National Institute for Health and Care Excellence

Final

Osteoarthritis in over 16s: diagnosis and management

[N] Evidence review for the clinical and cost effectiveness of arthroscopic procedures for the management of osteoarthritis

NICE guideline NG226

Evidence reviews underpinning recommendation 1.7.1 in the NICE guideline

October 2022

Final

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1.1 Review question

What is the clinical and cost-effectiveness of arthroscopic procedures for the management of osteoarthritis?

1.1.1 Introduction

Arthroscopic lavage, debridement and tidal irrigation are invasive procedures sometimes offered to patients who are failing medical management, predominantly for knee osteoarthritis. There is no general consensus on whether this is of benefit and which patients should be offered these procedures. Performing arthroscopy without clear benefit may have a negative impact on the person's osteoarthritis and quality of life, may delay more beneficial treatment and may not mitigate against joint replacement.

The previous osteoarthritis guideline recommended against the use of arthroscopic procedures except in those with a history of mechanical locking and currently arthroscopy is offered less frequently than it used to be for people with osteoarthritis with no evidence of locking. New evidence has emerged since the previous guideline, and the clinical and cost-effectiveness of arthroscopic procedures needs to be re-assessed.

This review aims to see if this recommendation is still correct. It will evaluate the clinical and cost-effectiveness of arthroscopic procedures in the management of osteoarthritis.

1.1.2 Summary of the protocol

Table 1: PICO characteristics of review question

Population	Inclusion: • Adults (age ≥16 years) with osteoarthritis affecting any joint Exclusion: • Children (age ≤16 years) • People with conditions that may make them susceptible to osteoarthritis or often occur alongside osteoarthritis (including: crystal arthritis, inflammatory arthritis, septic arthritis, hemochromatosis, haemophilic arthropathy, diseases of childhood that may predispose to osteoarthritis, and malignancy). • Studies in people with meniscal injury without osteoarthritis • Studies with an unclear population (e,g, proportion of participants with osteoarthritis unclear)
Interventions	Arthroscopic procedures (procedure includes): • Washout/lavage (including tidal irrigation) • Debridement • Resection, excision and removal (shaving, drilling) • Microfracture technique • Partial and total meniscectomy • Meniscal transplantation • Combinations of the above

Comparisons	• Any of the individual interventions above • Standard care • Placebo (sham procedure)
Outcomes	Primary outcomes: • Health-related quality of life at ≤3 months and >3 months • Physical function at ≤3 months and >3 months • Pain at ≤3 months and >3 months Secondary outcomes: • Progression to joint replacement at ≤3 months and >3 months • Osteoarthritis flare-ups at ≤3 months and >3 months • Serious adverse events at ≤3 months and >3 months
Study design	RCTs and systematic reviews of RCTs

For full details see the review protocol in Appendix A.

1.1.3 Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in Appendix A and the methods document.

Declarations of interest were recorded according to NICE's conflicts of interest policy.

1.1.4 Effectiveness evidence

1.1.4.1 Included studies

Five studies (reported in nine papers) were included in the review; [11, 63, 67, 68, 70, 80, 84, 87, 118] these are summarised in Table 2 below. Evidence from these studies is summarised in the clinical evidence summary below (Table 3). Four studies included populations with knee osteoarthritis. One study included a population with temporomandibular joint osteoarthritis.

No relevant clinical studies comparing arthroscopic procedures with any relevant comparators for hip, ankle, shoulder and wrist osteoarthritis were identified.

The studies included the following comparisons:

- Arthroscopic procedures compared to lavage alone
- Arthroscopic procedures compared to standard care
- Arthroscopic procedures compared to sham arthroscopic procedures
- Lavage alone compared to sham arthroscopic procedures

One study (Moseley 2002 [87]) included three intervention arms, comparing arthroscopic procedures to lavage alone and sham arthroscopic procedures.

For this review, standard care was defined as any intervention or set of interventions available to all study arms.

See also the study selection flow chart in Appendix C, study evidence tables in Appendix D, forest plots in Appendix E and GRADE tables in Appendix F.

1.1.4.2 Excluded studies

Two Cochrane reviews were identified (Laupattarakasem 2008[75] and Reichenbach 2010 [98]). These were ultimately excluded from the review as they included interventions[98] and

outcomes not included in the protocol[75, 98]. The references were checked and included in this review if relevant.

See the excluded studies list in Appendix J.

1.1.5 Summary of studies included in the effectiveness evidence

Table 2: Summary of studies included in the evidence review

Study	Intervention and comparison	Population	Outcomes	Comments
Basar 2021[14]	**Arthroscopic procedures** (n=96) Arthroscopic partial meniscectomy. Half of the group (n=48) also received hyaluronic acid (high molecular weight) as a single injection 4 weeks later. **Standard care (**n=96) Standard care received by all only. Half of the group (n=48) also received an injection of hyaluronic acid (high molecular weight) as a single injection just before the PT started. **Concomitant therapy**: Physical therapy (PT). TENS and low intensity pulsed ultrasound 3 sessions per week for 4 weeks Progressive neuromuscular and strength exercises 3 sessions per week for 8 weeks.	**Knee osteoarthritis** Mean age (SD): Group 1:48.4 (5.3) years, group 2: 49.3 (3.8) years, group 3: 50.9 (4.5) years, group 4: 49.9 (5.0) years N = 192 Definition: radiographic examination showing OA1, 2, 3 according to Kellgren Lawrence classification Severity: Kellgren Lawrence grade I-III Duration of symptoms: not reported Presence of multi-morbidities: Not stated/unclear	Pain at ≤3 months and >3 months	The population included people who had knee osteoarthritis and meniscal tears Groups were pooled for analysis: groups 1 and 2 (arthroscopic procedures), groups 3 and 4 (standard care) as this was consistent with the approach used in the protocol.
Kalunian 2000[63]	**Lavage alone** (n=41)	**Knee osteoarthritis**	Pain at >3 months	

Study	Intervention and comparison	Population	Outcomes	Comments
	Arthroscopic irrigation with 3000mL of normal saline. **Sham arthroscopic procedure** (n=49) Arthroscopy with minimal irrigation (250mL of normal saline). **Concomitant therapy:** Completed under local anaesthetic. No additional information	Mean age (range): 59.6 (40-88) years N = 90 Definition: knee pain for 10 years or less who fulfil the American College of Rheumatologists criteria for classification of knee osteoarthritis by clinical or radiographic means. Severity: Mean total radiographic score = 4.2 (range 0-12). Duration of symptoms (mean): 32.2 months.	Physical function at >3 months	
Katz 2013[68]	**Arthroscopic procedures** (n=174) Arthroscopic partial meniscectomy and removal of loose fragments of cartilage and bone. Followed by physiotherapy as per the control group. Anaesthesia type not mentioned. **Standard care** (n=177) Physical therapy based on a land-based, individualised program with progressive home exercise (including supervised sessions with the use of an elliptical machine, bicycle or treadmill). Recommended to	**Knee osteoarthritis** Mean age (SD): 58.4 (7.4) years N = 351 Definition: Symptomatic with a meniscal tear as well as osteoarthritis of the knee detected by radiography or MRI. Severity: Mean Kellgren-Lawrence radiographic grade = 1.6. Duration of symptoms: Not stated.	Quality of life at >3 months Pain at >3 months Physical function at >3 months Progression to joint replacement at >3 months Serious adverse events at >3 months	

Study	Intervention and comparison	Population	Outcomes	Comments
	attend physiotherapy sessions once or twice weekly for 6 weeks, and to perform exercises at home. **Concomitant therapy:** All people could receive paracetamol and NSAIDs as required. Steroid intra-articular injections were permitted over the course of the trial.			
Kirkley 2008[70]	**Arthroscopic procedures** (n=94) Arthroscopic including irrigation with at least 1 litre of saline and one or more of the following: synovectomy, debridement (83 people), excision of degenerative meniscal tears (70 had debridement or partial resection of meniscus), excision of fragments of articular cartilage, chondral flaps or osteophytes that prevented full extension (8 had excision of osteophytes, 12 had removal of loose bodies). Followed by physiotherapy as per control group. **Standard care** (n=94) Optimised physical and medical therapy.	**Knee osteoarthritis** Mean age (SD): 59.6 (10.1) N = 188 Definition: idiopathic or secondary osteoarthritis of the knee with grade 2-4 radiographic severity (as defined by the modified Kellgren-Lawrence classification). Severity: Mean Kellgren-Lawrence radiographic grade = 2.6 Duration of symptoms (range): between 40.1-47.1 months.	Quality of life at ≤3 months and >3 months Pain at ≤3 months and >3 months Physical function at ≤3 months and >3 months	

Study	Intervention and comparison	Population	Outcomes	Comments
	Concomitant therapy: Physiotherapy for at least 1 hour per week for 12 weeks (supervised exercise) with a personalised home exercise program that emphasised range-of-motion. All participants received booklets from "the Arthritis helpbook".			
Moseley 2002[87]	**Arthroscopic procedures** (n=59) Arthroscopic debridement with at least 10 litres of saline lavage, removal of loose debris and torn or degenerative meniscal fragments, and correction of any other soft tissue abnormalities. Conducted under general anaesthetic. **Lavage alone** (n=61) Arthroscopic lavage with at least 10 litres of saline. Conducted under general anaesthetic. **Sham arthroscopic procedure** (n=60) Three 1cm incisions were made with a scalpel but no instruments inserted. Otherwise the person was prepped for surgery as normal, the knee was manipulated, instruments were requested and passed, saline was splashed and a standard	**Knee osteoarthritis** Mean age (SD): 52.3 (11.3) years N = 180 Definition: Osteoarthritis of the knee as defined by the American College of Rheumatology Severity: 52 = mild, 83 = moderate, 45 = severe. Duration of symptoms: Not stated	Quality of life at ≤3 months and >3 months Pain at ≤3 months and >3 months	

Study	Intervention and comparison	Population	Outcomes	Comments
	debridement was simulated. Conducted with a short-acting intravenous tranquilizer and an opioid, while the person spontaneously breathed oxygen-enriched air. **Concomitant therapy:** People received a short-acting intravenous tranquilizer and an opioid and spontaneously breathed oxygen-enriched air			
Stegenga 1993[118]	**Arthroscopic procedures** (n=9) Using a double or triple superior posterolateral and anterolateral puncture technique. Examination and then any of the following procedures: capsular release, lysis or resection of adhesions, coagulation of hypervascular tissues and retrodiscal tissues, and mobilisation of the disc. Performed under general anaesthetic. In addition to standard care. **Standard care** (n=12) Initial therapy: Education about the condition, diet modification to softer food. Low intensity exercises. Subsequently physiotherapy: 6 sessions of 30 minutes duration.	**Temporomandibular joint osteoarthritis** Age 16-45 years N = 21 Definition: Clinical and radiographic examination (including an orthopantomogram, and transpharyngeal and transcranial radiographs). Severity: Not stated Duration of symptoms: Not stated.	Quality of life at ≤3 months and >3 months Pain at ≤3 months and >3 months Physical function at ≤3 months and >3 months	

Study	Intervention and comparison	Population	Outcomes	Comments
	Includes ultrasound therapy (3 minutes of 10ms alternating pulses of 2ms duration), manual techniques and active range of motion exercises. Supported by a home program of active stretching exercises with conical rubber plugs. **Concomitant therapy:** No additional information			

See Appendix D for full evidence tables.

1.1.6 Summary of the effectiveness evidence

Table 3: Clinical evidence summary: arthroscopic procedures compared to lavage alone for people with knee osteoarthritis

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with lavage alone	Risk difference with arthroscopic procedures	
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months	117 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 52.9	MD **3.3 lower** (12.7 lower to 6.1 higher)	MID = 3 (established value)
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months	117 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 47.1	MD **0.3 lower** (8.09 lower to 7.49 higher)	MID = 3 (established value)
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months	109 (1 RCT)	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 50.9	MD **3 lower** (13.12 lower to 7.12 higher)	MID = 3 (established value)

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with lavage alone	Risk difference with arthroscopic procedures	
	follow up: 2 years					
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months	109 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 44.4	MD **0.6 higher** (7.94 lower to 9.14 higher)	MID = 3 (established value)
Pain (AIMS pain subscale, 0-100, high is poor) at ≤3 months	117 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean pain was 53.7	MD **6.2 higher** (1.92 lower to 14.32 higher)	MID = 0.5 SD (SMD)
Pain (AIMS pain subscale, 0-100, high is poor) at >3 months	109 (1 RCT) follow up: 2 years	⊕⊕◯◯ LOW [a]	-	The mean pain was 56.7	MD **2.7 lower** (11.6 lower to 6.2 higher)	MID = 0.5 SD (SMD)

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 4: Clinical evidence summary: arthroscopic procedures compared to standard care for people with knee osteoarthritis

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with standard care	Risk difference with arthroscopic procedures	
Quality of life (SF-36 physical component, 0-100, final value, high is good) at ≤3 months	170 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 37.7	MD **1 higher** (1.91 lower to 3.91 higher)	MID = 2 (established value)

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with standard care	Risk difference with arthroscopic procedures	
Quality of life (SF-36 physical component, 0-100, final value, high is good) at >3 months	168 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 37.2	MD **0.2 lower** (3.53 lower to 3.13 higher)	MID = 2 (established value)
Quality of life (SF-36 physical activity score, 0-100, final values, high is good) at >3 months	320 (1 RCT) follow up: 12 months	⊕⊕◯◯ LOW [a]	-	The mean quality of life was 28.1	MD **3.1 lower** (8.78 lower to 2.58 higher)	MID = 3 (established value)
Pain (WOMAC pain, VAS [different scale ranges], final values, high is poor) at ≤3 months	266 (2 RCTs) follow up: mean 2.5 months	⊕◯◯◯ VERY LOW [a,c]	-		SMD **0.07 SD lower** (0.49 lower to 0.35 higher)	MID = 0.5 SD (SMD)
Pain (KOOS, WOMAC, VAS [different scale ranges], final values, high is poor) at >3 months	636 (3 RCTs) Follow-up: mean 21 weeks	⊕⊕⊕◯ MODERATE [a]	-	-	SMD **0.04 SD lower** (0.19 lower to 0.12 higher)	MID = 0.5 SD (SMD)
Physical function (WOMAC, 0-1700, final values, high is poor) at ≤3 months	170 (1 RCT) follow up: 12 weeks	⊕⊕◯◯ LOW [b]	-	The mean physical function was 598	MD **46 lower** (153.24 lower to 61.24 higher)	MID = 0.5 SD (SMD)
Physical function (WOMAC [different scale ranges], final values, high is poor) at >3 months	498 (2 RCTs) follow up: 18 months	⊕⊕⊕◯ MODERATE [a]	-	-	SMD **0.04 SD lower** (0.22 lower to 0.13 higher)	MID = 0.5 SD (SMD)
Progression to joint replacement at >3 months	328 (1 RCT) follow up: 12 months	⊕⊕◯◯ LOW [b]	RR 1.73 (0.42 to 7.12)	18 per 1,000	**13 more per 1,000** (10 fewer to 110 more)	MID (precision) = RR 0.8-1.25.

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with standard care	Risk difference with arthroscopic procedures	
Serious adverse events at >3 months	351 (1 RCT) follow up: 12 months	⊕⊕◯◯ LOW [b]	RR 2.54 (0.50 to 12.93)	11 per 1,000	**17 more per 1,000** (6 fewer to 135 more)	MID (precision) = RR 0.8-1.25.

[a.] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

[b.] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

c. I^2=65%

Table 5: Clinical evidence summary: arthroscopic procedures compared to sham arthroscopic procedures for people with knee osteoarthritis

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with sham arthroscopic procedures	Risk difference with arthroscopic procedures	
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months	114 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 52.4	MD **2.8 lower** (11.56 lower to 5.96 higher)	MID = 3 (established value)
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months	114 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 46.9	MD **0.1 lower** (8.72 lower to 8.52 higher)	MID = 3 (established value)
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months	106 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 49	MD **1.1 lower** (11.34 lower to 9.14 higher)	MID = 3 (established value)

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with sham arthroscopic procedures	Risk difference with arthroscopic procedures	
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months	107 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 42.3	MD **2.7 higher** (6.24 lower to 11.64 higher)	MID = 3 (established value)
Pain (AIMS pain subscale, 0-100, final value, high is poor) at ≤3 months	114 (1 RCT) follow up: 12 weeks	⊕⊕◯◯ LOW [a]	-	The mean pain was 50.1	MD **0.2 lower** (7.98 lower to 7.58 higher)	MID = 0.5 SD (SMD)
Pain (AIMS pain subscale, 0-100, final value, high is poor) at >3 months	108 (1 RCT) follow up: 2 years	⊕⊕◯◯ LOW [a]	-	The mean pain was 52.5	MD **1.5 higher** (7.63 lower to 10.63 higher)	MID = 0.5 SD (SMD)

[a.] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

[b.] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 6: Clinical evidence summary: lavage alone compared to sham arthroscopic procedures for people with knee osteoarthritis

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with sham arthroscopic procedures	Risk difference with lavage alone	
Quality of life (SF-36 physical function subscale, 0-100, final value, high is good) at ≤3 months	115 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 52.4	MD **0.5 higher** (8.85 lower to 9.85 higher)	MID = 3 (established value)
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months	115 (1 RCT)	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 46.9	MD **0.2 higher** (8.26 lower to 8.66 higher)	MID = 3 (established value)

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with sham arthroscopic procedures	Risk difference with lavage alone	
	follow up: 12 weeks					
Quality of life (SF-36 physical function subscale, 0-100, final value, high is good) at >3 months	111 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 49	MD **1.9 higher** (8.24 lower to 12.04 higher)	MID = 3 (established value)
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months	112 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 42.3	MD **2.1 higher** (6.54 lower to 10.74 higher)	MID = 3 (established value)
Pain (AIMS pain subscale, 0-100, final value, high is poor) at ≤3 months	116 (1 RCT) follow up: 12 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean pain was 50.1	MD **3.6 higher** (4.38 lower to 11.58 higher)	MID = 0.5 SD (SMD)
Pain (AIMS pain subscale, 0-100, final value, high is poor) at >3 months	111 (1 RCT) follow up: 2 years	⊕◯◯◯ VERY LOW [a,b]	-	The mean pain was 52.5	MD **4.2 higher** (4.96 lower to 13.36 higher)	MID = 0.5 SD (SMD)
Pain (WOMAC, 0-20, change score, high is poor) at >3 months	90 (1 RCT) follow up: 12 months	⊕⊕◯◯ LOW [a,b]	-	The mean pain was 2.3	MD **1.9 higher** (3.67 lower to 7.47 higher)	MID = 0.5 SD (SMD)
Physical function (WOMAC, 0-68, change score, high is poor) at >3 months	90 (1 RCT) follow up: 12 months	⊕⊕◯◯ LOW [a,b]	-	The mean physical function was 6.1	MD **3.8 higher** (0.6 lower to 8.2 higher)	MID = 0.5 SD (SMD)

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 7: Clinical evidence summary: arthroscopic procedures compared to standard care for people with temporomandibular joint osteoarthritis

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with standard care	Risk difference with arthroscopic procedures	
Quality of life (combined West Haven-Yale multidimensional pain inventory and general health questionnaire score, 0-1, final value, high is poor) at ≤3 months	19 (1 RCT) follow up: 9 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 0.11	MD **0** (0.03 lower to 0.03 higher)	MID = 0.5 SD (SMD)
Quality of life (combined West Haven-Yale multidimensional pain inventory and general health questionnaire score, 0-1, final value, high is poor) at >3 months	19 (1 RCT) follow up: 6 months	⊕◯◯◯ VERY LOW [a,b]	-	The mean quality of life was 0.14	MD **0.03 lower** (0.09 lower to 0.03 higher)	MID = 0.5 SD (SMD)
Pain (VAS, 0-100, final value, high is poor) at ≤3 months	19 (1 RCT) follow up: 9 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean pain was 18	MD **5 higher** (17.02 lower to 27.02 higher)	MID = 0.5 SD (SMD)
Pain (VAS, 0-100, final value, high is poor) at >3 months	19 (1 RCT) follow up: 6 months	⊕◯◯◯ VERY LOW [a,b]	-	The mean pain was 11	MD **2 lower** (15.14 lower to 11.14 higher)	MID = 0.5 SD (SMD)
Physical function (mandibular function impairment questionnaire, 0-1, final value, high is poor) at ≤3 months	19 (1 RCT) follow up: 9 weeks	⊕◯◯◯ VERY LOW [a,b]	-	The mean physical function was 0.25	MD **0** (0.15 lower to 0.15 higher)	MID = 0.5 SD (SMD)
Physical function (mandibular function impairment questionnaire, 0-1, final value, high is poor) at >3 months	19 (1 RCT) follow up: 6 months	⊕◯◯◯ VERY LOW [a,b]	-	The mean physical function was 0.12	MD **0** (0.12 lower to 0.12 higher)	MID = 0.5 SD (SMD)

[a.] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects		Comments
				Risk with standard care	Risk difference with arthroscopic procedures	
b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs						

See Appendix F for full GRADE tables.

1.1.7 Economic evidence

1.1.7.1 Included studies

One health economic study with the relevant comparison was included in this review.[80] This is summarised in the health economic evidence profile below (**Table 8**) and the health economic evidence table in Appendix H.

1.1.7.2 Excluded studies

No relevant health economic studies were excluded due to assessment of limited applicability or methodological limitations.

See also the health economic study selection flow chart in Appendix G.

1.1.8 Summary of included economic evidence

Table 8: Health economic evidence profile: Arthroscopic surgery in addition to optimal therapy vs optimal therapy alone

Study	Applicability	Limitations	Other comments	Incremental cost	Incremental effects	Cost effectiveness	Uncertainty
Marsh 2016 [80] (Canada)	Partially applicable [(a)]	Potentially serious limitations[(b)]	• Within-RCT analysis (Kirkley 2008[70]) • Cost-utility analysis (QALYs) • Population: Patients with symptomatic, radiographic knee OA • Comparators: 1.Optimal therapy 2.Arthroscopic surgery in addition to optimal therapy • Time horizon: 2 years	£1,076[(c)]	-0.02	1 dominates (more effective and less costly) 2	Probability 2 cost effective (£20/£30K threshold): 10/15% No further sensitivity analyses undertaken.

