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Cochrane in CORR

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Cochrane in *CORR*: Arthroscopic Surgery for Degenerative Knee Disease (Osteoarthritis Including Degenerative Meniscal Tears)

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Importance of the Topic

Osteoarthritis (OA) of the knee is both common and a major contributor to disability. The symptoms of OA affect 10% of the worldwide population older than 60 years of age [18]. The incidence of degenerative meniscal tears increases with age and is strongly correlated with the presence of OA [3]. Although arthroscopic surgery, particularly arthroscopic debridement [8, 10], has been used to treat symptomatic degenerative meniscal tears, numerous studies have found it not to be superior to placebo surgery or nonsurgical treatments. A robust 2017 systematic review identified 13 randomized controlled trials and 12 observational studies that compared arthroscopy to placebo or nonoperative controls [4] and found no clinically important benefits of knee arthroscopy in terms of pain or function at 3 months or 2 years after surgery when compared to placebo or nonsurgical interventions.

Despite the absence of clinical benefits to surgery in numerous studies, the number of patients undergoing knee arthroscopy and the average age of those patients have both increased [5]. Additionally, several orthopaedic professional and subspecialty societies continue to endorse the use of arthroscopic debridement for treating degenerative meniscal tears [1, 2, 17]. Because of the disconnect between those endorsements and the high-quality evidence from numerous randomized trials conducted around the world demonstrating arthroscopic surgery not to be beneficial for this indication when compared to safer, nonsurgical alternatives, debate in the orthopaedic community persists about how to treat degenerative meniscal tears and early osteoarthritis of the knee [6, 12, 13].

The current Cochrane review by O'Connor and colleagues updated the previously mentioned systematic

*A note from the Editor-in-Chief: We are pleased to publish the next installment of "*Cochrane in CORR®*", our partnership between* CORR®*, The Cochrane Collaboration®, and McMaster University's Evidence-Based Orthopaedics Group. In this column, researchers from McMaster University and other institutions will provide expert perspective on an abstract originally published in The Cochrane Library that we think is especially important. We welcome reader feedback on our editorials as we do on all of our columns and articles; please send your comments to eic@clinorthop.org.*

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Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and The Cochrane Library (http://www.thecochranelibrary.com) should be consulted for the most recent version of the review.

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review published in 2017 [4]. Synthesis of the available evidence is important to attempt to bridge the gap between knowledge and practice. In the current review [14], the authors analyzed 16 randomized control trials and trials that used quasi-randomized methods to determine the balance of risk and benefits associated with arthroscopic surgery for degenerative knee disease including OA and degenerative meniscal tears. The trials in this review compared patient-reported outcomes, including physical function, pain, return to activity, time to recovery, quality of life, treatment failure, and adverse events from patients who underwent arthroscopic surgery of the knee to placebo or nonoperative treatment. The review included 2105 patients. Overall, the authors found that arthroscopic surgery provides little or no benefit in pain, function, or knee-specific quality of life compared to placebo procedures and nonsurgical approaches like exercise programs and injection.

Upon Closer Inspection

The work by O'Connor and colleagues [14] is an up-to-date, robust review that included participants and interventions that largely reflect clinical practice. Control groups included placebo (four studies), exercise programs (eight studies), NSAIDs (one study), non-arthroscopic lavage (one study), glucocorticoid injection (one study), and hyaluronic acid (one study). Additionally, the studies in the review represented a diverse global population with varying levels of OA with and without meniscal tears. The follow-up for the studies demonstrated no difference in the short and longer term, with many studies having follow-up for 2 or more years. The review found that arthroscopic surgery provides little or no benefit in pain and function compared to placebo procedures (high certainty), exercise programs (moderate certainty), NSAIDs (low certainty), injections (low certainty), and non-arthroscopic lavage (low certainty).

Though the participants included were diverse, the review excluded patients with acute traumatic knee pain. Additionally, six of the included studies excluded patients with locking or locked knees. Though these patients are rare in the degenerative population, critics of the available evidence have previously argued that this subgroup of patients may be more likely to benefit from surgical intervention. It should be noted, however, that thus far, subgroup analysis has failed to identify benefits in such groups [15, 16], and so any such claims must be considered speculative and unsupported by high-quality evidence. Post hoc analysis in a randomized controlled trial comparing arthroscopy to placebo demonstrated no difference in any of the primary or secondary outcome measures for patients with mechanical symptoms or unstable tears [16]; that is, no greater improvement was observed from surgery in patients with mechanical symptoms or unstable tears. Additionally, a 2020 study examined patient preoperative clinical factors proposed to be important in the success of meniscal surgery (including mechanical symptoms and traumatic tears) and found them to poorly predict changes in patient-reported outcomes 1 year postsurgery [15].

