- Actual outcome: SF-12 scale - mental sub scale at 3 months at 3 months; Group 1: mean 55.81 (SD 8.17); n=42, Group 2: mean 55.16 (SD 8.46); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn
- Actual outcome: Harris Hip Score at 3 months at 3 months; Group 1: mean 92.04 (SD 7.26); n=42, Group 2: mean 95.44 (SD 7.5); n=36
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn

Protocol outcome 3: Length of stay at in hospital
- Actual outcome: Length of stay at N/A; MD; -1.4 (95%CI -1.8 to -1, Comments: Mean score
anterior - 0.8, lateral - 2.2);
Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: missed; Group 2 Number missing: 3, Reason: missed, withdrawn

ISBN 978-1-4731-3722-6

Protocol outcomes not reported by the study	Mortality: life expectancy at time to event; Mortality at within 30 days; Quality of life at 6 weeks or earlier; Quality of life at later than 6 weeks up to 1 year; Quality of life at later than 2 years ; Patient Reported Outcome Measures (PROMs) at later than 2 years ; Revision rate of of joint replacement at time to event; Deep surgical site Infection at before JR is revised; Superficial surgical site infection at before JR is revised; Reoperation/dislocation rate at N/A; Intraoperative complications (for example nerve damage) at before JR is revised; Surgery time at N/A; Function at 6 weeks or earlier; Function at later than 6 weeks up to 1 year; Function at later than 2 years ; Pain at 6 weeks or earlier; Pain at later than 6 weeks up to 1 year; Pain at later than 2 years

ISBN 978-1-4731-3722-6