Abbreviations: ICER= incremental cost-effectiveness ratio; QALY= quality-adjusted life years; RCT= randomised controlled trial

(a) Canadian resource use data and unit costs (2014) may not reflect current NHS context. Discount rates not applied.

(b) Within-trial analysis and so may not reflect the full body of available evidence. Utility values not estimated from EQ-5D in line with NICE reference case to calculate QALYs.

(c) 2014 Canadian dollars converted to UK pounds.[91]. Cost components incorporated: arthroscopy (including equipment, operating room and laboratory or other medical tests during the procedure), number of physical therapy sessions attended, and medication use.

1.1.9 Economic model

This area was not prioritised for economic modelling.

1.1.11 Economic evidence statements

- One cost utility analysis reported that optimal therapy (defined as optimised physical and medical therapy) dominated arthroscopic surgery plus optimal therapy. This analysis was graded as partially applicable with potentially serious limitations.

1.1.12 The committee's discussion and interpretation of the evidence

1.1.12.1. The outcomes that matter most

The critical outcomes were quality of life, pain and physical function. These were considered critical due to their importance to people with osteoarthritis. The Osteoarthritis Research Society International (OARSI) consider that pain and physical function were the most important outcomes for evaluating interventions. Quality of life gives a broader perspective on the person's wellbeing, allowing for examination of the biopsychosocial impact of interventions. Progression to joint replacement, osteoarthritis flares and serious adverse events (defined as the presence of mortality, persistent recurrent pain, venous thromboembolism, neurovascular damage and septic arthritis) were included as important outcomes.

The committee considered osteoarthritis flares to be important in the lived experience and management of osteoarthritis. However, these were also considered difficult to measure with no clear consensus on their definition. The Flares in OA OMERACT working group have proposed an initial definition and domains of OA flares through a consensus exercise; "it is a transient state, different from the usual state of the condition, with a duration of a few days, characterized by onset, worsening of pain, swelling, stiffness, impact on sleep, activity, functioning, and psychological aspects that can resolve spontaneously or lead to a need to adjust therapy.". However, this has been considered to have limitations and has not been widely adopted. Therefore, the committee included the outcome accepting any reasonable definition provided by any studies discussing the event.

Mortality was considered as a composite of serious adverse events rather than as a discrete outcome and categorised as an important outcome. Osteoarthritis as a disease process is not considered to cause mortality by itself and mortality is an uncommon outcome from osteoarthritis interventions, including arthroscopy.

There was limited evidence for all outcomes. Osteoarthritis flares were not reported in any of the studies.

1.1.12.2 The quality of the evidence

No relevant clinical studies for arthroscopic procedures in hip, ankle, shoulder, wrist, thumb, elbow, finger and hand osteoarthritis were identified. Five studies were included in this review. These studies included people with either knee or temporomandibular joint osteoarthritis. While evidence was available for all comparators for people with knee osteoarthritis, only one comparator was available for temporomandibular joint osteoarthritis. Evidence was available for the following comparisons:

- Knee osteoarthritis:
    - Arthroscopic procedures compared to lavage alone
    - Arthroscopic procedures compared to standard care
    - Arthroscopic procedures compared to sham arthroscopic procedures
    - Lavage alone compared to sham arthroscopic procedures
- Temporomandibular joint osteoarthritis:
    - Arthroscopic procedures compared to standard care

Evidence ranged from moderate to very low quality. Evidence quality was often downgraded due to risk of bias and imprecision. The majority of the analyses were based on data from a small number of participants.

Knee osteoarthritis

Arthroscopic procedures compared to lavage alone

This comparison included results from 1 study reporting only critical outcomes (pain and physical function). The quality of outcomes ranged from low to very low, with the majority of evidence being of very low quality. Outcomes were downgraded due to risk of bias and imprecision.

Arthroscopic procedures compared to standard care

The comparison included results from 2 studies reporting mostly critical outcomes (pain and physical function) but also important outcomes (progression to joint replacement and serious adverse events). The majority of outcomes included results from only 1 study. The quality ranged from moderate to very low, with the majority of evidence being of low quality. Outcomes were downgraded due to risk of bias and imprecision.

Arthroscopic procedures compared to sham arthroscopic procedures

The comparison included results from 1 study reporting only critical outcomes (pain and physical function). The quality of outcomes ranged from low to very low, with the majority of evidence being of very low quality. Outcomes were downgraded due to risk of bias and imprecision.

Lavage alone compared to sham arthroscopic procedures

The comparison included results from 2 studies reporting only critical outcomes (pain and physical function). All outcomes included results from only 1 study. The quality ranged from low to very low, with the majority of the evidence being of very low quality. Outcomes were downgraded due to risk of bias and imprecision.

Temporomandibular joint osteoarthritis

Arthroscopic procedures compared to standard care

The comparison included results from 1 study reporting only critical outcomes (health-related quality of life, pain and physical function). The quality of the evidence was very low, with all of the outcomes being downgraded due to risk of bias and imprecision.

1.1.12.3 Benefits and harms

Knee osteoarthritis

Arthroscopic procedures compared to lavage alone

For the comparison of arthroscopic procedures and lavage alone in knee osteoarthritis, a clinically important harm was seen for arthroscopic procedures in physical function at three months and two years based on one study. This was associated with no clinically important difference in pain. The study reporting this compared arthroscopic procedures, lavage alone and sham arthroscopic procedures. Lavage is usually part of an arthroscopic procedure, rather than a procedure on its own so it was considered similar to sham procedures.

Based on the limited amount of available evidence which was predominantly of very low quality, the lack of clinical benefit and some harms for arthroscopic procedures, the committee concluded that there was no benefit for arthroscopic procedures compared to lavage alone in knee osteoarthritis.

Arthroscopic procedures compared to standard care

For the comparison of arthroscopic procedures and standard care in knee osteoarthritis, no clinically important difference was seen in pain and physical function at three months and up to two years, progression to joint replacement at one year and serious adverse events at one year based on two studies. In one study, arthroscopic procedures were performed in people with knee osteoarthritis and included: lavage, debridement, excision of degenerative meniscal tears and excision of fragments of articular cartilage, chondral flaps and osteophytes that prevented full extension. In the second study, arthroscopic procedures were performed in people with symptomatic osteoarthritis and a meniscal tear present on MRI and radiographic imaging. In this study, the arthroscopic procedure consisted of an arthroscopic partial meniscectomy. Both studies were followed by physiotherapy, which was conducted in both the intervention and control arms.

While there was no clinically important difference in serious adverse events, the committee noted that the adverse events in the arthroscopic procedures group included pulmonary embolism and deep vein thrombosis, which were not present in the standard care group. These are a known risk with arthroscopic procedures.

Based on the limited amount of available evidence and lack of clinical benefits, the committee concluded that there was no benefit for arthroscopic procedures compared to standard care (as defined in these studies) in knee osteoarthritis.

Arthroscopic procedures compared to sham arthroscopic procedures

For the comparison of arthroscopic procedures and sham arthroscopic procedures in knee osteoarthritis, no clinically important difference was seen for pain and physical function at three months and two years. This was based on one study. The committee agreed that the sham procedure was a good example of a sham arthroscopic procedure.

Based on the limited amount of available evidence and lack of clinical benefits, the committee concluded that there was no benefit for arthroscopic procedures compared to sham arthroscopic procedures in knee osteoarthritis.

Lavage alone compared to sham arthroscopic procedures

For the comparison of lavage alone and sham arthroscopic procedures in knee osteoarthritis, no clinical important difference was seen for pain and physical function at three months and up to two years. This was based on two studies. One study included a comparison between arthroscopy with lavage and arthroscopic examination with a minimal amount of lavage (around 300mL). The committee agreed that while this was not a true sham arthroscopic procedure (as instruments were inserted into the knee) that it was still important and relevant evidence and should be included in this comparison.

Based on the limited amount of available evidence and lack of clinical benefits, the committee concluded that there was no benefit for lavage alone compared to sham arthroscopic procedures in knee osteoarthritis.

Temporomandibular joint osteoarthritis

Arthroscopic procedures compared to standard care

For the comparison of arthroscopic procedures and standard care in temporomandibular joint osteoarthritis, no clinically important difference was seen for health-related quality of life, pain and physical function at nine weeks and six months. This was based on one study. The committee noted that the definition of standard care used by the study was intensive care, including: education, exercise therapy, electrotherapy, manual therapy and use of devices. However, this care was provided to both the intervention arm and control group.

Based on the limited amount of available evidence and lack of clinical benefits, the committee concluded that there was no benefit for arthroscopic procedures compared to standard care (as defined in this study) in temporomandibular joint osteoarthritis.

Summary of benefits and harms

There was limited evidence available assessing arthroscopy in osteoarthritis. No evidence was found discussing the use of arthroscopic procedures in hip, ankle, shoulder, wrist, thumb, elbow, finger and hand osteoarthritis. Based on the evidence for knee and temporomandibular joint osteoarthritis, the committee decided that they could make a recommendation for all osteoarthritis.

The committee agreed that as there was no evidence of benefit for any of the comparisons and some evidence of harm, arthroscopy should not be used as an intervention in the management of osteoarthritis. Furthermore, arthroscopy is an invasive procedure and there are potential risks with surgery such as bleeding, pain and risk of infection as well as an associated cost. Therefore, the committee made a strong recommendation to not use arthroscopy in the management of osteoarthritis pain alone. However, the committee recognised that arthroscopic procedures are indicated for the treatment of clearly defined mechanical symptoms (due to meniscal tears, loose bodies or other musculoskeletal conditions) that may co-occur with osteoarthritis affecting the same joint, and that the general recommendation should not include these other indications

There were a limited number of relevant studies investigating arthroscopic procedures for osteoarthritis. Due to findings, and current clinical use of arthroscopic procedures, the committee agreed that no research recommendations were required as they were unlikely to find any new findings that would impact clinical practice.

Based on the lack of apparent efficacy shown for arthroscopic procedures in osteoarthritis, the committee agreed to the inclusion of recommendation A1.

1.1.12.4 Cost effectiveness and resource use

One economic evaluation was identified for inclusion in this review. This is a within-trial cost-utility analysis assessing the cost effectiveness of arthroscopic debridement and partial resection in addition to standard care compared to standard care alone in patients with symptomatic, radiographic knee osteoarthritis from a Canadian healthcare perspective. This study found that standard care alone was less costly and more effective than arthroscopic surgery, and hence arthroscopic surgery was not cost-effective. The economic evaluation was assessed as being partially applicable, with potentially serious limitations.

Due to the lack of efficacy of arthroscopic intervention demonstrated in the clinical review and the high cost of arthroscopic procedures, the committee concurred that arthroscopic surgery is not likely to be cost effective for the NHS. Therefore, the committee made a do not offer recommendation for arthroscopic procedures.

Overall, the committee considered this recommendation to be largely in line with current practice.

1.1.12.5 Other factors the committee took into account

The committee considered that current use of arthroscopic procedures in the NHS. In the previous NICE guidance on osteoarthritis (completed in 2014) the following recommendation was agreed upon; “Do not refer for arthroscopic lavage and debridement as part of treatment for osteoarthritis, unless the person has knee osteoarthritis with a clear history of mechanical locking (as opposed to morning joint stiffness, 'giving way' or X-ray evidence of loose bodies).” Since this time, the committee thought the use of arthroscopic procedures for osteoarthritis had decreased. While making the recommendation, the committee considered

that arthroscopic procedures may be an effective treatment for people with a clear history of mechanical symptoms. However, the committee agreed that this guidance is not for people with meniscal tears or those with mechanical symptoms due to the presence of an intra-articular loose body that are beyond the scope of the review. People with mechanical symptoms can be considered separately by clinicians. The committee agreed that osteoarthritis should not be a contraindication for anyone having an arthroscopic procedure for an indication for arthroscopic procedures.

People with commonly existing comorbidities related to osteoarthritis were not explicitly considered during this review. The recommendation should have no difference in impact for this group compared to people with osteoarthritis without commonly existing comorbidities.

1.1.13 Recommendations supported by this evidence review

This evidence review supports recommendation 1.7.1. Other evidence supporting these recommendations can be found in evidence review N.

1.1.14 References

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1

Appendices

Appendix A – Review protocols

Review protocol for the clinical and cost-effectiveness of arthroscopic procedures for the management of osteoarthritis

ID	Field	Content
0.	PROSPERO registration number	N/A
1.	Review title	What is the clinical and cost-effectiveness of arthroscopic procedures for the management of osteoarthritis?
2.	Review question	7.1 What is the clinical and cost-effectiveness of arthroscopic procedures for the management of osteoarthritis?
3.	Objective	To evaluate the clinical and cost-effectiveness of arthroscopic procedures in the management of osteoarthritis.
4.	Searches	The following databases will be searched: • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • Embase • MEDLINE Searches will be restricted by: • English language • Human studies • Letters and comments are excluded

		Other searches: • Inclusion lists of relevant systematic reviews will be checked by the reviewer. The searches may be re-run 6 weeks before final submission of the review and further studies retrieved for inclusion if relevant. The full search strategies for MEDLINE database will be published in the final review.
5.	Condition or domain being studied	Osteoarthritis in adults (defined as a clinical diagnosis of osteoarthritis with or without imaging)
6.	Population	Stratify by site of OA: • Hip • Knee • Ankle • Shoulder • Wrist • Elbow • TMJ Inclusion: • Adults (age ≥16 years) with osteoarthritis affecting any joint Exclusion: • Children (age ≤16 years) • People with conditions that may make them susceptible to osteoarthritis or often occur alongside osteoarthritis (including: crystal arthritis, inflammatory arthritis, septic arthritis, hemochromatosis, haemophilic arthropathy, diseases of childhood that may predispose to osteoarthritis, and malignancy). • Studies in people with meniscal injury without osteoarthritis

		• Studies with an unclear population (e,g, proportion of participants with osteoarthritis unclear)
7.	Intervention/Exposure/Test	Arthroscopic procedures (procedure includes): • Washout/lavage (including tidal irrigation?) • Debridement • Resection, excision and removal (shaving, drilling) • Microfracture technique • Partial and total meniscectomy • Meniscal transplantation • Combinations of the above
8.	Comparator/Reference standard/Confounding factors	• Placebo (sham procedure) • Lavage alone • Standard care?
9.	Types of study to be included	• Systematic reviews of RCTs • RCTs If insufficient RCT evidence is available, cross-over studies will not be considered as the effects will be carried over. Non-randomised studies will be excluded.
10.	Other exclusion criteria	• Non-English language studies • Non-randomised/observational studies • Abstracts will be excluded as it is expected there will be sufficient full text published studies available.
11.	Context	N/A

12.	Primary outcomes (critical outcomes)	Stratify by ≤/>3 months Health-related quality of life Physical function Pain
13.	Secondary outcomes (important outcomes)	Progression to joint replacement Osteoarthritis flare-ups Serious adverse events
14.	Data extraction (selection and coding)	EndNote will be used for reference management, sifting, citations and bibliographies. All references identified by the searches and from other sources will be screened for inclusion. 10% of the abstracts will be reviewed by two reviewers, with any disagreements resolved by discussion or, if necessary, a third independent reviewer. The full text of potentially eligible studies will be retrieved and will be assessed in line with the criteria outlined above. EviBASE will be used for data extraction. Study investigators may be contacted for missing data where time and resources allow.
15.	Risk of bias (quality) assessment	Risk of bias will be assessed using the appropriate checklist as described in Developing NICE guidelines: the manual For intervention reviews the following checklists will be used according to the study design being assessed: • Systematic reviews: Risk of Bias in Systematic Reviews (ROBIS) • Randomised Controlled Trial: Cochrane RoB (2.0) 10% of all evidence reviews are quality assured by a senior research fellow. This includes checking: • papers were included /excluded appropriately • a sample of the data extractions • correct methods are used to synthesise data • a sample of the risk of bias assessments Disagreements between the review authors over the risk of bias in particular studies will be resolved by discussion, with involvement of a third review author where necessary.

16.	Strategy for data synthesis	• Pairwise meta-analyses will be performed using Cochrane Review Manager (RevMan5). • GRADEpro will be used to assess the quality of evidence for each outcome, taking into account individual study quality and the meta-analysis results. The 4 main quality elements (risk of bias, indirectness, inconsistency and imprecision) will be appraised for each outcome. Publication bias is tested for when there are more than 5 studies for an outcome. The risk of bias across all available evidence was evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/ • Where meta-analysis is not possible, data will be presented and quality assessed individually per outcome. • WinBUGS will be used for network meta-analysis, if possible given the data identified. Heterogeneity between studies in the effect measures will be assessed using the I^2 statistic and visual inspection. We will consider an I^2 value great than 50% as indicative of substantial heterogeneity. If significant heterogeneity is identified during meta-analysis then subgroup analysis, using subgroups predefined by the GC, will take place. If this does not explain the heterogeneity, the results will be presented using a random-effects model.	
17.	Analysis of sub-groups		
18.	Type and method of review	☒	Intervention
		☐	Diagnostic
		☐	Prognostic
		☐	Qualitative
		☐	Epidemiologic
		☐	Service Delivery
		☐	Other (please specify)

19.	Language	English		
20.	Country	England		
21.	Anticipated or actual start date	23/08/2019		
22.	Anticipated completion date	25/08/2021		
23.	Stage of review at time of this submission	Review stage	Started	Completed
		Preliminary searches	☑	☑
		Piloting of the study selection process	☑	☑
		Formal screening of search results against eligibility criteria	☑	☑
		Data extraction	☑	☑
		Risk of bias (quality) assessment	☑	☑
		Data analysis	☑	☑
24.	Named contact	5a. Named contact National Guideline Centre 5b Named contact e-mail		

		[Guideline email]@nice.org.uk [Developer to check with Guideline Coordinator for email address] 5e Organisational affiliation of the review National Institute for Health and Care Excellence (NICE) and the National Guideline Centre
25.	Review team members	From the National Guideline Centre: Carlos Sharpin [Guideline lead] Rebecca Boffa [Senior systematic reviewer] George Wood [Systematic reviewer] Emma Cowles [Senior health economist] Joseph Runicles [Information specialist] Amber Hernaman [Project manager]
26.	Funding sources/sponsor	This systematic review is being completed by the National Guideline Centre which receives funding from NICE.
27.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.
28.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10127

29.	Other registration details		
30.	Reference/URL for published protocol		
31.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.	
32.	Keywords	Adults; Arthroscopy; Intervention; Osteoarthritis; Procedure	
33.	Details of existing review of same topic by same authors		
34.	Current review status	☐	Ongoing
		☒	Completed but not published
		☐	Completed and published
		☐	Completed, published and being updated
		☐	Discontinued
35..	Additional information	N/A	
36.	Details of final publication	www.nice.org.uk	

Table 9: Health economic review protocol

Review question	All questions – health economic evidence
Objectives	To identify health economic studies relevant to any of the review questions.
Search criteria	• Populations, interventions and comparators must be as specified in the clinical review protocol above. • Studies must be of a relevant health economic study design (cost–utility analysis, cost-effectiveness analysis, cost–benefit analysis, cost–consequences analysis, comparative cost analysis). • Studies must not be a letter, editorial or commentary, or a review of health economic evaluations. (Recent reviews will be ordered although not reviewed. The bibliographies will be checked for relevant studies, which will then be ordered.) • Unpublished reports will not be considered unless submitted as part of a call for evidence. • Studies must be in English.
Search strategy	A health economic study search will be undertaken for all years using population-specific terms and a health economic study filter – see appendix B below.
Review strategy	Studies not meeting any of the search criteria above will be excluded. Studies published before 2005, abstract-only studies and studies from non-OECD countries or the USA will also be excluded. Studies published in 2005 or later, that were included in the previous guidelines, will be reassessed for inclusion and may be included or selectively excluded based on their relevance to the questions covered in this update and whether more applicable evidence is also identified. Each remaining study will be assessed for applicability and methodological limitations using the NICE economic evaluation checklist which can be found in appendix H of Developing NICE guidelines: the manual (2014).[89] **Inclusion and exclusion criteria** • If a study is rated as both 'Directly applicable' and with 'Minor limitations' then it will be included in the guideline. A health economic evidence table will be completed and it will be included in the health economic evidence profile. • If a study is rated as either 'Not applicable' or with 'Very serious limitations' then it will usually be excluded from the guideline. If it is excluded then a health economic evidence table will not be completed and it will not be included in the health economic evidence profile. • If a study is rated as 'Partially applicable', with 'Potentially serious limitations' or both then there is discretion over whether it should be included.

Where there is discretion

The health economist will make a decision based on the relative applicability and quality of the available evidence for that question, in discussion with the guideline committee if required. The ultimate aim is to include health economic studies that are helpful for decision-making in the context of the guideline and the current NHS setting. If several studies are considered of sufficiently high applicability and methodological quality that they could all be included, then the health economist, in discussion with the committee if required, may decide to include only the most applicable studies and to selectively exclude the remaining studies. All studies excluded on the basis of applicability or methodological limitations will be listed with explanation in the excluded health economic studies appendix below.

The health economist will be guided by the following hierarchies.

Setting:

- UK NHS (most applicable).
- OECD countries with predominantly public health insurance systems (for example, France, Germany, Sweden).
- OECD countries with predominantly private health insurance systems (for example, Switzerland).
- Studies set in non-OECD countries or in the USA will be excluded before being assessed for applicability and methodological limitations.

Health economic study type:

- Cost–utility analysis (most applicable).
- Other type of full economic evaluation (cost–benefit analysis, cost-effectiveness analysis, cost–consequences analysis).
- Comparative cost analysis.
- Non-comparative cost analyses including cost-of-illness studies will be excluded before being assessed for applicability and methodological limitations.

Year of analysis:

- The more recent the study, the more applicable it will be.
- Studies published in 2005 or later (including any such studies included in the previous guidelines) but that depend on unit costs and resource data entirely or predominantly from before 2005 will be rated as 'Not applicable'.
- Studies published before 2005 (including any such studies included in the previous guidelines) will be excluded before being assessed for applicability and methodological limitations.

Quality and relevance of effectiveness data used in the health economic analysis:

- The more closely the clinical effectiveness data used in the health economic analysis match with the outcomes of the studies included in the clinical review the more useful the analysis will be for decision-making in the guideline.

Appendix B – Literature search strategies

- What is the clinical and cost-effectiveness of arthroscopic procedures for the management of osteoarthritis?