Treatment crossover was also present, which may underestimate the effectiveness of surgery. Conversely, though, patients who crossover to surgical groups in this setting are likely to be motivated and especially likely to gain benefit from the placebo effect, which appears rather substantial in this setting. Several included studies had patient crossover from nonoperative or placebo to surgery [7, 9, 11]. One study [9] demonstrated 30% crossover from the nonoperative to arthroscopic group. Patients who have persistent symptoms despite nonoperative management and crossed into the surgical arm in this trial had improvement of their symptoms after knee arthroscopy [9]. This study, however, was unblinded and thus may have increased the likelihood that patients would request operative intervention for their persistent symptoms. The rate of crossover in a large, blinded randomized controlled trial was lower (9%) [16], and that study found those who did cross over had no additional benefit from the arthroscopic procedure. Blinding in any future studies should be ensured to minimize bias and decrease patient crossover.

Take-home Messages

O'Connor and colleagues [14] confirm what has been previously demonstrated—that arthroscopic surgery shows little to no benefit over placebo and nonoperative interventions (including exercise programs and injection) in patients with degenerative changes in the knee. The review included patients with knee OA (with and without meniscal tears) and with degenerative meniscal tears alone. This review adds to the growing body of evidence demonstrating that surgical intervention is ineffective in this condition.

It is important to have a frank discussion with patients regarding the natural course of knee OA and degenerative meniscal tears. Thorough counseling is necessary to ensure patients understand that abundant evidence demonstrates this procedure has

shown no clinically important benefit over placebo and conservative treatments. Nonoperative interventions and lifestyle modification should be considered first-line treatment in the degenerative knee. Surgeons who continue to support the use of arthroscopic surgery in this patient population have a responsibility to conduct trials to provide evidence that identifies subgroups in which it may be beneficial.

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Arthroscopic surgery for degenerative knee disease (osteoarthritis including degenerative meniscal tears) (Review)

O'Connor D, Johnston RV, Brignardello-Petersen R, Poolman RW, Cyril S, Vandvik PO, Buchbinder R

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[Intervention Review]

Arthroscopic surgery for degenerative knee disease (osteoarthritis including degenerative meniscal tears)

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ABSTRACT

Background

Arthroscopic knee surgery remains a common treatment for symptomatic knee osteoarthritis, including for degenerative meniscal tears, despite guidelines strongly recommending against its use. This Cochrane Review is an update of a non-Cochrane systematic review published in 2017.

Objectives

To assess the benefits and harms of arthroscopic surgery, including debridement, partial menisectomy or both, compared with placebo surgery or non-surgical treatment in people with degenerative knee disease (osteoarthritis, degenerative meniscal tears, or both).

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, and two trials registers up to 16 April 2021, unrestricted by language.

Selection criteria

We included randomised controlled trials (RCTs), or trials using quasi-randomised methods of participant allocation, comparing arthroscopic surgery with placebo surgery or non-surgical interventions (e.g. exercise, injections, non-arthroscopic lavage/irrigation, drug therapy, and supplements and complementary therapies) in people with symptomatic degenerative knee disease (osteoarthritis or degenerative meniscal tears or both). Major outcomes were pain, function, participant-reported treatment success, knee-specific quality of life, serious adverse events, total adverse events and knee surgery (replacement or osteotomy).

Data collection and analysis

Two review authors independently selected studies for inclusion, extracted data, and assessed risk of bias and the certainty of evidence using GRADE. The primary comparison was arthroscopic surgery compared to placebo surgery for outcomes that measured benefits of surgery, but we combined data from all control groups to assess harms and knee surgery (replacement or osteotomy).