The literature searches for this review are detailed below and complied with the methodology outlined in Developing NICE guidelines: the manual.[89]

For more information, please see the Methodology review published as part of the accompanying documents for this guideline.

B.1 Clinical search literature search strategy

Searches were constructed using an Osteoarthritis population. All results were then sifted for each question. Search filters were applied to the search where appropriate.

Table 10: Database date parameters and filters used

Database	Dates searched	Search filter used
Medline (OVID)	1946 – 17 November 2021	Randomised controlled trials Systematic review studies Exclusions (animals studies, letters, comments)
Embase (OVID)	1974 – 17 November 2021	Randomised controlled trials Systematic review studies Exclusions (animals studies, letters, comments)
The Cochrane Library (Wiley)	Cochrane Reviews to 2021 Issue 11 of 12 CENTRAL to 2021 Issue 11 of 12	None

Medline (Ovid) search terms

1.	exp osteoarthritis/
2.	(osteoarthriti* or osteo-arthriti* or osteoarthrotic or osteoarthros*).ti,ab.
3.	(degenerative adj2 arthritis).ti,ab.
4.	coxarthrosis.ti,ab.
5.	gonarthrosis.ti,ab.
6.	or/1-5
7.	letter/
8.	editorial/
9.	news/
10.	exp historical article/
11.	Anecdotes as Topic/
12.	comment/
13.	case report/
14.	(letter or comment*).ti.
15.	or/7-14

16.	randomized controlled trial/ or random*.ti,ab.
17.	15 not 16
18.	animals/ not humans/
19.	exp Animals, Laboratory/
20.	exp Animal Experimentation/
21.	exp Models, Animal/
22.	exp Rodentia/
23.	(rat or rats or mouse or mice or rodent*).ti.
24.	or/17-23
25.	6 not 24
26.	limit 25 to English language
27.	randomized controlled trial.pt.
28.	controlled clinical trial.pt.
29.	randomi#ed.ti,ab.
30.	placebo.ab.
31.	randomly.ti,ab.
32.	Clinical Trials as topic.sh.
33.	trial.ti.
34.	or/27-33
35.	Meta-Analysis/
36.	exp Meta-Analysis as Topic/
37.	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
38.	((systematic* or evidence*) adj3 (review* or overview*)).ti,ab.
39.	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
40.	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
41.	(search* adj4 literature).ab.
42.	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
43.	cochrane.jw.
44.	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
45.	or/35-44
46.	26 and (34 or 45)

Embase (Ovid) search terms

1.	exp osteoarthritis/
2.	(osteoarthriti* or osteo-arthriti* or osteoarthrotic or osteoarthros*).ti,ab.
3.	(degenerative adj2 arthritis).ti,ab.
4.	coxarthrosis.ti,ab.
5.	gonarthrosis.ti,ab.
6.	or/1-5
7.	letter.pt. or letter/
8.	note.pt.
9.	editorial.pt.
10.	case report/ or case study/
11.	(letter or comment*).ti.

12.	or/7-11
13.	randomized controlled trial/ or random*.ti,ab.
14.	12 not 13
15.	animal/ not human/
16.	nonhuman/
17.	exp Animal Experiment/
18.	exp Experimental Animal/
19.	animal model/
20.	exp Rodent/
21.	(rat or rats or mouse or mice or rodent*).ti.
22.	or/14-21
23.	6 not 22
24.	Limit 23 not English language
25.	random*.ti,ab.
26.	factorial*.ti,ab.
27.	(crossover* or cross over*).ti,ab.
28.	((doubl* or singl*) adj blind*).ti,ab.
29.	(assign* or allocat* or volunteer* or placebo*).ti,ab.
30.	crossover procedure/
31.	single blind procedure/
32.	randomized controlled trial/
33.	double blind procedure/
34.	or/25-33
35.	systematic review/
36.	meta-analysis/
37.	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
38.	((systematic* or evidence*) adj3 (review* or overview*)).ti,ab.
39.	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
40.	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
41.	(search* adj4 literature).ab.
42.	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
43.	cochrane.jw.
44.	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
45.	or/35-44
46.	24 and (34 or 45)

Cochrane Library (Wiley) search terms

#1.	MeSH descriptor: [Osteoarthritis] explode all trees
#2.	(osteoarthriti* or osteo-arthriti* or osteoarthrotic or osteoarthros*):ti,ab
#3.	(degenerative near/2 arthritis):ti,ab
#4.	coxarthrosis:ti,ab
#5.	gonarthrosis:ti,ab

#6.	(or #1-#5)

B.2 Health Economics literature search strategy

Health economic evidence was identified by conducting a broad search relating to a Gout population in NHS Economic Evaluation Database (NHS EED – this ceased to be updated after March 2015) and the Health Technology Assessment database (HTA – this ceased to be updates after March 2018). NHS EED and HTA databases are hosted by the Centre for Research and Dissemination (CRD). Additional searches were run on Medline and Embase for health economics studies and quality of life studies. Searches for quality of life studies were run for general information.

Table 11: Database date parameters and filters used

Database	Dates searched	Search filter used
Medline	1 January 2014 – 17 November 2021	Health economics studies Quality of life studies Exclusions (animals studies, letters, comments)
Embase	1 January 2014 – 17 November 2021	Health economics studies Quality of life studies Exclusions (animals studies, letters, comments)
Centre for Research and Dissemination (CRD)	HTA - Inception – 31 March 2018 NHSEED - Inception to 31 March 2015	None

Medline (Ovid) search terms

1.	exp osteoarthritis/
2.	(osteoarthriti* or osteo-arthriti* or osteoarthrotic or osteoarthros*).ti,ab.
3.	(degenerative adj2 arthritis).ti,ab.
4.	coxarthrosis.ti,ab.
5.	gonarthrosis.ti,ab.
6.	or/1-5
7.	letter/
8.	editorial/
9.	news/
10.	exp historical article/
11.	Anecdotes as Topic/
12.	comment/
13.	case report/
14.	(letter or comment*).ti.
15.	or/7-14
16.	randomized controlled trial/ or random*.ti,ab.
17.	15 not 16

18.	animals/ not humans/
19.	exp Animals, Laboratory/
20.	exp Animal Experimentation/
21.	exp Models, Animal/
22.	exp Rodentia/
23.	(rat or rats or mouse or mice or rodent*).ti.
24.	or/17-23
25.	6 not 24
26.	limit 25 to English language
27.	Economics/
28.	Value of life/
29.	exp "Costs and Cost Analysis"/
30.	exp Economics, Hospital/
31.	exp Economics, Medical/
32.	Economics, Nursing/
33.	Economics, Pharmaceutical/
34.	exp "Fees and Charges"/
35.	exp Budgets/
36.	budget*.ti,ab.
37.	cost*.ti.
38.	(economic* or pharmaco?economic*).ti.
39.	(price* or pricing*).ti,ab.
40.	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
41.	(financ* or fee or fees).ti,ab.
42.	(value adj2 (money or monetary)).ti,ab.
43.	or/27-42
44.	quality-adjusted life years/
45.	sickness impact profile/
46.	(quality adj2 (wellbeing or well being)).ti,ab.
47.	sickness impact profile.ti,ab.
48.	disability adjusted life.ti,ab.
49.	(qal* or qtime* or qwb* or daly*).ti,ab.
50.	(euroqol* or eq5d* or eq 5*).ti,ab.
51.	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
52.	(hui or hui1 or hui2 or hui3).ti,ab.
53.	(health* year* equivalent* or hye or hyes).ti,ab.
54.	discrete choice*.ti,ab.
55.	rosser.ti,ab.
56.	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.

57.	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
58.	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
59.	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
60.	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
61.	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
62.	or/44-61
63.	26 and (43 or 62)

Embase (Ovid) search terms

1.	exp osteoarthritis/
2.	(osteoarthriti* or osteo-arthriti* or osteoarthrotic or osteoarthros*).ti,ab.
3.	(degenerative adj2 arthritis).ti,ab.
4.	coxarthrosis.ti,ab.
5.	gonarthrosis.ti,ab.
6.	or/1-5
7.	letter.pt. or letter/
8.	note.pt.
9.	editorial.pt.
10.	case report/ or case study/
11.	(letter or comment*).ti.
12.	or/7-11
13.	randomized controlled trial/ or random*.ti,ab.
14.	12 not 13
15.	animal/ not human/
16.	nonhuman/
17.	exp Animal Experiment/
18.	exp Experimental Animal/
19.	animal model/
20.	exp Rodent/
21.	(rat or rats or mouse or mice or rodent*).ti.
22.	or/14-21
23.	6 not 22
24.	Limit 23 to English language
25.	health economics/
26.	exp economic evaluation/
27.	exp health care cost/
28.	exp fee/
29.	budget/
30.	funding/
31.	budget*.ti,ab.

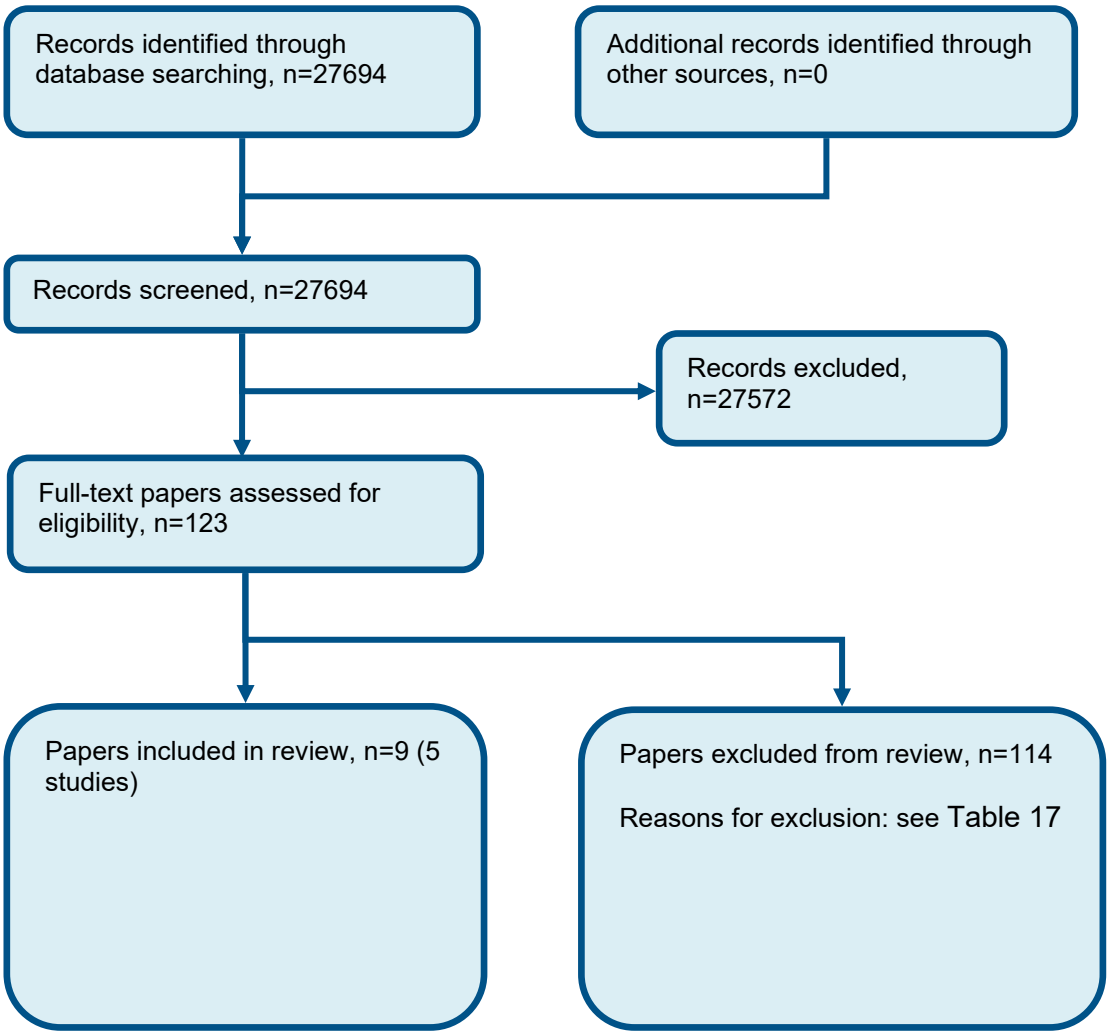
32.	cost*.ti.
33.	(economic* or pharmaco?economic*).ti.
34.	(price* or pricing*).ti,ab.
35.	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
36.	(financ* or fee or fees).ti,ab.
37.	(value adj2 (money or monetary)).ti,ab.
38.	or/25-37
39.	quality adjusted life year/
40.	"quality of life index"/
41.	short form 12/ or short form 20/ or short form 36/ or short form 8/
42.	sickness impact profile/
43.	(quality adj2 (wellbeing or well being)).ti,ab.
44.	sickness impact profile.ti,ab.
45.	disability adjusted life.ti,ab.
46.	(qal* or qtime* or qwb* or daly*).ti,ab.
47.	(euroqol* or eq5d* or eq 5*).ti,ab.
48.	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
49.	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
50.	(hui or hui1 or hui2 or hui3).ti,ab.
51.	(health* year* equivalent* or hye or hyes).ti,ab.
52.	discrete choice*.ti,ab.
53.	rosser.ti,ab.
54.	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
55.	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
56.	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
57.	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
58.	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
59.	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
60.	or/39-59
61.	24 and (38 or 60)

NHS EED and HTA (CRD) search terms

#1.	MeSH DESCRIPTOR Osteoarthritis EXPLODE ALL TREES
#2.	((osteoarthriti* or osteo-arthriti* or osteoarthrotic or osteoarthros*))
#3.	((degenerative adj2 arthritis))
#4.	(coxarthrosis)
#5.	(gonarthrosis)
#6.	#1 OR #2 OR #3 OR #4 OR #5
#7.	(#6) IN NHSEED
#8.	(#6) IN HTA

Appendix C – Effectiveness evidence study selection

Figure 1: Flow chart of clinical study selection for the review of arthroscopic procedures



Appendix D – Effectiveness evidence

Study	Basar 2021[14]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	(n=192)
Countries and setting	Conducted in Turkey; Setting: Unclear
Line of therapy	Unclear
Duration of study	Follow up (post intervention): 6 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: radiographic examination showing OA1, 2, 3 according to K-L classification
Stratum	Knee
Subgroup analysis within study	Not applicable
Inclusion criteria	Age 40-60 years; radiographic examination showing OA1, 2, 3 according to K-L classification; MRI showing degenerative meniscal tear.
Exclusion criteria	Traumatic meniscal injury; fractures of the lower extremities <1 year earlier; knee surgery during the last year; loose bodies, ligaments, injuries, osteochondral defects and tumours (MRI); neurological or rheumatic diseases; lower limb deformity more than 5 degrees; intra-articular injection history in the past year.
Recruitment/selection of patients	Not reported
Age, gender and ethnicity	Age - Mean (SD): Group 1:48.4 (5.3), group 2: 49.3 (3.8), group 3: 50.9 (4.5), group4: 49.9 (5.0). Gender (M:F): 53M/ 93F. Ethnicity: Not reported
Further population details	
Extra comments	Severity: K-L gradesI I-III Duration: not reported
Indirectness of population	No indirectness
Interventions	(n=96) Intervention 1: Arthroscopic procedures. Arthroscopic partial meniscectomy (APM) was performed while preserving stable meniscus tissue. Participants were allowed to mobilise with full load the next day after the operation. They were discharged the day after surgery. On the first post-operative day, the home exercise programme, which lasted 6-8 weeks was started. Half of the group (n=48) received hyaluronic acid (high molecular weight) as a single injection 4 weeks after APM.. Duration 6-8 weeks. Concurrent medication/care: Not reported.. Indirectness: No indirectness

Study	Basar 2021[14]
	Comments: The two groups receiving APM and APM plus hyaluronic acid were combined together due to the class effect as agreed in the protocol. (n=96) Intervention 2: Standard care. Physical therapy (PT). As a PT agent TENS and low intensity pulsed ultrasound were applied. As exercise therpy, progressive neuromuscular and strength exercises were applied by a physiotherapist. PT agents were administered 3 sessions per week for 4 weeks, and progressive neuromuscular and strength exercises were performed for 3 sessions per week for 8 weeks. All patients performed single leg strength exercises on both the injured and uninjured sides. The patients performed concentric and eccentric exercises in both weight bearing and non weight bearing positions. Participants initially performed 2 sets of 15 repetitions, then 3 sets of 12 repetitions, then 3 sets of 8 repetitions and finally 4 sets of 6 repetitions at the end of the programme. Half of the group (n=48) also received an injection of hyaluronic acid (high molecular weight) as a single injection just before the PT started.. Duration 8 weeks. Concurrent medication/care: Not reported. Indirectness: No indirectness Comments: The two groups receiving PT and PT plus hyaluronic acid were combined together due to the class effect as agreed in the protocol.
Funding	Funding not stated

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ARTHROSCOPIC PROCEDURES versus STANDARD CARE

Protocol outcome 1: Pain reduction at ≤3- or >3- months
- Actual outcome for Knee: VAS pain at 2 months ; Group 1: mean 2.15 (SD 1.2093); n=96, Group 2: mean 1.95 (SD 1.1522); n=96; VAS 0-10 Top=High is poor outcome; Comments: APM and APM plus HAI groups were pooled. Reported APM: 2(1.2). Reported APM+HAI: 2.3(1.2). Reported PT: 1.9 (1.2). Reported PT+HAI: 2 (1.1).
Baseline values: APM: 6.6 (0.8). APM+HAI: 6.8 (0.8). PT: 6.9 (0.7). PT+HAI: 6.9 (0.7)
Number of drop-outs unclear so number randomised used for analysis.
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Blinding details: The outcome assessor (physiotherapist was blinded to interventions) but it would be the patient for this outcome.; Group 1 Number missing: 0, Reason: Unclear; Group 2 Number missing: 0, Reason: Unclear
- Actual outcome for Knee: VAS pain at 6 months ; Group 1: mean 2.25 (SD 1.3519); n=96, Group 2: mean 2.05 (SD 1.2052); n=96; VAS 0-10 Top=High is poor outcome; Comments: APM and APM plus HAI groups were pooled. Reported APM: 2.2(1.3). Reported APM+HAI: 2.3(1.4). Reported PT: 2 (1.1). Reported PT+HAI: 2.1 (1.3).
Baseline values: APM: 6.6 (0.8). APM+HAI: 6.8 (0.8). PT: 6.9 (0.7). PT+HAI: 6.9 (0.7)
Number of drop-outs unclear so number randomised used for analysis.
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Blinding details: The outcome assessor (physiotherapist was

Study	Basar 2021[14]
blinded to interventions) but it would be the patient for this outcome.; Group 1 Number missing: 0, Reason: 46 overall: 34 discontinued the study, 4 had bone fractures, 4 were operated on due to GIS pathology, 2 had MIs, 2 had cerebrovascular occlusion.; Group 2 Number missing: 0, Reason: as above	
Protocol outcomes not reported by the study	Quality of life at ≤3- or >3- months; Physical function at ≤3- or >3- months; Progression to joint replacement at ≤3- or >3- months; Osteoarthritis flare-ups at ≤3- or >3- months; Serious adverse events at ≤3- or >3- months

Study	Kalunian 2000[63]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=90)
Countries and setting	Conducted in USA; Setting: Secondary care
Line of therapy	Unclear
Duration of study	Intervention + follow up: 12 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: Either clinical or radiologically diagnosis according to the American College of Rheumatology guidelines
Stratum	Knee
Subgroup analysis within study	Not applicable
Inclusion criteria	Age >40 years; knee pain for 10 years or less; unsatisfactory pain relief as assessed by both the person and their primary physician despite at least 6 weeks of supervised physical therapy (isometric exercises and joint protection techniques) and 2 or more different NSAIDs and/or analgesics given for 3 or more weeks each (the following were waived if the person could not tolerate the pharmacological management or if they had third-party payor limitations stopping them from accessing physiotherapy); willingness to attend follow-up visits and can give written informed consent; normal or minimally abnormal radiographs (Kellgren-Lawrence grades 0-2); fulfill the ACR criteria for classification of knee osteoarthritis by clinical or radiographic means
Exclusion criteria	Back/hip or ankle/foot disease of significant severity; intra-articular corticosteroid injection into the affected knee within 1 month prior to enrollment; significantly abnormal radiographs (Kellgren-Lawrence grades 3-4); BMI >35kg/m²; sensitivity to amide anaesthetic agents; any serious medical illness that would, in the opinion of the investigators, place the person at increased risk; a recent history of substance abuse.
Recruitment/selection of patients	People enrolled at 4 university centres
Age, gender and ethnicity	Age - Mean (range): Mean intervention: 60.9 (range 41-88). Mean control: 58.3 (range 40-85).. Gender (M:F): 42:48. Ethnicity: 72 people were caucasian. 18 were not caucasian.
Further population details	
Extra comments	Duration of symptoms intervention: 30 months (range 2-120). Duration of symptoms control: 34.4 months (range 2-120). Average total radiographic score intervention: 4.00 (range 0-10). Average total radiographic score control: 4.44 (range 0-12)..

Indirectness of population	No indirectness
Interventions	(n=41) Intervention 1: Arthroscopic procedures - Lavage alone. Arthroscopic irrigation with 3000mL of normal saline.. Duration N/A - surgical procedure. Concurrent medication/care: Completed under local anaesthetic. No other information given.. Indirectness: No indirectness (n=49) Intervention 2: Sham arthroscopic procedure. Minimal irrigation arthroscopy. Same as intervention, but they only inserted 250mL of saline.. Duration N/A - surgical procedure. Concurrent medication/care: Completed under local anaesthetic. No other information given.. Indirectness: No indirectness
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: LAVAGE ALONE versus SHAM ARTHROSCOPIC PROCEDURE Protocol outcome 1: Pain reduction at ≤3- or >3- months - Actual outcome for Knee: WOMAC pain at 12 months; Group 1: mean 4.2 (SD 16.5); n=41, Group 2: mean 2.3 (SD 8.4); n=49; WOMAC pain subscale 0-20 Top=High is poor outcome; Comments: Change score is the reduction in the parameter. Standard deviation calculated from confidence intervals. Reported intervention: 4.2 (-0.9 to 9.4). Reported control: 2.3 (-0.1 to 4.7) Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Blinding details: Both groups received arthroscopy. The people performing it gave a larger amount of fluid to the intervention group than the control during irrigation. The person will have been unaware of this. The outcome assessor were independent rheumatologists.; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 2: Physical function at ≤3- or >3- months - Actual outcome for Knee: WOMAC function at 12 months; Group 1: mean 9.9 (SD 9.8); n=41, Group 2: mean 6.1 (SD 11.5); n=49; WOMAC function subscale 0-68 Top=High is poor outcome; Comments: Change score is the reduction in the parameter. Standard deviation calculated from confidence intervals. Reported intervention: 9.9 (4.9 to 13.0). Reported control: 6.1 (2.8 to 9.4) Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Blinding details: Both groups received arthroscopy. The people performing it gave a larger amount of fluid to the intervention group than the control during irrigation. The person will have been unaware of this. The outcome assessor were independent rheumatologists.; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Quality of life at ≤3- or >3- months; Progression to joint replacement at ≤3- or >3- months; Osteoarthritis flare-ups at ≤3- or >3- months; Serious adverse events at ≤3- or >3- months

Study (subsidiary papers)	Katz 2013[68] (Katz 2013[67])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=351)
Countries and setting	Conducted in USA; Setting: Secondary care
Line of therapy	Unclear
Duration of study	Intervention + follow up: 12 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: Clinically and imaging (radiography or MRI)
Stratum	Knee
Subgroup analysis within study	Not applicable
Inclusion criteria	Symptomatic people 45 years of age or older with a meniscal tear as well as osteoarthritis detected on MRI or radiography. People must have at least 1 symptom consistent with a meniscal tear that had persisted for at least 1 month despite pharmacologic treatment, physical therapy, or limitation of activity.
Exclusion criteria	Chronically locked knee (e.g. patient cannot flex or extend the knee; a clear indication for APM); Kellgren-Lawrence grade 4; inflammatory arthritis or clinically symptomatic chondrocalcinosis; injection with viscosupplementation in the past 4 weeks in the index knee; contraindication to surgery or physical therapy; bilateral symptomatic meniscal tears; prior surgery on index knee
Recruitment/selection of patients	Recruited in seven U.S. tertiary referral centres
Age, gender and ethnicity	Age - Other: Intervention: 59±7.9, control: 57.8±6.8. Gender (M:F): 143:187. Ethnicity: 85% were white. 10% were black. Around 2% were hispanic. Around 3% belonged to other ethnic groups.
Further population details	
Extra comments	Duration of osteoarthritis not stated. Symptoms had to persist beyond 1 month to be eligible for the trial. Severity based on Kellgren-Lawrence grade: Grade 0 in 70 people (24%), grade 1 in 61 people, grade 2 in 76 people, grade 3 in 84 people.
Indirectness of population	No indirectness
Interventions	(n=174) Intervention 1: Arthroscopic procedures. Arthroscopic partial meniscectomy - trim the damaged meniscus back to a stable rim. Surgeons removed loose fragments of cartilage and bone, but this did not involve penetration of the subchondral bone. This was followed by physiotherapy as per the control group.. Duration N/A - surgical

	procedure. Physiotherapy for around 6 weeks.. Concurrent medication/care: Preoperative antibiotics were used. Post-operatively weight bearing was allowed. Bracing was not used. People could receive paracetamol and NSAIDs as required. Steroid intra-articular injections were permitted over the course of the trial.. Indirectness: No indirectness (n=177) Intervention 2: Standard care. Physical therapy - Protocol based on effective land-based, indivisualised physical therapy with progressive home exercise for people with knee osteoarthritis. A three-stage structured program designed to address inflammation, range of motion, concentric and eccentric muscle strength, muscle length restrictions, aerobic conditions (eg. with the use of a bicycle, elliptical machine, or treadmill), functional mobility and proprioception, and balance. Recommended to attend physiotherapy sessions once or twice weekly and perform exercises at home. People progressed at their own pace.. Duration Around 6 weeks. Concurrent medication/care: People could receive paracetamol and NSAIDs as required. Steroid intra-articular injections were permitted over the course of the trial.. Indirectness: No indirectness
Funding	Other author(s) funded by industry (Several authors are receive grants and funding from industry (Dr Brophy receives fees from Genzyme and through his institution for Orthopaedic Research and Education Foundation; Dr Cole receives fees from Arthrex, Carticept, DJ Orthopaedics, Genzyme, Johnson and Johnson, DePuy Orthopaedics, Regentis and Zimmer, and other authors receive additional funding. The principle author is not included in this).)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ARTHROSCOPIC PROCEDURES versus STANDARD CARE

Protocol outcome 1: Quality of life at ≤3- or >3- months
- Actual outcome for Knee: SF-36 physical activity score at 12 months; Group 1: mean 25 (SD 25.9); n=156, Group 2: mean 28.1 (SD 25.9); n=164; SF-36 physical activity score 0-100 Top=High is good outcome; Comments: Baseline intervention: 44.3±23.7 (in 161 people). Baseline control: 43.3±23.3 (in 169 people). Standard deviations calculated from confidence intervals. 12 months intervention: 69.0 (64.6 to 73.4) SD = 27.8. 12 months control: 71.4 (67.0 to 75.7) SD = 27.9. Change score intervention: 25 (20.9 to 29.1). Change score control: 28.1 (24.0 to 32.1).
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 18, Reason: 9 didn't have the procedure but were analysed in the intervention group. At 6 months: 1 died, 3 had a total knee replacement operation, 7 withdrew from the study, 2 were ineligible. At 12 months: 2 had total knee replacement, 2 withdrew, 1 was lost to follow up.; Group 2 Number missing: 13, Reason: At 3 months: 1 died, 1 underwent total knee replacement, 4 withdrew, 2 were lost to follow up. 51 crossed over to the intervention arm but were analysed in intention to treat. At 12 months: 2 underwent total knee replacement, 3 withdrew, and an additional 8 crossed over. 36% switched by the end of the study but were analysed in the control group by intention to treat.

Protocol outcome 2: Pain reduction at ≤3- or >3- months
- Actual outcome for Knee: KOOS pain score at 12 months; Group 1: mean 19.1 (SD 17.7); n=156, Group 2: mean 19.3 (SD 17.5); n=164; KOOS pain score 0-100 Top=High is poor outcome; Comments: Baseline intervention: 46.0±15.5 (in 161 people). Baseline control: 47.2±16.4 (in 169 people). Standard deviations calculated from confidence intervals. 12 months intervention: 19.1 (16.4 to 21.9) - SD = 17.7. 12 months control: 19.3 (16.6 to 22.0) - SD = 17.5. Change score intervention: 26.8 (23.7 to 30.0) - SD = 20.2. Change score control: 27.3 (24.1 to 30.4) - SD 20.1.
Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 18, Reason: 9 didn't have the procedure but were analysed in the intervention group. At 6 months: 1 died, 3 had a total knee replacement operation, 7 withdrew from the study, 2 were ineligible. At 12 months: 2 had total knee replacement, 2 withdrew, 1 was lost to follow up.; Group 2 Number missing: 13, Reason: At 3 months: 1 died, 1 underwent total knee replacement, 4 withdrew, 2 were lost to follow up. 51 crossed over to the intervention arm but were analysed in intention to treat. At 12 months: 2 underwent total knee replacement, 3 withdrew, and an additional 8 crossed over. 36% switched by the end of the study but were analysed in the control group by intention to treat.

Protocol outcome 3: Physical function at ≤3- or >3- months
- Actual outcome for Knee: WOMAC physical-function subscale at 12 months; Group 1: mean 13.7 (SD 16.2); n=161, Group 2: mean 14.5 (SD 16.3); n=169; WOMAC physical function subscale 0-100 Top=High is poor outcome; Comments: Baseline intervention: 37.1 (17.9). Baseline control: 37.5 (18.3). Values reported as mean (95% CI). 12 months intervention: 13.7 (11.2 to 16.2). 12 months control: 14.5 (12.0 to 16.9).
Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 18, Reason: 9 didn't have the procedure but were analysed in the intervention group. At 6 months: 1 died, 3 had a total knee replacement operation, 7 withdrew from the study, 2 were ineligible. At 12 months: 2 had total knee replacement, 2 withdrew, 1 was lost to follow up.; Group 2 Number missing: 13, Reason: At 3 months: 1 died, 1 underwent total knee replacement, 4 withdrew, 2 were lost to follow up. 51 crossed over to the intervention arm but were analysed in intention to treat. At 12 months: 2 underwent total knee replacement, 3 withdrew, and an additional 8 crossed over. 36% switched by the end of the study but were analysed in the control group by intention to treat.

Protocol outcome 4: Progression to joint replacement at ≤3- or >3- months
- Actual outcome for Knee: People receiving total knee replacement at 12 months; Group 1: 5/161, Group 2: 3/167
Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 13, Reason: 9 didn't have the procedure but were analysed in the intervention group. At 6 months: 1 died, 3 had a total knee replacement operation, 7 withdrew from the study, 2 were ineligible. At 12 months: 2 had total knee replacement, 2 withdrew, 1 was lost to follow up.; Group 2 Number missing: 10, Reason: At 3 months: 1 died, 1 underwent total knee replacement, 4 withdrew, 2 were lost to follow up. 51 crossed over to the intervention arm but were analysed in intention to treat. At 12 months: 2 underwent total knee replacement, 3 withdrew, and an additional 8 crossed over. 36% switched by the end of the study but were analysed in the control group by intention to treat.

Protocol outcome 5: Serious adverse events at ≤3- or >3- months
- Actual outcome for Knee: Adverse events (pulmonary embolism (fatal), sudden death, hypoxemia, knee pain, and deep vein thrombosis) at 12 months; Group 1: 5/174, Group 2: 2/177; Comments: Intervention arm events: 1 pulmonary embolism (fatal), 1 hypoxaemia, 1 knee pain, 2 deep vein thrombosis. Control arm events: 1 sudden death, 1 knee pain
Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover -

Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0, Reason: 9 didn't have the procedure but were analysed in the intervention group. At 6 months: 1 died, 3 had a total knee replacement operation, 7 withdrew from the study, 2 were ineligible. At 12 months: 2 had total knee replacement, 2 withdrew, 1 was lost to follow up.; Group 2 Number missing: 0, Reason: At 3 months: 1 died, 1 underwent total knee replacement, 4 withdrew, 2 were lost to follow up. 51 crossed over to the intervention arm but were analysed in intention to treat. At 12 months: 2 underwent total knee replacement, 3 withdrew, and an additional 8 crossed over. 36% switched by the end of the study but were analysed in the control group by intention to treat.	
Protocol outcomes not reported by the study	Osteoarthritis flare-ups at ≤3- or >3- months

Study (subsidiary papers)	Kirkley 2008[70] (Marsh 2016[80])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=188)
Countries and setting	Conducted in Canada; Setting: Secondary care
Line of therapy	Unclear
Duration of study	Follow up (post intervention): 2 years
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: Assessed by any of seven orthopaedic surgeons using detailed examination and assessment of radiological findings
Stratum	Knee
Subgroup analysis within study	Not applicable
Inclusion criteria	18 years of age or older with idiopathic or secondary osteoarthritis of the knee with grade 2, 3 or 4 radiographic severity, as defined by the modified Kellgren-Lawrence classification
Exclusion criteria	Large meniscal tears ("bucket handle tears), as detected by clinical examination or by MRI scan; inflammatory or postinfectious arthritis; previous arthroscopic treatment for knee osteoarthritis; more than 5 degrees of varus or valgus deformity; previous major knee trauma; Kellgren-Lawrence grade 4 osteoarthritis in two compartments (the medial or lateral compartments of the tibiofemoral joint or the patellofemoral compartment) in persons over 60 years of age; intra-articular corticosteroid injection within the previous 3 months; a major neurologic deficit; serious medical illness (life expectancy of less than 2 years or high intraoperative risk); pregnancy; people unable to provide informed consent or comply with follow-up
Recruitment/selection of patients	Eligible people with one hospital, no additional information
Age, gender and ethnicity	Age - Mean (SD): Intervention: 58.6 (49.9), Control: 60.6 (46.8). Gender (M:F): 66:122. Ethnicity: Not stated
Further population details	
Extra comments	Duration of osteoarthritis symptoms intervention: 47.1±69.4 months. Duration of osteoarthritis symptoms control: 40.1±72.6 months. Severity: Kellgren-Lawrence grade 2 (78), grade 3 (91), grade 4 (9)
Indirectness of population	No indirectness
Interventions	(n=94) Intervention 1: Arthroscopic procedures. Arthroscopy completed under general anaeshtetic with the use of a tourniquet and a thigh holder. An orthopaedic surgeon evaluates the medial, lateral and patellofemoral joint compartment with at least 1L of

	saline, an performed one or more of the following: synovectomy (number not recorded), debridement (83 had debridement of articular cartilage), excision of degenerative meniscal tears (70 had debridement or partial resection of meniscus, 0 had repair of meniscus), excision of fragments of articular cartilage, chondral flaps and osteophytes that prevented full extension (8 had excision of osteophytes, 12 had removal of loose bodies). Abrasion or microfracture of chondral defects was not performed. People then had optimised physical and medical therapy initiated within 7 days after surgery (as per control group). Physiotherapy for at least 1 hour per week for 12 weeks with a personalised home exercise programme that emphasised range-of-motion and strengthening exercises recommended based on a person's age, severity of osteoarthritis and person specific needs. All participants recieved booklets from "the Arthritis helpbook". 88 people participated in physical therapy, with them attending for 9.3±5.1 sessions.. Duration Surgical procedure, then exercise for up to 12 weeks. Followed up for 2 years.. Concurrent medication/care: Medical treatment plans were reviewed by a surgeon. Recommended stepwise use of paracetamol, to NSAIDs, to intraarticular hyaluronic acid. They could also offer oral hyaluronic acid and glucosamine. 53 people used NSAIDs, 53 people used paracetamol, 28 people used chondroitin sulfate or glucosamine, 39 had a hyaluronic acid injection. 3 people used a brace.. Indirectness: No indirectness (n=94) Intervention 2: Standard care. People had optimised physical and medical therapy initiated within 7 days after surgery (as per intervention group). Physiotherapy for at least 1 hour per week for 12 weeks with a personalised home exercise programme that emphasised range-of-motion and strengthening exercises recommended based on a person's age, severity of osteoarthritis and person specific needs. All participants recieved booklets from "the Arthritis helpbook". 77 people participated in physical therapy, with them attending for 8.0±5.7 sessions.. Duration Exercise for 12 weeks. Followed up for 24 months.. Concurrent medication/care: Medical treatment plans were reviewed by a surgeon. Recommended stepwise use of paracetamol, to NSAIDs, to intraarticular hyaluronic acid. They could also offer oral hyaluronic acid and glucosamine. 48 people used NSAIDs, 43 people used paracetamol, 25 people used chondroitin sulfate or glucosamine, 33 had a hyaluronic acid injection. 5 people used a brace.. Indirectness: No indirectness
Funding	Academic or government funding (Supported by the Canadian Institute of Health Research)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ARTHROSCOPIC PROCEDURES versus STANDARD CARE	

Protocol outcome 1: Quality of life at ≤3- or >3- months
- Actual outcome for Knee: SF-36 Physical component summary at 24 months; Group 1: mean 37 (SD 11.4); n=88, Group 2: mean 37.2 (SD 10.6); n=80; SF-36 Physical component 0-100 Top=High is good outcome; Comments: 24 months surgery: 37.0±11.4; 24 months control: 37.2±10.6; Baseline surgery: 33.8±7.6 (36.7), baseline control: 33.9±8.6 (40.1)
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: The control group had on average lower weight (by around 7kg), BMI (by 1 .4, however, to the point that they are almost underneath the threshold for being classified as obese), shorter duration of osteoarthritis symptoms (by 7 months), and better baseline values for WOMAC.; Group 1 Number missing: 6, Reason: By 24 months: 2 withdrew consent before the procedure was performed, 6 declined surgery and were followed up in the intervention arm (with 1 being lost to follow up), 3 withdrew after the procedure was performed: 1 was lost to follow up, 1 withdrew consent for the study, and 1 died (reason not given). By 12 months, there were 88 participants analysed in the intervention arm.; Group 2 Number missing: 14, Reason: By 24 months: 8 people withdrew consent after randomisation. There were no cross overs. 6 people were lost to follow up. By 12 months, there were 80 participants analysed in the control arm
- Actual outcome for Knee: SF-36 Physical component summary at 3 months; Group 1: mean 38.7 (SD 9); n=90, Group 2: mean 37.7 (SD 10.2); n=80; SF-36 Physical component 0-100 Top=High is good outcome; Comments: 3 months surgery: 38.7±9.0; 3 months control: 37.7±10.2; Baseline surgery: 33.8±7.6 (36.7), baseline control: 33.9±8.6 (40.1)
Risk of bias: All domain - Very high, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: The control group had on average lower weight (by around 7kg), BMI (by 1 .4, however, to the point that they are almost underneath the threshold for being classified as obese), shorter duration of osteoarthritis symptoms (by 7 months), and better baseline values for WOMAC.; Group 1 Number missing: 4, Reason: By 24 months: 2 withdrew consent before the procedure was performed, 6 declined surgery and were followed up in the intervention arm (with 1 being lost to follow up), 3 withdrew after the procedure was performed: 1 was lost to follow up, 1 withdrew consent for the study, and 1 died (reason not given). By 3 months, there were 90 participants analysed in the intervention arm.; Group 2 Number missing: 14, Reason: By 24 months: 8 people withdrew consent after randomisation. There were no cross overs. 6 people were lost to follow up. By 3 months, there were 80 participants analysed in the control arm

Protocol outcome 2: Pain reduction at ≤3- or >3- months
- Actual outcome for Knee: WOMAC pain subscale at 3 months; Group 1: mean 141 (SD 109); n=90, Group 2: mean 172 (SD 124); n=80; WOMAC pain subscale 0-500 Top=High is poor outcome; Comments: 3 months surgery: 141±109; 3 months control: 172±124; Baseline surgery: 239±105 (507), baseline control: 214±122 (569)
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: The control group had on average lower weight (by around 7kg), BMI (by 1 .4, however, to the point that they are almost underneath the threshold for being classified as obese), shorter duration of osteoarthritis symptoms (by 7 months), and better baseline values for WOMAC.; Group 1 Number missing: 4, Reason: By 24 months: 2 withdrew consent before the procedure was performed, 6 declined surgery and were followed up in the intervention arm (with 1 being lost to follow up), 3 withdrew after the procedure was performed: 1 was lost to follow up, 1 withdrew consent for the study, and 1 died (reason not given). By 3 months, there were 90 participants analysed in the intervention arm.; Group 2 Number missing: 14, Reason: By 24 months: 8 people withdrew consent after randomisation. There were no cross overs. 6 people were lost to follow up. By 3 months, there were 80 participants analysed in the control arm
- Actual outcome for Knee: WOMAC pain subscale at 24 months; Group 1: mean 168 (SD 134); n=88, Group 2: mean 185 (SD 132); n=80; WOMAC pain subscale 0-500 Top=High is poor outcome; Comments: 24 months surgery: 168±134; 24 months control: 185±132; Baseline surgery: 239±105 (507), baseline

control: 214±122 (569) 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 ; Baseline details: The control group had on average lower weight (by around 7kg), BMI (by 1 .4, however, to the point that they are almost underneath the threshold for being classified as obese), shorter duration of osteoarthritis symptoms (by 7 months), and better baseline values for WOMAC.; Group 1 Number missing: 6, Reason: By 24 months: 2 withdrew consent before the procedure was performed, 6 declined surgery and were followed up in the intervention arm (with 1 being lost to follow up), 3 withdrew after the procedure was performed: 1 was lost to follow up, 1 withdrew consent for the study, and 1 died (reason not given). By 12 months, there were 88 participants analysed in the intervention arm.; Group 2 Number missing: 14, Reason: By 24 months: 8 people withdrew consent after randomisation. There were no cross overs. 6 people were lost to follow up. By 12 months, there were 80 participants analysed in the control arm Protocol outcome 3: Physical function at ≤3- or >3- months - Actual outcome for Knee: WOMAC physical function subscale at 24 months; Group 1: mean 612 (SD 448); n=88, Group 2: mean 623 (SD 439); n=80; 0-1700 WOMAC physical function subscale Top=High is poor outcome; Comments: Baseline arthroscopic procedure: 830 (355). Baseline standard care: 726 (397). 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 ; Baseline details: The control group had on average lower weight (by around 7kg), BMI (by 1 .4, however, to the point that they are almost underneath the threshold for being classified as obese), shorter duration of osteoarthritis symptoms (by 7 months), and better baseline values for WOMAC.; Group 1 Number missing: 6, Reason: By 24 months: 2 withdrew consent before the procedure was performed, 6 declined surgery and were followed up in the intervention arm (with 1 being lost to follow up), 3 withdrew after the procedure was performed: 1 was lost to follow up, 1 withdrew consent for the study, and 1 died (reason not given). By 12 months, there were 88 participants analysed in the intervention arm.; Group 2 Number missing: 14, Reason: By 24 months: 8 people withdrew consent after randomisation. There were no cross overs. 6 people were lost to follow up. By 12 months, there were 80 participants analysed in the control arm - Actual outcome for Knee: WOMAC physical function subscale at 3 months; Group 1: mean 522 (SD 341); n=90, Group 2: mean 568 (SD 369); n=80; WOMAC physical function subscale 0-1700 Top=High is poor outcome; Comments: Baseline arthroscopic procedure: 830 (355). Baseline standard care: 726 (397). Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: The control group had on average lower weight (by around 7kg), BMI (by 1 .4, however, to the point that they are almost underneath the threshold for being classified as obese), shorter duration of osteoarthritis symptoms (by 7 months), and better baseline values for WOMAC.; Group 1 Number missing: 4, Reason: By 24 months: 2 withdrew consent before the procedure was performed, 6 declined surgery and were followed up in the intervention arm (with 1 being lost to follow up), 3 withdrew after the procedure was performed: 1 was lost to follow up, 1 withdrew consent for the study, and 1 died (reason not given). By 3 months, there were 90 participants analysed in the intervention arm.; Group 2 Number missing: 14, Reason: By 24 months: 8 people withdrew consent after randomisation. There were no cross overs. 6 people were lost to follow up. By 3 months, there were 80 participants analysed in the control arm	
Protocol outcomes not reported by the study	Progression to joint replacement at ≤3- or >3- months; Osteoarthritis flare-ups at ≤3- or >3- months; Serious adverse events at ≤3- or >3- months