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Main results

Sixteen trials (2105 participants) met our inclusion criteria. The average age of participants ranged from 46 to 65 years, and 56% of participants were women. Four trials (380 participants) compared arthroscopic surgery to placebo surgery. For the remaining trials, arthroscopic surgery was compared to exercise (eight trials, 1371 participants), a single intra-articular glucocorticoid injection (one trial, 120 participants), non-arthroscopic lavage (one trial, 34 participants), non-steroidal anti-inflammatory drugs (one trial, 80 participants) and weekly hyaluronic acid injections for five weeks (one trial, 120 participants). The majority of trials without a placebo control were susceptible to bias: in particular, selection (56%), performance (75%), detection (75%), attrition (44%) and selective reporting (75%) biases. The placebo-controlled trials were less susceptible to bias and none were at risk of performance or detection bias. Here we limit reporting to the main comparison, arthroscopic surgery versus placebo surgery.

High-certainty evidence indicates arthroscopic surgery leads to little or no difference in pain or function at three months after surgery, moderate-certainty evidence indicates there is probably little or no improvement in knee-specific quality of life three months after surgery, and low-certainty evidence indicates arthroscopic surgery may lead to little or no difference in participant-reported success at up to five years, compared with placebo surgery.

Mean post-operative pain in the placebo group was 40.1 points on a 0 to 100 scale (where lower score indicates less pain) compared to 35.5 points in the arthroscopic surgery group, a difference of 4.6 points better (95% confidence interval (CI) 0.02 better to 9 better; I^2 = 0%; 4 trials, 309 participants). Mean post-operative function in the placebo group was 75.9 points on a 0 to 100 rating scale (where higher score indicates better function) compared to 76 points in the arthroscopic surgery group, a difference of 0.1 points better (95% CI 3.2 worse to 3.4 better; I^2 = 0%; 3 trials, 302 participants).

Mean post-operative knee-specific health-related quality of life in the placebo group was 69.7 points on a 0 to 100 rating scale (where higher score indicates better quality of life) compared with 75.3 points in the arthroscopic surgery group, a difference of 5.6 points better (95% CI 0.36 better to 10.68 better; I^2 = 0%; 2 trials, 188 participants). We downgraded this evidence to moderate certainty as the 95% confidence interval does not rule in or rule out a clinically important change.

After surgery, 74 out of 100 people reported treatment success with placebo and 82 out of 100 people reported treatment success with arthroscopic surgery at up to five years (risk ratio (RR) 1.11, 95% CI 0.66 to 1.86; I^2 = 53%; 3 trials, 189 participants). We downgraded this evidence to low certainty due to serious indirectness (diversity in definition and timing of outcome measurement) and serious imprecision (small number of events).

We are less certain if the risk of serious or total adverse events increased with arthroscopic surgery compared to placebo or non-surgical interventions. Serious adverse events were reported in 6 out of 100 people in the control groups and 8 out of 100 people in the arthroscopy groups from eight trials (RR 1.35, 95% CI 0.64 to 2.83; I^2 = 47%; 8 trials, 1206 participants). Fifteen out of 100 people reported adverse events with control interventions, and 17 out of 100 people with surgery at up to five years (RR 1.15, 95% CI 0.78 to 1.70; I^2 = 48%; 9 trials, 1326 participants). The certainty of the evidence was low, downgraded twice due to serious imprecision (small number of events) and possible reporting bias (incomplete reporting of outcome across studies). Serious adverse events included death, pulmonary embolism, acute myocardial infarction, deep vein thrombosis and deep infection.

Subsequent knee surgery (replacement or high tibial osteotomy) was reported in 2 out of 100 people in the control groups and 4 out of 100 people in the arthroscopy surgery groups at up to five years in four trials (RR 2.63, 95% CI 0.94 to 7.34; I^2 = 11%; 4 trials, 864 participants). The certainty of the evidence was low, downgraded twice due to the small number of events.

Authors' conclusions

Arthroscopic surgery provides little or no clinically important benefit in pain or function, probably does not provide clinically important benefits in knee-specific quality of life, and may not improve treatment success compared with a placebo procedure. It may lead to little or no difference, or a slight increase, in serious and total adverse events compared to control, but the evidence is of low certainty. Whether or not arthroscopic surgery results in slightly more subsequent knee surgery (replacement or osteotomy) compared to control remains unresolved.

PLAIN LANGUAGE SUMMARY

Arthroscopic surgery for degenerative knee disease

Background

Degenerative knee disease (osteoarthritis in the knee which affects the joint lining and menisci) is the most common cause of knee pain, swelling and stiffness in the knee joint which leads to difficulty in walking. The cartilage in the knee joint is damaged, resulting in friction in the joint surfaces and formation of new bone in severe cases. Arthroscopic knee surgery removes damaged cartilage and loose tissue and smooths the knee joint surfaces.