Study (subsidiary papers)	Moseley 2002[87] (Bailey 2002[11], Mohtadi 2003[84])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=180)
Countries and setting	Conducted in USA; Setting: Secondary care
Line of therapy	Unclear
Duration of study	Intervention + follow up: 2 years
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: Clinically by the American College of Rheumatology criteria, followed by radiographically
Stratum	Knee
Subgroup analysis within study	Not applicable
Inclusion criteria	People with osteoarthritis of the knee as defined by the American College of Rheumatology, reporting at least moderate knee pain (visual analogue scale ≥4) despite maximal medical treatment for ≥6 months.
Exclusion criteria	>75 years, no arthroscopy in the past 2 years, a severity grade of 9 or higher (based on radiographic scoring), severe deformity, serious medical problems
Recruitment/selection of patients	Consecutive patients from the Houston Veterans Affairs Medical Centre
Age, gender and ethnicity	Age - Mean (SD): Mean placebo: 52.0 (43.0), Mean lavage: 51.2 (41.0), Mean debridement: 53.6 (41.4). Gender (M:F): 167:13. Ethnicity: Not stated
Further population details	
Extra comments	Severity of osteoarthritis in the knee: mild = 52, moderate = 83, severe = 45. Duration of osteoarthritis not explicitly stated (had to be on maximal medical treatment for at least 6 months).. Follow up to the pilot study by Moseley - recruitment started after that study had finished therefore reported as two distinct studies.
Indirectness of population	No indirectness
Interventions	(n=59) Intervention 1: Arthroscopic procedures. Arthroscopic debridement - They also received: a minimum of 10L saline lavage; removal of loose debris and torn or degenerative meniscal fragments, and correction of any other soft tissue abnormalities. There were no abrasion arthroscopy or removal of spurs performed (however, if a spur from the tibial spine area blocked full extension it was shaved smooth). . Duration N/A - surgical procedure. Concurrent medication/care: Anaesthesia was

	achieved through general anaesthetic (by a "standard" anaesthetic) and people were intubated with endotracheal tubes. All people were extubated in the operating room before going to the recovery room (to maintain blinding of recovery health care professionals). . Indirectness: No indirectness (n=61) Intervention 2: Arthroscopic procedures - Lavage alone. Arthroscopic lavage - They received 10L of saline. No other arthroscopic techniques were performed (unless there were mechanically important, unstable tears in the meniscus, where the torn portion would be removed and the remaining meniscus smoothed).. Duration N/A - surgical procedure. Concurrent medication/care: Anaesthesia was achieved through general anaesthetic (by a "standard" anaesthetic) and people were intubated with endotracheal tubes. All people were extubated in the operating room before going to the recovery room (to maintain blinding of recovery health care professionals).. Indirectness: No indirectness (n=60) Intervention 3: Sham arthroscopic procedure. The knee was prepped as per standard arthroscopy. Three 1cm incisions were made with a scalpel but no instruments inserted. The knee was manipulated, instruments were requested and passed, saline was splashed and a standard debridement was stimulated.. Duration N/A - surgical procedure. Concurrent medication/care: People received a short-acting intravenous tranquilizer and an opioid and spontaneously breathed oxygen-enriched air.. Indirectness: No indirectness
Funding	Funding not stated

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ARTHROSCOPIC PROCEDURES versus LAVAGE ALONE

Protocol outcome 1: Quality of life at ≤3- or >3- months
- Actual outcome for Knee: Pain subscale of SF-36 at 3 months; Group 1: mean 46.8 (SD 21.9); n=58, Group 2: mean 47.1 (SD 21.1); n=59; SF-36 pain subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 38.9±19.3 (in 59 people). Baseline lavage alone: 37.4±15.9 (in 61 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 1, Reason: Reason not given; Group 2 Number missing: 2, Reason: Reason not given
- Actual outcome for Knee: Pain subscale of SF-36 at 2 years; Group 1: mean 45 (SD 23); n=52, Group 2: mean 44.4 (SD 22.4); n=57; SF-36 pain subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 38.9±19.3 (in 59 people). Baseline lavage alone: 37.4±15.9 (in 61 people).

Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 7, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given
- Actual outcome for Knee: Physical-functioning subscale of SF-36 at 3 months; Group 1: mean 49.6 (SD 24.2); n=58, Group 2: mean 52.9 (SD 27.6); n=59; SF-36 physical functioning subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 42.2±22.4 (in 59 people). Baseline lavage alone: 44.4±22.8 (in 61 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 1, Reason: Reason not given; Group 2 Number missing: 2, Reason: Reason not given
- Actual outcome for Knee: Physical-functioning subscale of SF-36 at 2 years; Group 1: mean 47.9 (SD 26.6); n=52, Group 2: mean 50.9 (SD 27.3); n=57; SF-36 physical functioning subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 42.2±22.4 (in 59 people). Baseline lavage alone: 44.4±22.8 (in 61 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 7, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given

Protocol outcome 2: Pain reduction at ≤3- or >3- months
- Actual outcome for Knee: AIMS pain subscale at 3 months; Group 1: mean 59.9 (SD 21.7); n=58, Group 2: mean 53.7 (SD 23.1); n=59; AIMS pain subscale 0-100 Top=High is poor outcome; Comments: Baseline debridement: 59.3 (22.2). Baseline lavage: 59.3 (16.7). Baseline placebo: 59.5 (18.5).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 1, Reason: Reason not given; Group 2 Number missing: 2, Reason: Reason not given
- Actual outcome for Knee: AIMS pain subscale at 2 years; Group 1: mean 54 (SD 23.3); n=53, Group 2: mean 56.7 (SD 24.1); n=56; AIMS pain subscale 0-100 Top=High is poor outcome; Comments: Baseline debridement: 59.3 (22.2). Baseline lavage: 59.3 (16.7). Baseline placebo: 59.5 (18.5).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 7, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ARTHROSCOPIC PROCEDURES versus SHAM ARTHROSCOPIC PROCEDURE

Protocol outcome 1: Quality of life at ≤3- or >3- months
- Actual outcome for Knee: Pain subscale of SF-36 at 3 months; Group 1: mean 46.8 (SD 21.9); n=58, Group 2: mean 46.9 (SD 24.9); n=56; SF-36 pain subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 38.9±19.3 (in 59 people). Baseline sham arthroscopic procedure: 37.8±17.6 (in 60 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 1, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given

- Actual outcome for Knee: Pain subscale of SF-36 at 2 years; Group 1: mean 45 (SD 23); n=52, Group 2: mean 42.3 (SD 24.2); n=55; SF-36 pain subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 38.9±19.3 (in 59 people). Baseline sham arthroscopic procedure: 37.8±17.6 (in 60 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 7, Reason: Reason not given; Group 2 Number missing: 5, Reason: Reason not given
- Actual outcome for Knee: Physical-functioning subscale of SF-36 at 3 months; Group 1: mean 49.6 (SD 24.2); n=58, Group 2: mean 52.4 (SD 23.5); n=56; SF-36 physical function subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 42.2±22.4 (in 59 people). Baseline sham arthroscopic procedure: 46.8±22.5 (in 60 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 1, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given
- Actual outcome for Knee: Physical-functioning subscale of SF-36 at 2 years; Group 1: mean 47.9 (SD 26.6); n=52, Group 2: mean 49 (SD 27.2); n=54; SF-36 physical function subscale 0-100 Top=High is good outcome; Comments: Baseline arthroscopic procedures: 42.2±22.4 (in 59 people). Baseline sham arthroscopic procedure: 46.8±22.5 (in 60 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 7, Reason: Reason not given; Group 2 Number missing: 5, Reason: Reason not given

Protocol outcome 2: Pain reduction at ≤3- or >3- months
- Actual outcome for Knee: AIMS pain subscale at 3 months; Group 1: mean 49.9 (SD 21.7); n=58, Group 2: mean 50.1 (SD 20.7); n=56; AIMS pain subscale 0-100 Top=High is poor outcome; Comments: Baseline debridement: 59.3 (22.2). Baseline lavage: 59.3 (16.7). Baseline placebo: 59.5 (18.5).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 1, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given
- Actual outcome for Knee: AIMS pain subscale at 2 years; Group 1: mean 54 (SD 23.3); n=53, Group 2: mean 52.5 (SD 25.1); n=55; AIMS pain subscale 0-100 Top=High is poor outcome; Comments: Baseline debridement: 59.3 (22.2). Baseline lavage: 59.3 (16.7). Baseline placebo: 59.5 (18.5).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 7, Reason: Reason not given; Group 2 Number missing: 5, Reason: Reason not given

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: LAVAGE ALONE versus SHAM ARTHROSCOPIC PROCEDURE

Protocol outcome 1: Quality of life at ≤3- or >3- months
- Actual outcome for Knee: Pain subscale of SF-36 at 3 months; Group 1: mean 47.1 (SD 21.1); n=59, Group 2: mean 46.9 (SD 24.9); n=56; SF-36 pain subscale 0-100 Top=High is good outcome; Comments: Baseline lavage alone: 37.4±15.9 (in 61 people). Baseline sham arthroscopic procedure: 37.8±17.6 (in 60 people).
Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low,

Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 2, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given - Actual outcome for Knee: Pain subscale of SF-36 at 2 years; Group 1: mean 44.4 (SD 22.4); n=57, Group 2: mean 42.3 (SD 24.2); n=55; SF-36 pain subscale 0-100 Top=High is good outcome; Comments: Baseline lavage alone: 37.4±15.9 (in 61 people). Baseline sham arthroscopic procedure: 37.8±17.6 (in 60 people). Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low, Comments - ; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 4, Reason: Reason not given; Group 2 Number missing: 5, Reason: Reason not given - Actual outcome for Knee: Physical-functioning subscale of SF-36 at 3 months; Group 1: mean 52.9 (SD 27.6); n=59, Group 2: mean 52.4 (SD 23.5); n=56; SF-36 physical function subscale 0-100 Top=High is good outcome; Comments: Baseline lavage alone: 44.4±22.8 (in 61 people). Baseline sham arthroscopic procedure: 46.8±22.5 (in 60 people). Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 2, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given - Actual outcome for Knee: Physical-functioning subscale of SF-36 at 2 years; Group 1: mean 50.9 (SD 27.3); n=57, Group 2: mean 49 (SD 27.2); n=54; SF-36 physical function subscale 0-100 Top=High is good outcome; Comments: Baseline lavage alone: 44.4±22.8 (in 61 people). Baseline sham arthroscopic procedure: 46.8±22.5 (in 60 people). Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low, Comments - ; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 4, Reason: Reason not given; Group 2 Number missing: 5, Reason: Reason not given Protocol outcome 2: Pain reduction at ≤3- or >3- months - Actual outcome for Knee: AIMS pain subscale at 3 months; Group 1: mean 53.7 (SD 23.1); n=59, Group 2: mean 50.1 (SD 20.7); n=57; AIMS pain subscale 0-100 Top=High is poor outcome; Comments: Baseline debridement: 59.3 (22.2). Baseline lavage: 59.3 (16.7). Baseline placebo: 59.5 (18.5). Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 2, Reason: Reason not given; Group 2 Number missing: 4, Reason: Reason not given - Actual outcome for Knee: AIMS pain subscale at 2 years; Group 1: mean 56.7 (SD 24.1); n=56, Group 2: mean 52.5 (SD 25.1); n=55; AIMS pain subscale 0-100 Top=High is poor outcome; Comments: Baseline debridement: 59.3 (22.2). Baseline lavage: 59.3 (16.7). Baseline placebo: 59.5 (18.5). Risk of bias: All domain - Very high, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - High, Measurement - Low, Crossover - Low, Subgroups - Low, Comments - ; Indirectness of outcome: No indirectness ; Baseline details: People in the debridement group use significantly less analgesia than placebo. Otherwise similar.; Group 1 Number missing: 4, Reason: Reason not given; Group 2 Number missing: 5, Reason: Reason not given	
Protocol outcomes not reported by the study	Physical function at ≤3- or >3- months; Progression to joint replacement at ≤3- or >3- months; Osteoarthritis flare-ups at ≤3- or >3- months; Serious adverse events at ≤3- or >3- months

Study	Stegenga 1993[118]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=28)
Countries and setting	Conducted in Netherlands; Setting: Secondary care
Line of therapy	Unclear
Duration of study	Intervention + follow up: 6 months, 2 weeks
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: People received a thorough clinical and radiographic examination (orthopantomogram and transpharyngeal and transcranial radiographs)
Stratum	Other
Subgroup analysis within study	Not applicable
Inclusion criteria	Presence of preauriciular pain, perceived restriction of mandibular movement of sudden onset, restriction of horizontal excursion towards the opposite site of ≤8mm and age 16-45 years.
Exclusion criteria	People with a history of condylar fracture, occlusal equilibration therapy, TMJ surgery or patients who were treated during the preceeding 6 months in any activate way; presence of TMJ growth disturbances; infectious arthritis; crystal-induced arthropathies; polyarticular musculoskeletal disorders; regional nonarticular disorders; other medical conditions that could impact on the person's general health; to be sure that psychological factors did not play a dominant role in their complaints, people were also excluded when they scored above average or higher in comparison with normative scores on the following Symptom Checklist scales (depression, anxiety or somatic symptoms, psychoneuroticism); people with obvious occlusal disturbances, such as cross-bite, open bite, insufficient molar support, or with partial or full dentures; factors that would interfere with a proper follow-up, such as inability to keep the appointments or having plans to move within 6/12.
Recruitment/selection of patients	People referred by their dentist or physician to the TMJ and orofacial pain clinic of the department of oral and maxillofacial surgery, University Hospital Groningen
Age, gender and ethnicity	Age - Mean (SD): 23.7 (6.7). Gender (M:F): 2:19. Ethnicity: Not stated
Further population details	
Extra comments	Duration of symptoms not stated. Severity not explicitly stated, but fulfilling the inclusion criteria requires a firm clinical diagnosis.
Indirectness of population	No indirectness

Interventions	(n=9) Intervention 1: Arthroscopic procedures. Initial therapy (completed in both arms): Education about the condition, instruction to reduce mandibular function voluntarily by avoiding opening wide, clenching and chewing excessively and removing abusive habits. Diet modification to softer food. A hinge movement exercise was instructed to improvement movement coordination and incorporate stable jaw movements into functional movement patterns. Arthroscopy: performed under general anaesthetic with nasoendotracheal intubation. Saline was used for irrigation and distention. Used a double or triple superior posterolateral and anterolateral puncture technique. A system examination was performed followed by any of the following: capsular release, lysis or resection of adhesions, coagulation of hypervascular tissues and retrodiscal tissues, and mobilisation of the disc. Physiotherapy from the first postoperative day (as per the control group except from the addition of ice massage and exercises immediately postoperatively for this cohort).. Duration 9 weeks. Concurrent medication/care: Given corticosteroids (dexamethasone 0.5mg/kg) and an antibiotic operatively. Indirectness: No indirectness (n=12) Intervention 2: Standard care. Initial therapy (completed in both arms): Education about the condition, instruction to reduce mandibular function voluntarily by avoiding opening wide, clenching and chewing excessively and removing abusive habits. Diet modification to softer food. A hinge movement exercise was instructed to improvement movement coordination and incorporate stable jaw movements into functional movement patterns. Physiotherapy: 6 sessions of 30 minutes duration. Includes: ultrassound therapy (3 mins of 10ms alternating pulses of 2ms duration), manual techniques and active range of motion exercises. This supported by a home programme of active stretching exercises (active opening movement and lateral excursions, aided by conical rubber plugs).. Duration 9 weeks. Concurrent medication/care: None mentioned. Indirectness: No indirectness
Funding	Funding not stated

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: ARTHROSCOPIC PROCEDURES versus STANDARD CARE

Protocol outcome 1: Quality of life at ≤3- or >3- months
- Actual outcome for Other: Combined West Haven-Yale Multidimensional Pain Inventory and General Health Questionnaire Score at 9 weeks; Group 1: mean 0.11 (SD 0.03); n=8, Group 2: mean 0.11 (SD 0.03); n=11; Combined West Haven-Yale Multidimensional Pain Inventory and General Health Questionnaire Score combined 0-1 Top=High is poor outcome; Comments: Baseline intervention: 0.16 (0.07). Baseline control: 0.14 (0.06).. Questionnaire scores combined

and standardised to range 0-1.
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - High, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.; Group 2 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.
- Actual outcome for Other: Combined West Haven-Yale Multidimensional Pain Inventory and General Health Questionnaire Score at 6 months; Group 1: mean 0.11 (SD 0.07); n=8, Group 2: mean 0.14 (SD 0.06); n=11; Combined West Haven-Yale Multidimensional Pain Inventory and General Health Questionnaire Score combined 0-1 Top=High is poor outcome; Comments: Baseline intervention: 0.16 (0.07). Baseline control: 0.14 (0.06).. Questionnaire scores combined and standardised to range 0-1.
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - High, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.; Group 2 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.

Protocol outcome 2: Pain reduction at ≤3- or >3- months
- Actual outcome for Other: Pain (mm Visual Analogue Scale) at 9 weeks; Group 1: mean 23 (SD 25); n=8, Group 2: mean 18 (SD 23); n=11; mm Visual Analogue Scale 0-100 Top=High is poor outcome; Comments: Baseline intervention: 34 (17). Baseline control: 56 (21).
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: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.; Group 2 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.
- Actual outcome for Other: Pain (mm Visual Analogue Scale) at 6 months; Group 1: mean 9 (SD 14); n=8, Group 2: mean 11 (SD 15); n=11; mm Visual Analogue Scale 0-100 Top=High is poor outcome; Comments: Baseline intervention: 34 (17). Baseline control: 56 (21).
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: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.; Group 2 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.

Protocol outcome 3: Physical function at ≤3- or >3- months
- Actual outcome for Other: Mandibular function impairment questionaire total score at 9 weeks; Group 1: mean 0.25 (SD 0.16); n=8, Group 2: mean 0.25 (SD 0.17); n=11; Mandibular function impairment questionnaire 0-1 Top=High is poor outcome; Comments: Baseline intervention: 0.40 (0.10). Baseline control: 0.47 (0.18). Questionnaire standardised to range 0-1.
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: 1, Reason: 7 people across both groups were

excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.; Group 2 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance. - Actual outcome for Other: Mandibular function impairment questionaire total score at 6 months; Group 1: mean 0.12 (SD 0.12); n=8, Group 2: mean 0.12 (SD 0.14); n=11; Mandibular function impairment questionnaire 0-1 Top=High is poor outcome; Comments: Baseline intervention: 0.40 (0.10). Baseline control: 0.47 (0.18). Questionnaire standardised to range 0-1. 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: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.; Group 2 Number missing: 1, Reason: 7 people across both groups were excluded after randomisation as their symptoms improved in the initial phase - the groups they belonged to were not reported. 1 dropped out for non-compliance.	
Protocol outcomes not reported by the study	Progression to joint replacement at ≤3- or >3- months; Osteoarthritis flare-ups at ≤3- or >3- months; Serious adverse events at ≤3- or >3- months

Appendix E – Forest plots

E.1 Knee

E.1.1 Arthroscopic procedures compared to lavage alone

Figure 2: Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months

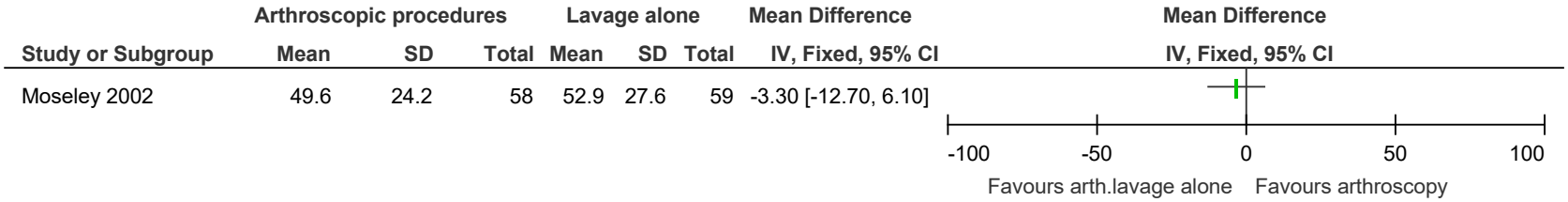


Figure 3: Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months

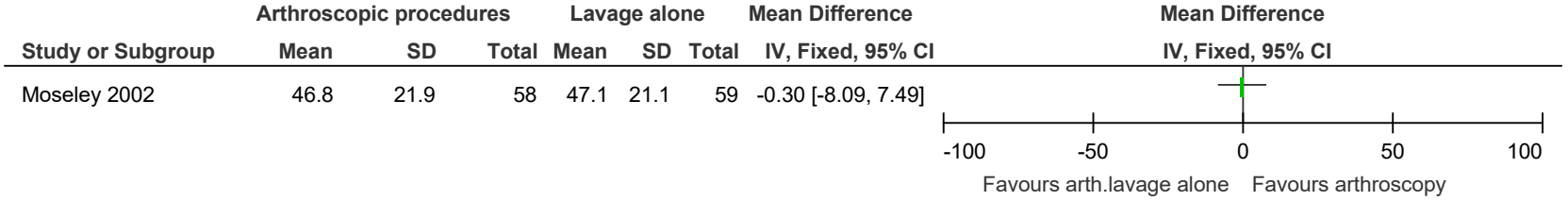


Figure 4: Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months

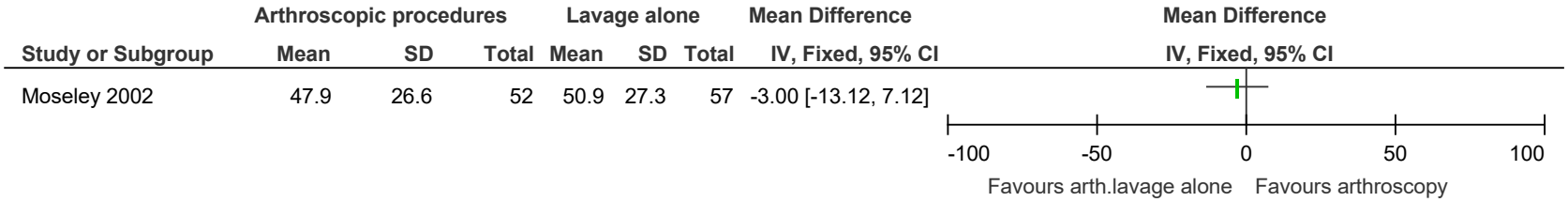


Figure 5: Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months

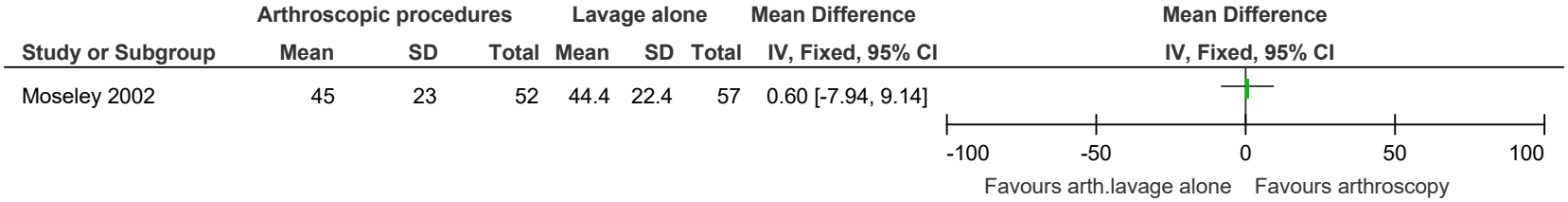


Figure 6: Pain (AIMS pain subscale, 0-100, high is poor) at ≤3 months

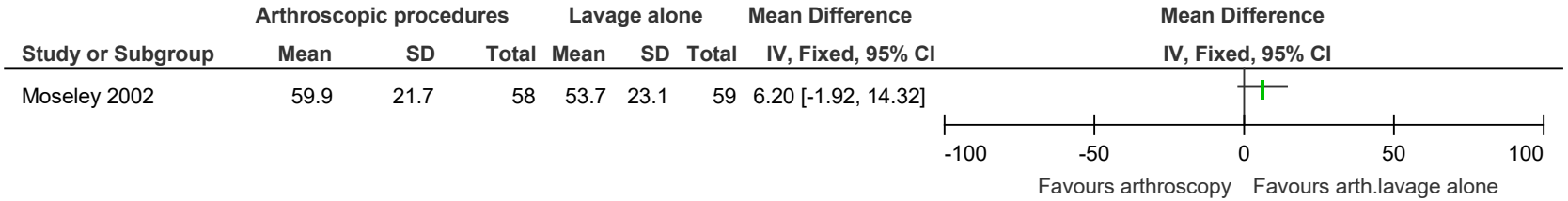
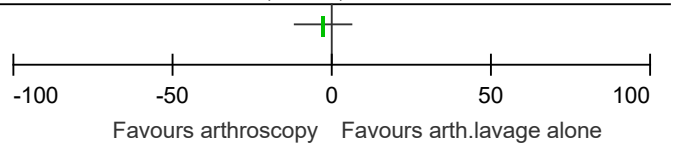


Figure 7: Pain (AIMS pain subscale, 0-100, high is poor) at >3 months

	Arthroscopic procedures			Lavage alone			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Moseley 2002	54	23.3	53	56.7	24.1	56	-2.70 [-11.60, 6.20]	



E.1.2 Arthroscopic procedures compared to standard care

Figure 8: Quality of life (SF-36 physical component, 0-100, final value, high is good) at ≤3 months

	Arthroscopic procedures			Standard care			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Kirkley 2008	38.7	9	90	37.7	10.2	80	1.00 [-1.91, 3.91]	

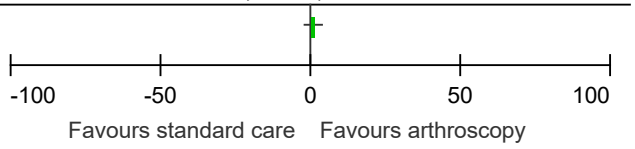


Figure 9: Quality of life (SF-36 physical component, 0-100, final value, high is good) at >3 months

	Arthroscopic procedures			Standard care			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Kirkley 2008	37	11.4	88	37.2	10.6	80	-0.20 [-3.53, 3.13]	

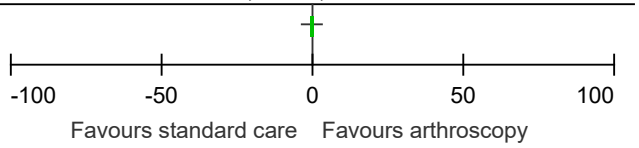


Figure 10: Quality of life (SF-36 physical activity score, 0-100, final values, high is good) at >3 months

Study or Subgroup	Arthroscopic procedures Mean	SD	Total	Standard care Mean	SD	Total	Mean Difference IV, Fixed, 95% CI
Katz 2013	25	25.9	156	28.1	25.9	164	-3.10 [-8.78, 2.58]

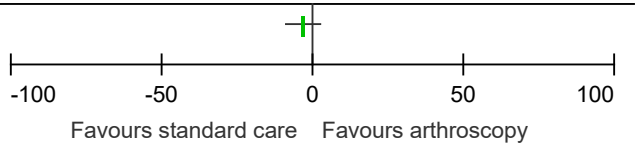


Figure 11: Pain (WOMAC pain, VAS [different scale ranges], final values, high is poor) at <3 months

Study or Subgroup	Arthroscopic procedures Mean	SD	Total	Standard care Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Basar 2021	2.15	1.2093	48	1.95	1.1522	48	45.2%	0.17 [-0.23, 0.57]
Kirkley 2008	141	109	90	172	124	80	54.8%	-0.27 [-0.57, 0.04]
Total (95% CI)			**138**			**128**	**100.0%**	**-0.07 [-0.49, 0.35]**

Heterogeneity: Tau² = 0.06; Chi² = 2.86, df = 1 (P = 0.09); I² = 65%

Test for overall effect: Z = 0.32 (P = 0.75)

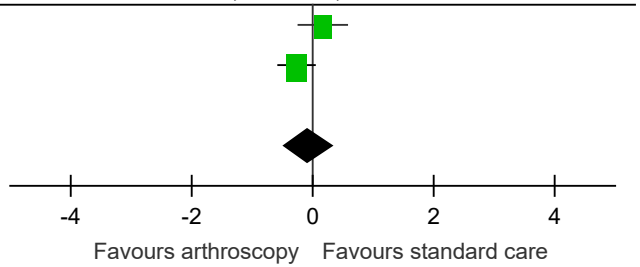


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Figure 12: Pain (KOOS, WOMAC, VAS [different scale ranges], final values, high is poor) at >3 months

Study or Subgroup	Arthroscopic procedures Mean	SD	Total	Standard care Mean	SD	Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Basar 2021	2.25	1.3519	48	2.05	1.2052	48	15.3%	0.15 [-0.25, 0.56]
Katz 2013	19.1	17.7	156	19.3	17.5	164	51.1%	-0.01 [-0.23, 0.21]
Kirkley 2008	168	134	88	185	80	132	33.6%	-0.16 [-0.43, 0.11]
Total (95% CI)			**292**			**344**	**100.0%**	**-0.04 [-0.19, 0.12]**

Heterogeneity: Chi² = 1.75, df = 2 (P = 0.42); I² = 0%

Test for overall effect: Z = 0.46 (P = 0.65)

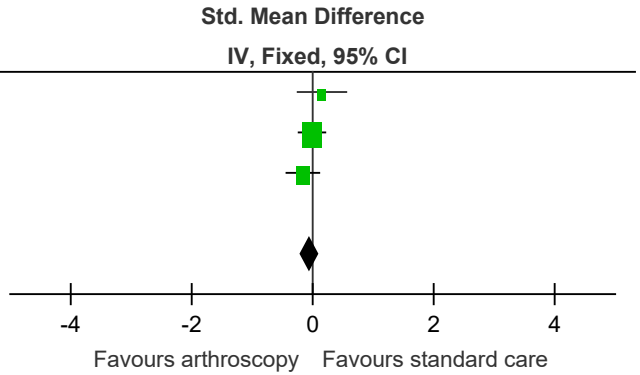


Figure 13: Physical function (WOMAC, 0-1700, final values, high is poor) at ≤3 months

Study or Subgroup	Arthroscopic procedures Mean	SD	Total	Standard care Mean	SD	Total	Mean Difference IV, Fixed, 95% CI
Kirkley 2008	522	341	90	568	369	80	-46.00 [-153.24, 61.24]

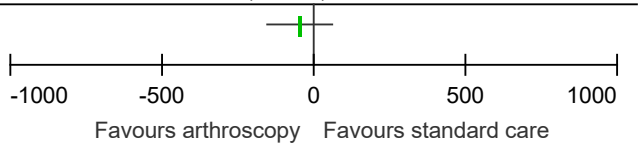


Figure 14: Physical function (WOMAC [different scale ranges], final values, high is poor) at >3 months

	Arthroscopic procedures			Standard care				Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI
Katz 2013	13.7	16.2	161	14.5	16.3	169	66.3%	-0.05 [-0.26, 0.17]
Kirkley 2008	612	448	88	623	439	80	33.7%	-0.02 [-0.33, 0.28]
Total (95% CI)			**249**			**249**	**100.0%**	**-0.04 [-0.22, 0.13]**

Heterogeneity: Chi² = 0.02, df = 1 (P = 0.90); I² = 0%

Test for overall effect: Z = 0.46 (P = 0.65)

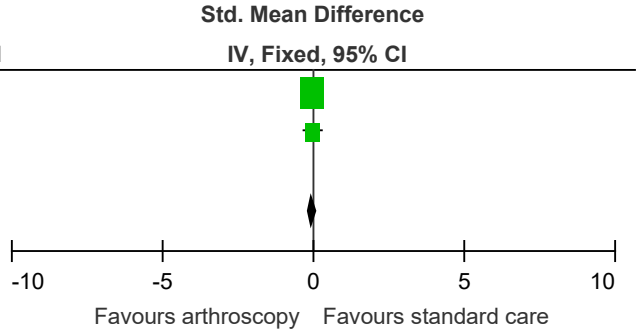


Figure 15: Progression to joint replacement at >3 months

	Arthroscopic procedures		Standard care		Risk Ratio
Study or Subgroup	Events	Total	Events	Total	M-H, Fixed, 95% CI
Katz 2013	5	161	3	167	1.73 [0.42, 7.12]

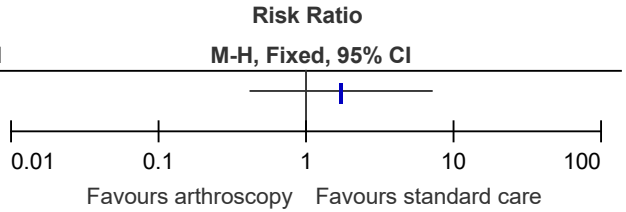
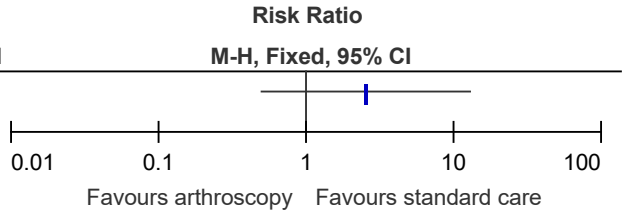


Figure 16: Serious adverse events at >3 months

	Arthroscopic procedures		Standard care		Risk Ratio
Study or Subgroup	Events	Total	Events	Total	M-H, Fixed, 95% CI
Katz 2013	5	174	2	177	2.54 [0.50, 12.93]



Note: Katz: Adverse events arthroscopic procedures: 1 pulmonary embolism (fatal), 1 hypoxaemia, 1 knee pain, 2 deep vein thrombosis. Adverse events standard care: 1 sudden death, 1 knee pain

E.1.3 Arthroscopic procedures compared to sham arthroscopic procedures

Figure 17: Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months

	Arthroscopic procedures			Sham arthroscopy			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Moseley 2002	49.6	24.2	58	52.4	23.5	56	-2.80 [-11.56, 5.96]	

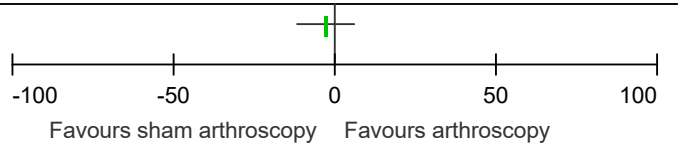


Figure 18: Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months

	Arthroscopic procedures			Sham arthroscopy			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Moseley 2002	46.8	21.9	58	46.9	24.9	56	-0.10 [-8.72, 8.52]	

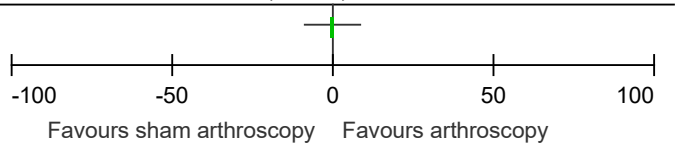


Figure 19: Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months

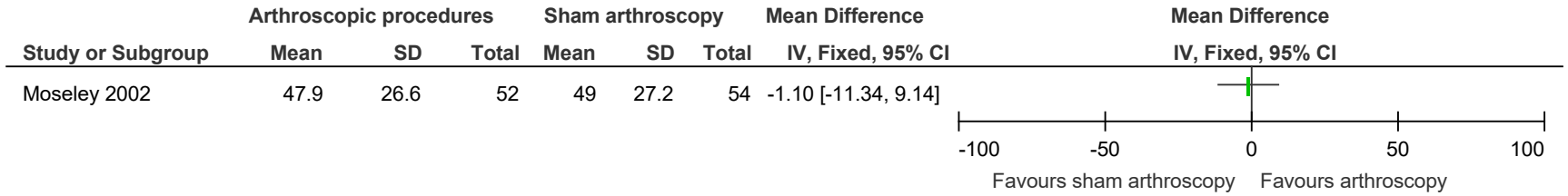


Figure 20: Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months

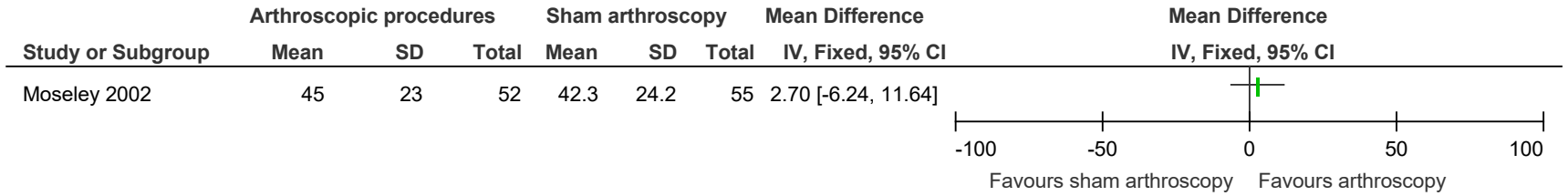


Figure 21: Pain (AIMS pain subscale, 0-100, high is poor) at ≤3 months

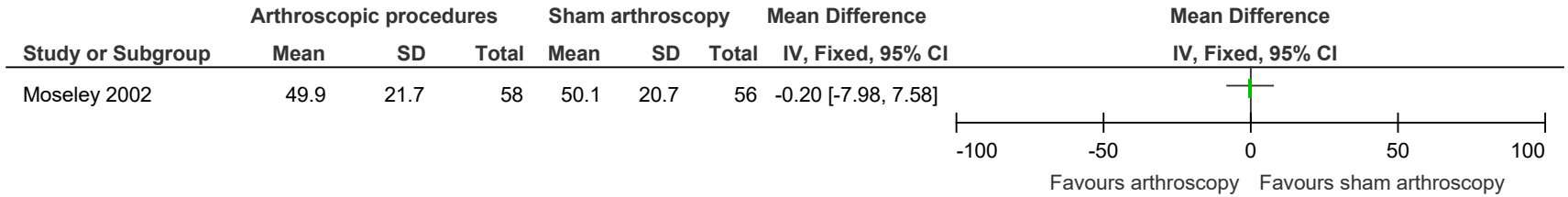
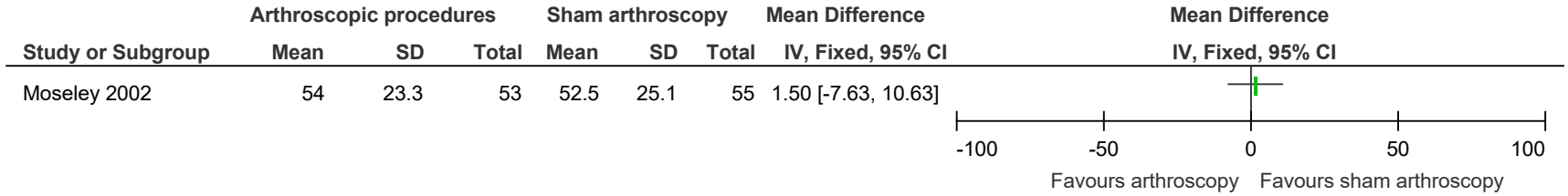


Figure 22: Pain (AIMS pain subscale, 0-100, high is poor) at >3 months



E.1.4 Lavage alone compared to sham arthroscopic procedures

Figure 23: Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months

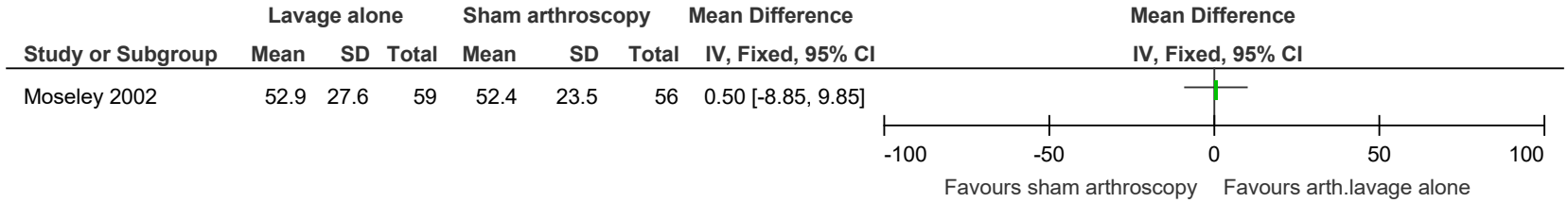


Figure 24: Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months

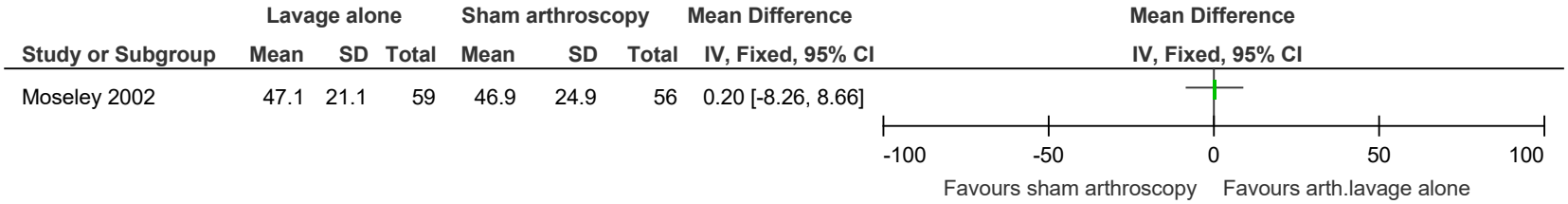


Figure 25: Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months

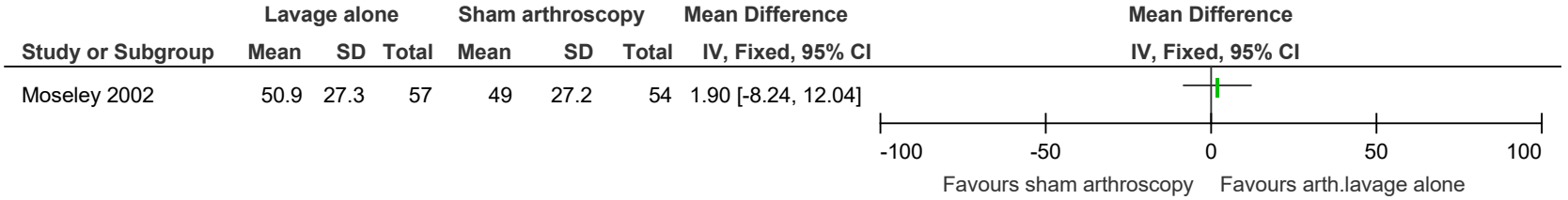


Figure 26: Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months

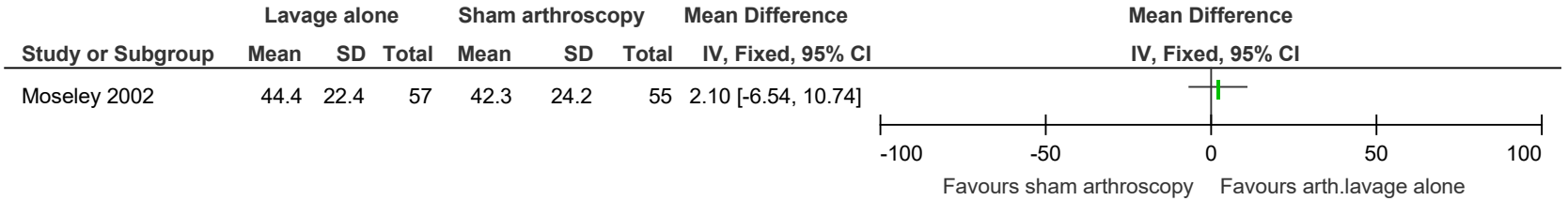


Figure 27: Pain (AIMS pain subscale, 0-100, high is poor) at ≤3 months

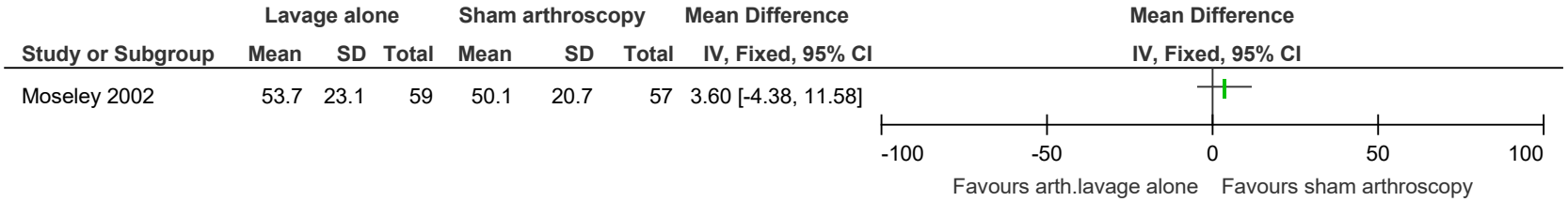


Figure 28: Pain (AIMS pain subscale, 0-100, high is poor) at >3 months

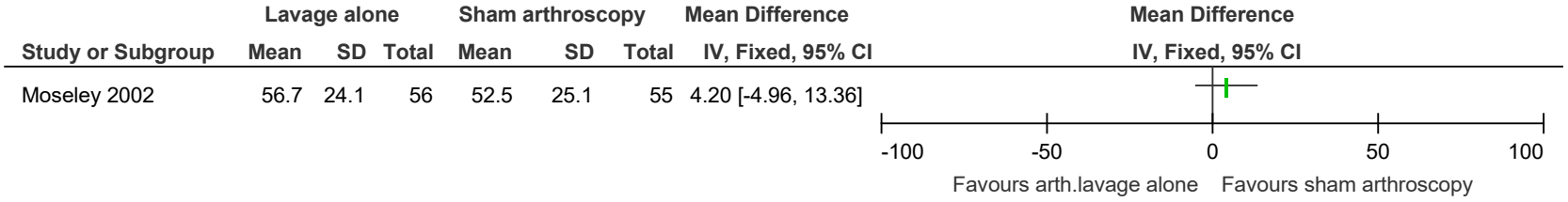


Figure 29: Pain (WOMAC pain subscale, 0-20, change score, high is poor) at >3 months