Study characteristics

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We included 16 randomised trials (2105 participants) published up to 16 April 2021. Trials were conducted in Canada, Denmark, Finland, Italy, Norway, Pakistan, South Korea, Spain, Sweden, Netherlands and USA.

Overall, 56% of participants were women. The average age of participants ranged from 46 to 65 years and the average duration of symptoms ranged from 1.6 months to 4.4 years. Of the nine trials reporting their funding source, none received funding from industry. The other seven trials did not report any funding source.

We limit reporting to the main comparison, arthroscopic surgery versus placebo (dummy or sham) surgery.

Key results

Compared with placebo surgery, arthroscopic surgery had little benefit:

Pain (lower scores mean less pain)

Improvement in pain was 4.6 points better (0.02 better to 9 better) on a 0 to 100 point scale with arthroscopic surgery than with placebo, 3 months after surgery.

• People who had arthroscopic surgery rated their post-operative pain as 35.5 points.

• People who had placebo surgery rated their post-operative pain as 40.1 points.

Knee function (higher scores mean better function)

Improvement in knee function was 0.1 points better (3.2 worse to 3.4 better) on a 0 to 100 point scale with arthroscopic surgery than with placebo, 3 months after surgery.

• People who had arthroscopic surgery rated their post-operative knee function as 76.0 points.

• People who had placebo surgery rated their post-operative knee function as 75.9 points.

Knee-specific quality of life (higher scores mean better quality of life)

Improvement in knee-specific quality of life was 5.6 points better (0.4 better to 10.7 better) on a 0 to 100 point scale with arthroscopic surgery than with placebo, 3 months after surgery.

• People who had arthroscopic surgery rated their post-operative quality of life as 75.3 points.

• People who had placebo surgery rated their post-operative quality of life as 69.7 points.

Treatment success (rated by participants)

8% more people rated their treatment a success (25% fewer to 63% more), or 8 more people out of 100, at up to 5 years after surgery.

• 82 out of 100 people reported treatment success with arthroscopic surgery.

• 74 out of 100 people reported treatment success with placebo surgery.

Serious adverse events

2% more people (2% fewer to 10% more) had serious adverse events, or 2 more people out of 100, at up to 5 years after surgery.

• 8 out of 100 people reported serious adverse events with arthroscopic surgery.

• 6 out of 100 people reported serious adverse events with placebo surgery.

Total adverse events

2% more people (3% fewer to 11% more), had adverse events, or 2 more people out of 100, at up to 5 years after surgery.

• 17 out of 100 people reported adverse events with arthroscopic surgery.

• 15 out of 100 people reported adverse events with placebo surgery.

Subsequent knee surgery

2% more people (0.1% fewer to 9% more), had subsequent knee surgery, or 2 more people out of 100, at up to 5 years.

• 4 out of 100 people had knee replacement or osteotomy (knee surgery that reshapes bone) with arthroscopic surgery.

• 2 out of 100 people had knee replacement or osteotomy with placebo surgery.

Certainty of the evidence

We are confident that knee arthroscopy does not provide any clinically important benefits in terms of pain and function. We are moderately confident that knee arthroscopy probably does not provide any clinically important benefits in knee-specific quality of life over a placebo procedure. Knee arthroscopy may not increase participant-reported success compared with placebo. We have little confidence in the evidence because of differences across trials in reporting success and the small number of events. We are less certain of the risk of serious and total adverse events in arthroscopy versus placebo surgery: the evidence was uncertain because of the small number of events and incomplete reporting of study information.

Adverse events associated with surgery include total knee replacement, osteotomy, repeat arthroscopy, arthroscopy in opposite knee, cutaneous nerve lesion (damage to nerves in the skin), deep or superficial infection, general knee pain, swelling, instability, stiffness or decreased range of motion in the affected or opposite knee, haemarthrosis (bleeding into the knee joint), death, acute myocardial infarction (heart attack), hypoxaemia (decreased oxygen in the blood), deep vein thrombosis (blood clot in the deep veins), tendonitis (inflammation of tendons), pain from fall or other trauma, rupture of a Baker's cyst (a fluid-filled sac behind the knee), and back or hip or foot pain.

Arthroscopic surgery may or may not lead to slightly more subsequent knee surgery (replacement or osteotomy) than the placebo procedure.