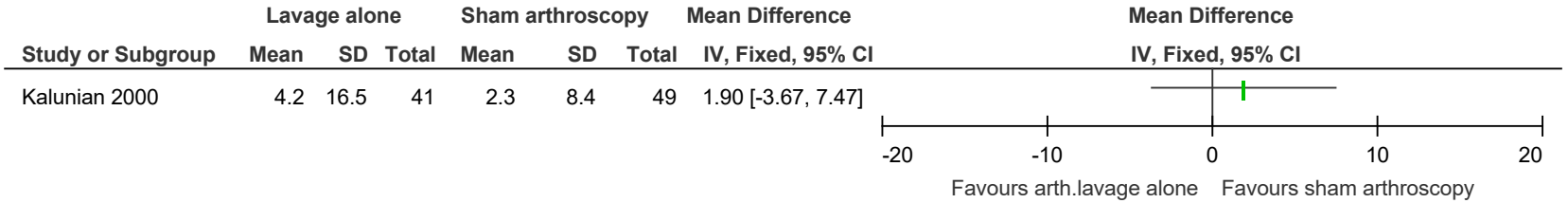
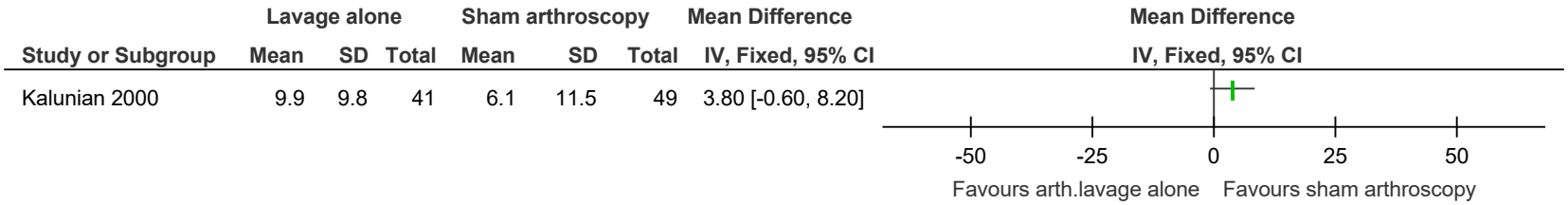


Figure 30: Physical function (WOMAC function subscale, 0-68, change score, high is poor) at >3 months



E.2 Temporomandibular joint

E.2.1 Arthroscopic procedures compared to standard care

Figure 31: Quality of life (combined West Haven-Yale multidimensional pain inventory and general health questionnaire score, 0-1, final value, high is poor) at ≤3 months

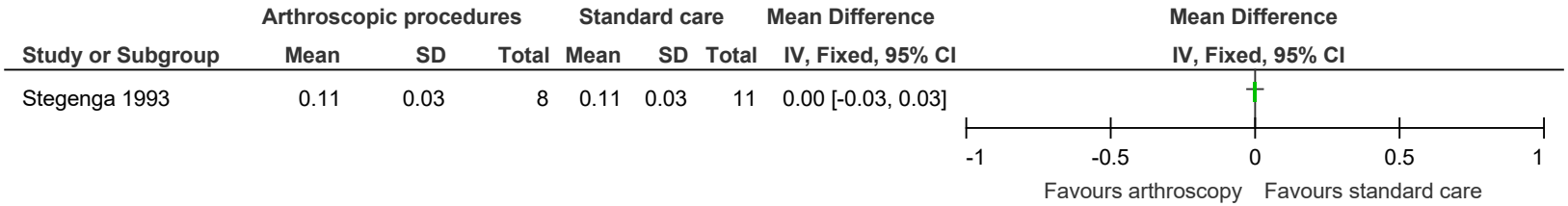


Figure 32: Quality of life (combined West Haven-Yale multidimensional pain inventory and general health questionnaire score, 0-1, final value, high is poor) at >3 months

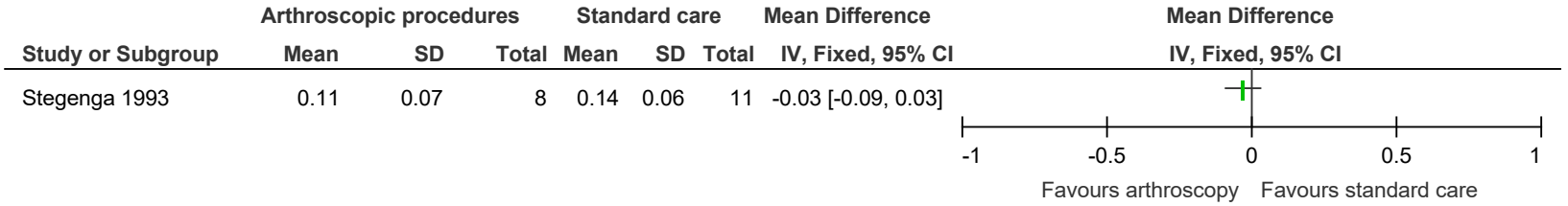


Figure 33: Pain (VAS, 0-100, final value, high is poor) at ≤3 months

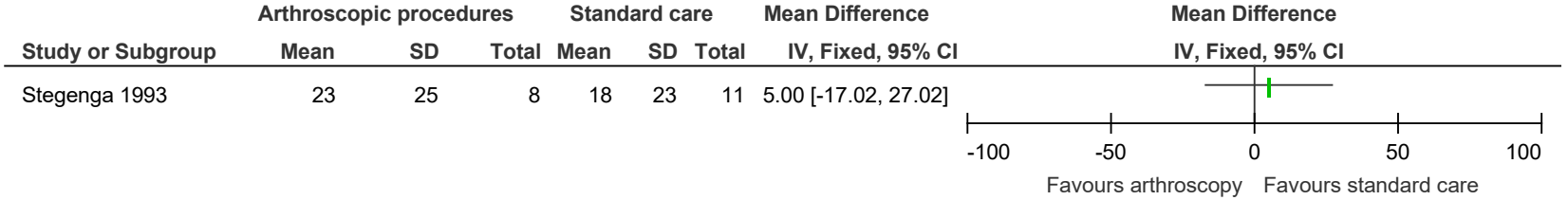


Figure 34: Pain (VAS, 0-100, final value, high is poor) at >3 months

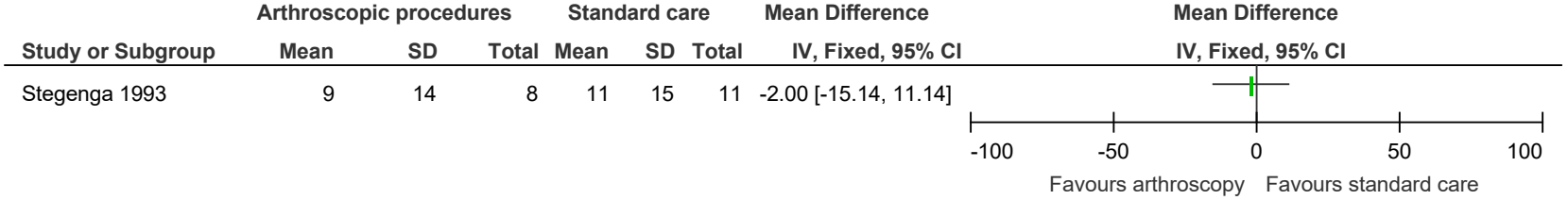


Figure 35: Physical function (mandibular function impairment questionnaire, 0-1, final value, high is poor) at ≤3 months

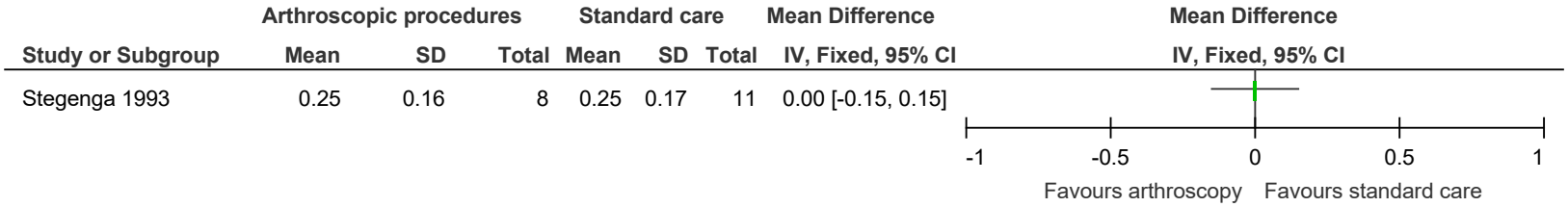
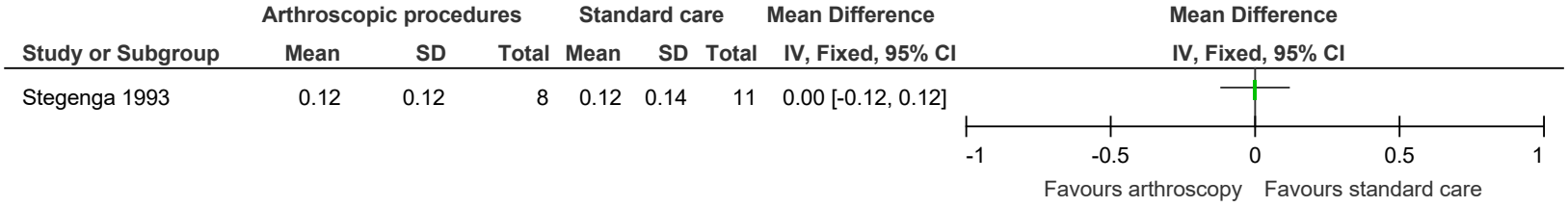


Figure 36: Physical function (mandibular function impairment questionnaire, 0-1, final value, high is poor) at >3 months



Appendix F – GRADE tables

F.1 Knee

Table 12: Clinical evidence profile: arthroscopic procedures compared to lavage alone

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	lavage alone	Relative (95% CI)	Absolute (95% CI)		
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 physical functioning subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	58	59	-	MD **3.3 lower** (12.7 lower to 6.1 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	58	59	-	MD **0.3 lower** (8.09 lower to 7.49 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 physical functioning subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	52	57	-	MD **3 lower** (13.12 lower to 7.12 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	52	57	-	MD **0.6 higher** (7.94 lower to 9.14 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (AIMS pain subscale, 0-100, high is poor) at ≤3 months (follow up: 12 weeks; assessed with: AIMS pain subscale; Scale from: 0 to 100)												

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	lavage alone	Relative (95% CI)	Absolute (95% CI)		
1	randomised trials	very serious [a]	not serious	not serious	serious [b]	none	58	59	-	MD **6.2 higher** (1.92 lower to 14.32 higher)	⨁◯◯◯ VERY LOW	CRITICAL

Pain (AIMS pain subscale, 0-100, high is poor) at >3 months (follow up: 2 years; assessed with: AIMS pain subscale; Scale from: 0 to 100)

1	randomised trials	very serious [a]	not serious	not serious	not serious	none	53	56	-	MD **2.7 lower** (11.6 lower to 6.2 higher)	⨁⨁◯◯ LOW	CRITICAL

CI: Confidence interval; **MD:** Mean difference

Explanations

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 13: Clinical evidence profile: arthroscopic procedures compared to standard care

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	standard care	Relative (95% CI)	Absolute (95% CI)		
Quality of life (SF-36 physical component, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 physical component; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	serious [b]	none	90	80	-	MD **1 higher** (1.91 lower to 3.91 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 physical component, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 physical component; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	88	80	-	MD **0.2 lower** (3.53 lower to 3.13 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 physical activity score, 0-100, final values, high is good) at >3 months (follow up: 12 months; assessed with: SF-36 physical activity score; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	not serious	none	156	164	-	MD **3.1 lower** (8.78 lower to 2.58 higher)	⨁⨁◯◯ LOW	CRITICAL
Pain (WOMAC pain, VAS [different scale ranges], final values, high is poor) at <3 months (follow-up: mean 2.5 months; assessed with: WOMAC, VAS)												
2	randomised trials	very serious [a]	seriousc	not serious	serious [b]	none	158	128	-	SMD **0.07 SD lower** (0.49 lower to 0.35 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (KOOS, WOMAC,VAS [different scale ranges], final values, high is poor) at >3 months (follow up: mean 21 weeks; assessed with: KOOS, WOMAC, VAS)												
3	randomised trials	serious [a]	not serious	not serious	not serious	none	292	344	-	SMD **0.04 lower** (0.19 lower to 0.12 higher)	⨁⨁⨁◯ MODERATE	CRITICAL
Physical function (WOMAC, 0-1700, final values, high is poor) at ≤3 months (follow up: 12 weeks; assessed with: WOMAC; Scale from: 0 to 1700)												

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	standard care	Relative (95% CI)	Absolute (95% CI)		
1	randomised trials	very serious [b]	not serious	not serious	not serious	none	90	80	-	MD **46 lower** (153.24 lower to 61.24 higher)	⨁⨁◯◯ LOW	CRITICAL
Physical function (WOMAC [different scale ranges], final values, high is poor) at >3 months (follow up: 18 months; assessed with: WOMAC)												
2	randomised trials	serious [a]	not serious	not serious	not serious	none	249	249	-	SMD **0.04 lower** (0.22 lower to 0.13 higher)	⨁⨁⨁◯ MODERATE	CRITICAL
Progression to joint replacement at >3 months (follow up: 12 months)												
1	randomised trials	not serious	not serious	not serious	very serious [b]	none	5/161 (3.1%)	3/167 (1.8%)	**RR 1.73** (0.42 to 7.12)	**13 more per 1,000** (from 10 fewer to 110 more)	⨁⨁◯◯ LOW	IMPORTANT
Serious adverse events at >3 months (follow up: 12 months)												
1	randomised trials	not serious	not serious	not serious	very serious [b]	none	5/174 (2.9%)	2/177 (1.1%)	**RR 2.54** (0.50 to 12.93)	**17 more per 1,000** (from 6 fewer to 135 more)	⨁⨁◯◯ LOW	IMPORTANT

CI: Confidence interval; **MD:** Mean difference; **SMD:** Standardised mean difference; **RR:** Risk ratio

Explanations

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

c. I2=65%

Table 14: Clinical evidence profile: arthroscopic procedures compared to sham arthroscopic procedures

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	sham arthroscopic procedures	Relative (95% CI)	Absolute (95% CI)		
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 physical functioning subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	58	56	-	MD **2.8 lower** (11.56 lower to 5.96 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	58	56	-	MD **0.1 lower** (8.72 lower to 8.52 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 physical functioning subscale, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 physical functioning subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	52	54	-	MD **1.1 lower** (11.34 lower to 9.14 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	52	55	-	MD **2.7 higher** (6.24 lower to 11.64 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (AIMS pain subscale, 0-100, final value, high is poor) at ≤3 months (follow up: 12 weeks; assessed with: AIMS pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	not serious	none	58	56	-	MD **0.2 lower** (7.98 lower to 7.58 higher)	⨁⨁◯◯ LOW	CRITICAL
Pain (AIMS pain subscale, 0-100, final value, high is poor) at >3 months (follow up: 2 years; assessed with: AIMS pain subscale; Scale from: 0 to 100)												

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	sham arthroscopic procedures	Relative (95% CI)	Absolute (95% CI)		
1	randomised trials	very serious [a]	not serious	not serious	not serious	none	53	55	-	MD **1.5 higher** (7.63 lower to 10.63 higher)	⨁⨁◯◯ LOW	CRITICAL

CI: Confidence interval; **MD:** Mean difference

Explanations

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 15: Clinical evidence profile: lavage alone compared to sham arthroscopic procedures

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	lavage alone	sham arthroscopic procedures	Relative (95% CI)	Absolute (95% CI)		
Quality of life (SF-36 physical function subscale, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 physical function subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	59	56	-	MD **0.5 higher** (8.85 lower to 9.85 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at ≤3 months (follow up: 12 weeks; assessed with: SF-36 pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	59	56	-	MD **0.2 higher** (8.26 lower to 8.66 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 physical function subscale, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 physical function subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	57	54	-	MD **1.9 higher** (8.24 lower to 12.04 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of life (SF-36 pain subscale, 0-100, final value, high is good) at >3 months (follow up: 2 years; assessed with: SF-36 pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	57	55	-	MD **2.1 higher** (6.54 lower to 10.74 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (AIMS pain subscale, 0-100, final value, high is poor) at ≤3 months (follow up: 12 weeks; assessed with: AIMS pain subscale; Scale from: 0 to 100)												
1	randomised trials	very serious [a]	not serious	not serious	serious [b]	none	59	57	-	MD **3.6 higher** (4.38 lower to 11.58 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (AIMS pain subscale, 0-100, final value, high is poor) at >3 months (follow up: 2 years; assessed with: AIMS pain subscale; Scale from: 0 to 100)												

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	lavage alone	sham arthroscopic procedures	Relative (95% CI)	Absolute (95% CI)		
1	randomised trials	very serious [a]	not serious	not serious	serious [b]	none	56	55	-	MD **4.2 higher** (4.96 lower to 13.36 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (WOMAC, 0-20, change score, high is poor) at >3 months (follow up: 12 months; assessed with: WOMAC; Scale from: 0 to 20)												
1	randomised trials	serious [a]	not serious	not serious	serious [b]	none	41	49	-	MD **1.9 higher** (3.67 lower to 7.47 higher)	⨁⨁◯◯ LOW	CRITICAL
Physical function (WOMAC, 0-68, change score, high is poor) at >3 months (follow up: 12 months; assessed with: WOMAC; Scale from: 0 to 68)												
1	randomised trials	serious [a]	not serious	not serious	serious [b]	none	41	49	-	MD **3.8 higher** (0.6 lower to 8.2 higher)	⨁⨁◯◯ LOW	CRITICAL

CI: Confidence interval; **MD:** Mean difference

Explanations

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

F.2 Temporomandibular joint

Table 16: Clinical evidence profile: arthroscopic procedures compared to standard care

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	standard care	Relative (95% CI)	Absolute (95% CI)		
Quality of Life (combined West Haven-Yale multidimensional pain inventory and general health questionnaire score, 0-1, final value, high is poor) at ≤3 months												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	8	11	-	MD **0** (0.03 lower to 0.03 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Quality of Life (combined West Haven-Yale multidimensional pain inventory and general health questionnaire score, 0-1, final value, high is poor) at ≤3 months												
1	randomised trials	very serious [a]	not serious	not serious	serious [b]	none	8	11	-	MD **0.03 lower** (0.09 lower to 0.03 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (VAS, 0-100, final value, high is poor) at ≤3 months												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	8	11	-	MD **5 higher** (17.02 lower to 27.02 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Pain (VAS, 0-100, final value, high is poor) at >3 months												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	8	11	-	MD **2 lower** (15.14 lower to 11.14 higher)	⨁◯◯◯ VERY LOW	CRITICAL
Physical function (mandibular function impairment questionnaire, 0-1, final value, high is poor) at ≤3 months												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	8	11	-	MD **0** (0.15 lower to 0.15 higher)	⨁◯◯◯ VERY LOW	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	arthroscopic procedures	standard care	Relative (95% CI)	Absolute (95% CI)		
Physical function (mandibular function impairment questionnaire, 0-1, final value, high is poor) at >3 months												
1	randomised trials	very serious [a]	not serious	not serious	very serious [b]	none	8	11	-	MD **0** (0.12 lower to 0.12 higher)	⨁◯◯◯ VERY LOW	CRITICAL

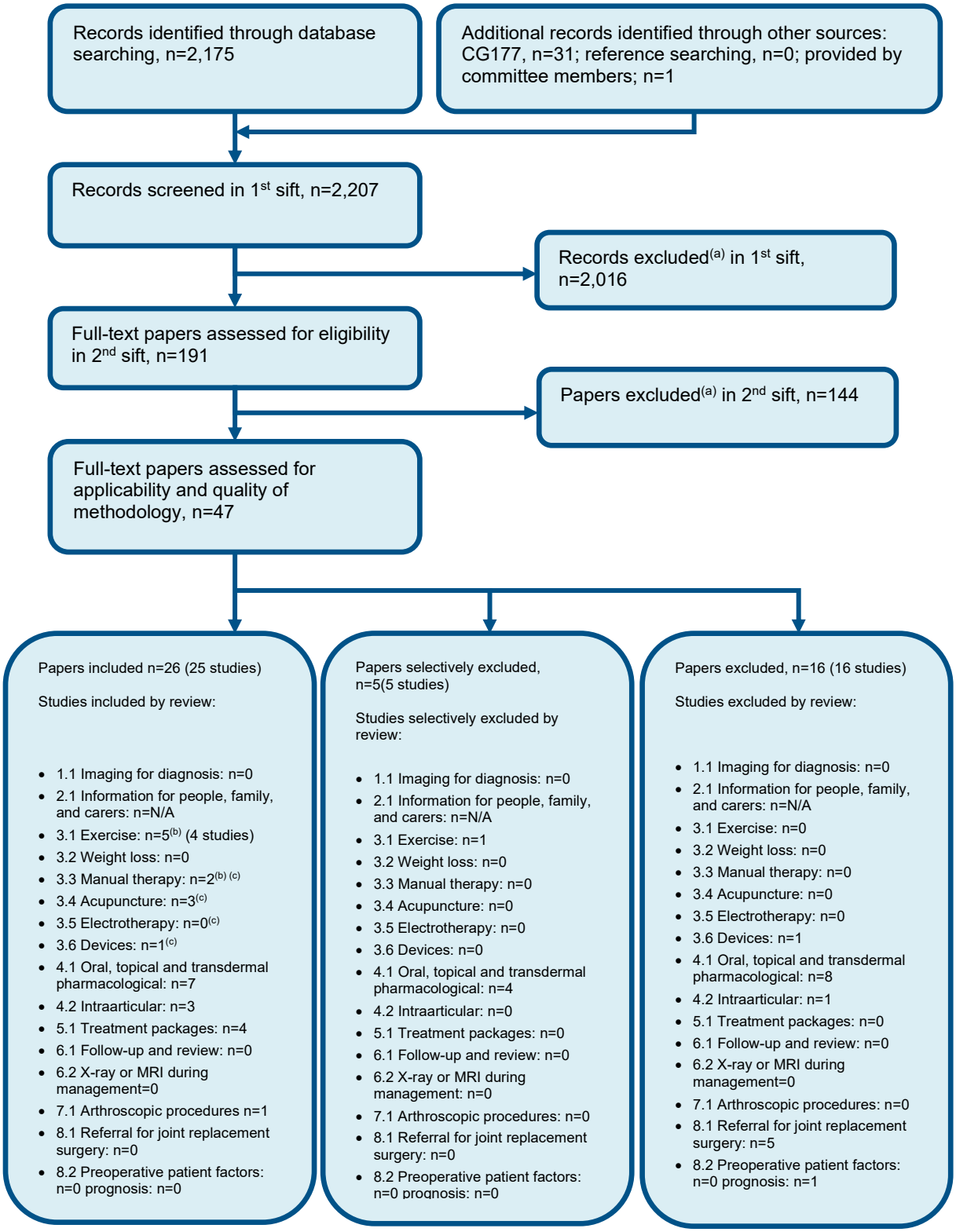
CI: Confidence interval; **MD:** Mean difference

Explanations

a. Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

b. Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Appendix G – Economic evidence study selection



(a) Non-relevant population, intervention, comparison, design or setting; non-English language.
(b) Two articles identified were applicable to Q3.1 and Q3.3, for the purposes of this diagram they have been included under Q3.1 only.
(c) One article identified was applicable to Q3.3, Q3.4, Q3.5 and Q3.6, for the purposes of this diagram it has been included under Q3.3 only.

Appendix H – Economic evidence tables

Study	Marsh 2016			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Within-trial analysis of Kirkley 2008[70] **Approach to analysis:** Analysis of individual level data for quality of life and resource use. Unit costs applied. **Perspective:** Canadian healthcare perspective **Follow-up:** 2 years **Discounting:** Costs: NR; Outcomes: NR	**Population:** Patients with symptomatic, radiographic knee OA **Patient characteristics:** Age: Arthroscopic group = 58 Control group = 61 Male: Arthroscopic group =39% Control group =28% **Intervention 1:** Optimised physical and medical therapy **Intervention 2:** Knee arthroscopic surgery in addition to optimised physical and medical therapy	**Total costs (mean per patient):** Intervention 1: £419 Intervention 2: £1,495 Incremental (2−1): £1,076 (95% CI: £974 – £1,536; p=≤0.01) **Currency & cost year:** 2014 Canadian dollars (presented here as 2014 UK pounds[(b)]) **Cost components incorporated:** Arthroscopy including equipment, operating room and laboratory or other medical tests during the procedure; number of physical therapy sessions attended, and medication use.	**QALYs (mean per patient):** Intervention 1: 1.66 Intervention 2:1.64 Incremental (2−1): -0.02 (95% CI:-0.09 – 0.13; p=0.72)	**ICER (Intervention 2 versus Intervention 1):** Intervention 1 dominates (more effective and less costly) intervention 2. Probability Intervention 2 cost effective (£20K/30K threshold): 10%/15% **Analysis of uncertainty:** None undertaken.
Data sources				
Health outcomes: QALYs were calculated using patient-level utility data collected at baseline, 3 months, 6 months, 12 months, 18 months and 24 months. **Quality-of-life weights:** Standard gamble technique in trial population. **Cost sources:** Ontario Case Costing Initiative, Ontario Schedule of Benefits, and Ontario Drug Benefit Formulary.				
Comments				
Source of funding: Canadian Institutes of Health Research, The Ontario Ministry of Research and Innovation, and The Canada Research Chairs Programme. **Limitations:** Canadian resource use data and unit costs (2014) may not reflect current NHS context. Discount rates not applied. Time				

horizon? Within-trial analysis and so may not reflect the full body of available evidence. Standard gamble technique used to calculate QALYs rather than the NICE reference standard of EQ5D. **Other:** None.	
Overall applicability:(c) Partially applicable	**Overall quality:**(d) Potentially serious limitations

Abbreviations: CUA= cost–utility analysis; ICER= incremental cost-effectiveness ratio; NR= not reported; pa= probabilistic analysis; QALYs= quality-adjusted life years
(a) Converted using 2019 purchasing power parities[91]
(b) Directly applicable / Partially applicable / Not applicable
(c) Minor limitations / Potentially serious limitations / Very serious limitations

Appendix I – Health economic model

No original economic modelling was undertaken.

Appendix J – Excluded studies

Clinical studies

Table 17: Studies excluded from the clinical review

Study	Exclusion reason
Aae 2016[1]	Not review population. Not guideline condition (focal cartilage defect). Protocol only
Abraamyan 2021[2]	Not guideline condition.(other pain conditions) chondral defects
Abram 2020[3]	Not guideline condition (meniscal tears of the knee)
Acharya 2014[4]	Poster abstract only
Acosta pereira 2008[5]	Non-English language study
Adams 2014[6]	Systematic review: study designs inappropriate (Includes only observational studies). Systematic review: references checked
Anonymous 2005[7]	Systematic review: study designs inappropriate. Systematic review: methods unclear. Systematic review: references checked
Arden 2008[8]	Incorrect interventions (arthroscopic tidal irrigation, intraarticular steroid injection (triamcinolone acetonide))
Avouac 2010[9]	Systematic review: references checked (all papers are RCTs but not all of them may be arthroscopic in nature.)
Ayral 2005[10]	Systematic review: methods unclear (narrative review). Systematic review: references checked
Baker 2012[12]	Not guideline condition. Not review population (mixed meniscal tears and osteochondral defects (associated with osteochondritis dissecans). Incorrect interventions (arthroscopic surgery, control (lavage, best medical care))
Barlow 2015[13]	Systematic review: references checked
Bellamy 2006[15]	Incorrect interventions. Systematic review: references checked
Bisson 2017[16]	Not guideline condition. Not review population (Excluded patients with evidence of degenerative joint disease)
Bloom 2008[17]	Non-English language study
Bradley 2002[18]	Incorrect interventions (Tidal irrigation)
Brignardello-petersen 2017[19]	Systematic review: references checked. People with meniscal injury without osteoarthritis
Brittberg 2018[20]	Not guideline condition. Not review population (cartilage lesions of the knee). Incorrect interventions (matrix-applied characterised autologous cultured chondrocytes versus microfracture)
Campbell 2010[21]	Pilot study with no quantitative outcomes (mixed methods - includes qualitative element (survey of doctors and patients towards acceptability of the study) and a pilot RCT with no outcomes reported)
Chang 1993[22]	Incorrect interventions (arthroscopic surgery - debridement, meniscectomy, removal of proliferative synovium and excision of loose article cartilage fragments, non-arthroscopic joint lavage)
Clar 2005[23]	Not guideline condition. Not review population (cartilage defects of the knee.). Systematic review: study designs inappropriate. Incorrect interventions(Autologous chondrocyte implantation versus Microfracture and others). Systematic review: references checked

Study	Exclusion reason
Crawford 2012[24]	Not guideline condition. Not review population (distal femoral cartilage lesion). Incorrect interventions (autologous cartilage tissue implant [NeoCart] versus microfracture)
Dawes 1987[25]	Incorrect interventions (saline arthroscopic washout v saline intraarticular injection)
Domb 2015[26]	Systematic review: references checked- Incorrect study design (only observational studies)
Edelson 1995[27]	Incorrect study design. Inappropriate comparison (arthroscopic washout versus no comparator)
Evidence 2014[28]	Systematic review: references checked
Farfaras 2017[29]	Conference abstract only
Farfaras 2018[30]	Not guideline condition. Not review population (Population had subacromial pain and signs of impingement. An exclusion criteria was presence of radiographic osteoarthritis.) Incorrect interventions open acromioplasty, arthroscopic acromioplasty, physiotherapy)
Felson 2010[31]	Systematic review: methods unclear (comparison groups overall unclear. Systematic review: references checked
Filardo 2016[32]	. Unclear population (people with meniscal injury without osteoarthritis) (for example, the proportion of participants with an osteoarthritis diagnosis not stated)
Forster 2003[33]	Incorrect interventions (arthroscopic washout, intraarticular hyalgan injections)
Frias 2004[35]	Incorrect interventions (joint lavage (no statement whether this is arthroscopic or not) with intraarticular injection of corticosteroids versus joint lavage without steroids)
Freitag 2015[34]	Not review population (chondral defects of the knee). Not guideline condition. Inappropriate comparison (post-operative adipose derived mesenchymal stem cell treatment versus no treatment).
Fu 2015[36]	Non-English language study
Furia 2010[37]	Incorrect study design (observational study)
Gatz 2020[38]	Not guideline condition (femoacetabular impingement)
Gauffin 2014[40]	People with meniscal injury without osteoarthritis. Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated) Excludes patients with features that would indicate osteoarthritis on joint radiograph
Gauffin 2017[39]	Not guideline condition. Not review population Excludes patients with features that would indicate osteoarthritis on joint radiograph
Goldman 1997[41]	Systematic review: methods unclear. Systematic review: references checked
Goyal 2013[42]	Not guideline condition. Not review population. Systematic review: study designs inappropriate (includes observational studies). Incorrect interventions (various, including: osteochondral cylinder transfer techniques, autologous chondrocyte implantation using periosteum, membrane-based autologous chondrocyte implantation, scaffold autologous chondrocyte implantation, and ACI using characterised chondrocytes)
Gudas 2012[43]	Not guideline condition. Not review population Osteochondral defect. Incorrect interventions (mosaic osteochondral autologous transplantation, microfracture)
Haien 2018[44]	Not guideline condition. Not review population (osteochondral defect). Incorrect interventions (Osteochondral autologous

Study	Exclusion reason
	transplantation, microfracture). Systematic review: references checked
Han 2021[45]	Not guideline condition (articular chondral defects of the knee)
Helenius 2001[46]	Incorrect study design (non-randomised study). Inappropriate comparison (hip arthroscopy (varying from diagnostic to procedural with synovectomy) versus no comparator))
Hempfling 2007[47]	Incorrect interventions (arthroscopic joint lavage and hyaluronic acid injection, arthroscopic lavage alone)
Herrera-perez 2018[48]	Incorrect interventions (ankle arthroscopic debridement alone, debridement and hinged ankle distraction group)
Herrera-perez 2019[48]	Inappropriate comparison (debridement plus hinged ankle distraction versus debridement alone)
Herrera-perez 2020[49]	Inappropriate comparison (debridement plus hinged ankle distraction versus debridement alone)
Herrlin 2007[50]	Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated). People with meniscal injury without osteoarthritis
Herrlin 2013[51]	Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated). People with meniscal injury without osteoarthritis
Heybeli 2008[52]	Incorrect interventions (arthroscopic debridement and hyaluronic acid injection, arthroscopic debridement alone)
Hitzeman 2008[53]	Clinical case study discussion - not relevant
Horner 2017[54]	Systematic review: study designs inappropriate (observational studies). Inappropriate comparison (not explicitly stated). Systematic review: references checked
Howell 2010[55]	Systematic review: methods unclear (narrative review). Systematic review: references checked
Huang 2021[56]	Non-English language study
Hubbard 1996[57]	Not guideline condition. Not review population (Unclear as to whether it exclude osteoarthritis - is to manage degeneration of the medial femoral condyle. However, excludes patients based on joint space reduction on radiographs).
Hunt 2002[58]	Systematic review: methods unclear (narrative review).. Systematic review: references checked
Ibarra 2021[59]	Inappropriate comparison (arthroscopic matrix-assisted autologous chondrocyte transplantation versus microfracture)
Ike 1992[60]	Incorrect interventions (tidal irrigation by arthrocentesis - not arthroscopic, medical management - isometric exercises and joint protection techniques. NSAIDs/analgesia.)
Ioannidis 2004[61]	Systematic review: methods unclear. Systematic review: references checked
Jiang 2013[62]	Non-English language study
Kang 2005[64]	Non-English language study
Karelse 2016[65]	Incorrect interventions (arthroscopic interpositioning arthroplasty by meniscal allograft, and by dermal allograft)
Karpinski 2019[66]	People with conditions that may make them susceptible to osteoarthritis or often occur alongside osteoarthritis (including: crystal arthritis, inflammatory arthritis, septic arthritis, hemochromatosis, haemophilic arthropathy, diseases of childhood that may predispose to osteoarthritis and malignancy)

Study	Exclusion reason
Kemp 2015[69]	Systematic review: references checked (only observational studies)
Knutsen 2004[73]	Not guideline condition. Not review population (single symptomatic cartilage defect, none with generalized osteoarthritis). Incorrect interventions (autologous chondrocyte implantation, microfracture)
Knutsen 2007[71]	Not guideline condition. Not review population (single symptomatic cartilage defect, none with generalized osteoarthritis). Incorrect interventions(autologous chondrocyte implantation, microfracture)
Knutsen 2016[72]	Not guideline condition. Not review population (single symptomatic cartilage defect, none with generalized osteoarthritis). Incorrect interventions(autologous chondrocyte implantation, microfracture)
Lamplot 2016[74]	People with meniscal injury without osteoarthritis. Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated). Systematic review: references checked (comparison groups not clearly stated)
Laupattarakasem 2008[75]	Systematic review: references checked (arthroscopic debridement - assumed that the procedure may have included shaving, lavage, drilling, microfracture technique or abrasion arthroplasty (unless specifically stated by the study that these were not used) Any non-surgical intervention or comparative operation (including chondrocyte implantation, corrective osteotomy and replacement arthroplasty), including sham or placebo surgery)
Lazic 2014[76]	Incorrect study design (non-randomised study). Inappropriate comparison. Incorrect interventions (arthroscopic debridement or washout versus no comparator.)
Liebs 2018[77]	Systematic review: references checked. People with meniscal injury without osteoarthritis.
Litchfield 2013[78]	Abstract and commentary only
Livesley 1991[79]	Incorrect study design (quasi-randomised - treatment allocation dependent on which surgeon the person was referred to)
Martin 2021[81]	Not guideline condition (acetabular labral tears)
Medical advisory secretariat 2005[82]	Systematic review: references checked (arthroscopic lavage or debridement (with or without meniscectomy versus placebo (sham) arthroplasty, Either diseased or health subjects or where the subjects were their own control.)
Merchan 1993[83]	No appropriate outcomes reported
Monk 2017[85]	Systematic review: references checked
Moseley 1996[86]	No adequate outcomes identified
Napoleoni 1997[88]	Abstract only
Nguyen 2017[90]	Inappropriate comparison (arthroscopic microfracture with stromal vascular fraction injection versus arthroscopic microfracture alone).
Osteras 2011[92]	Conference abstract only
Parmigiani 2010[93]	Incorrect interventions (Joint lavage with intraarticular injection with triamcinolone hexacetonide (60mg) versus joint lavage alone (no reference to arthroscopy))
Piuzzi 2016[94]	Systematic review: study designs inappropriate. Systematic review: references checked (Only observational studies, Not very thorough search parameters.)
Poonit 2018[95]	Systematic review: study designs inappropriate (observational studies). Incorrect interventions (arthroscopic debridement versus open debridement.). Systematic review: references checked

Study	Exclusion reason
Randsborg 2016[96]	Not guideline condition. Not review population (Focal cartilage defect). Incorrect interventions (autologous chondrocyte implantation versus arthroscopic debridement)
Ravaud 1999[97]	Incorrect interventions (joint lavage with corticosteroid injection versus joint lavage without steroids)
Reichenbach 2008[99]	Out of date version of this Cochrane review, please see Reichenbach 2010
Reichenbach 2010[98]	Incorrect interventions (Arthroscopic and non-arthroscopic (but not open) lavage. Excluded arthroscopic debridement. Versus sham intervention, placebo injection, non-intervention.). Systematic review: references checked
Rejaili 2005[100]	Incorrect interventions (Arthroscopic surgery with chondral lavage, debridement and partial or total meniscus stabilisation AND hylan GF-20 intraarticular injection versus arthroscopic surgery as per the intervention BUT no hylan GF-20 intraarticular injection)
Risberg 2009[101]	Commentary only
Russell 2003[102]	Incorrect interventions (arthroscopic lavage versus synvisc intraarticular injection.). Abstract only
Saeed 2015[103]	Incorrect interventions (arthroscopic debridement, hyaluronic acid intraarticular injection)
Saris 2008[106]	Not guideline condition. Not review population (cartilage defects of the knee. Excludes patients with osteoarthritis grade 2 or above). Incorrect interventions
Saris 2009[105]	Not guideline condition. Not review population. Incorrect interventions (characterised chondrocyte implantation versus microfracture)
Saris 2014[104]	Not guideline condition. Not review population (symptomatic focal cartilage defect.). Incorrect interventions (matrix-applied characterised autologous cultured chondrocytes, microfracture).
Schrock 2017[107]	Not guideline condition. Not review population (chondral lesion of the knee). Systematic review: study designs inappropriate (includes observational studies).. Incorrect interventions (osteochondral autograft transplantation, autologous chondrocyte implantation, microfracture). Systematic review: references checked
Schwabe 2020[108]	Not guideline condition (femoacetabular impingement)
Shi 2018[109]	Not review population (People with meniscal injury without osteoarthritis)
Sihvonen 2013[111]	Not review population (People with meniscal injury without osteoarthritis). Protocol only
Sihvonen 2018[110]	Not review population (People with meniscal injury without osteoarthritis)
Siparsky 2007[112]	Systematic review: references checked
Slutsky 2014[113]	Systematic review: methods unclear (narrative review). Systematic review: references checked
Smith 2003[114]	Incorrect interventions (Arthroscopic lavage plus intra-articular corticosteroids (120mg methylprednisolone), arthroscopic lavage alone).
Smith 2003[115]	Incorrect interventions (Arthroscopic lavage plus intra-articular corticosteroids)
Sochacki 2017[116]	Systematic review: study designs inappropriate (contains only non-randomised studies). Systematic review: references checked

Study	Exclusion reason
Spahn 2013[117]	Incorrect interventions. Systematic review; references checked Contains only observational studies.
Stensrud 2015[119]	People with meniscal injury without osteoarthritis. Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated) Exclusion criteria for patients with KL grade >2 osteoarthritis. But allows grade 2 and lower. However, 72% of patients were grade 0. Therefore, no osteoarthritis.
Thein 2010[120]	Incorrect interventions (arthroscopic meniscectomy and hyaluronic acid injection, arthroscopic meniscectomy alone). Not review population (People with meniscal injury without osteoarthritis)
Thorlund 2015[121]	People with meniscal injury without osteoarthritis. Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated). Systematic review: references checked
Ulstein 2014[122]	Incorrect interventions (microfracture, osteochondral autologous transplantation mosaicplasty). Not guideline condition. Not review population (articular chondral lesions of the knee).
Uluçay 2007[123]	Not review population - People with meniscal injury without osteoarthritis. Unclear population (for example, the proportion of participants with an osteoarthritis diagnosis not stated). Incorrect interventions
Van de graaf 2016[124]	Systematic review: references checked
Van oosterhout 2006[125]	Incorrect interventions (arthroscopic lavage plus administration of placebo (anaesthetic) injection during the procedure versus arthroscopic lavage and corticosteroid injection, joint aspiration and corticosteroid injection)
Vanlauwe 2011[126]	Not guideline condition. Not review population (cartilage defects of the knee). Incorrect interventions (characterised chondrocyte implantation versus microfracture)
Vermesan 2013[127]	Incorrect interventions (arthroscopic debridement, intra-articular steroid injection)
Volz 2017[128]	Not guideline condition. Not review population (medium sized cartilage defect). Incorrect interventions (autologous matrix-induced chondrogenesis, microfracture)
Wang 2008[129]	Non-English language study
Ward 1998[130]	Letter only
Westrich 2009[131]	Incorrect interventions (knee arthroscopy with partial meniscectomy and debridement and adjuvant hyaluronic acid injection, knee arthroscopy and partial meniscectomy alone)
Wilkens 2018[132]	Systematic review: study designs inappropriate (non-randomised).. Systematic review: references checked
Yim 2013[133]	Not review population (people with meniscal injury without osteoarthritis)
Zhang 2018[134]	No usable outcomes (reports satisfaction rather than clinical outcomes)
Zhao 2018[135]	Incorrect interventions (Arthroscopic loose body removal surgery, conservative treatment (intraarticular paracetamol.), no useable outcomes (presented in graphical format only)

Health Economic studies

Published health economic studies that met the inclusion criteria (relevant population, comparators, economic study design, published 2005 or later and not from non-OECD country or USA) but that were excluded following appraisal of applicability and methodological quality are listed below. See the health economic protocol for more details.

None.