

Is There a Role for Arthroscopy in the Treatment of Knee Osteoarthritis?

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Arthroscopy was first described to treat osteoarthritis (OA) of the knee by Burman and coauthors¹ in 1934. Over the past several decades, arthroscopic debridement of the degenerative knee has become a commonly performed orthopedic procedure. Despite its popularity, the exact role of arthroscopy in treating OA is controversial. Older, primarily uncontrolled cohort studies have suggested that arthroscopy has a variety of benefits in patients with early OA.²⁻⁶ However, a more recent study has suggested that the placebo effect may be responsible for the benefit related to arthroscopic treatment.⁷ The variety of arthroscopic procedures, the retrospective nature of the majority of published studies, and the lack of control subjects probably adds even more confusion as to which patients will benefit from arthroscopy.⁸

Additional prospective, randomized, controlled studies are needed to try and define the role of arthroscopic debridement in the treatment of OA of the knee. This is essential because it would allow for a greater efficiency in the management of these patients; those who would benefit from surgery can be indicated, whereas those who would not can be spared the unnecessary expense and operative risk of a surgical procedure. In the meantime, it is important to analyze the current literature in an effort to determine which patients are most likely to benefit from arthroscopy. The goal of this chapter is to summarize the current literature in an effort to determine whether there is, in fact, a role for arthroscopy in the treatment of OA.

OPTIONS

Numerous treatment options are available for the patient with OA of the knee. Generally speaking, nonoperative treatments are indicated initially, followed by surgical options if the former are not effective. The degree of OA in the involved knee also plays a role in the decision-making process.

Nonoperative management begins with activity modification, physical therapy, and a trial of anti-inflammatory medications. Many patients will often experience significant relief after intra-articular corticosteroid injections and hyaluronate injections. It

is important to note that the degree of pain relief, as well as how long it lasts, can be varied.⁹

Surgical management includes arthroscopic debridement and lavage, osteotomies to correct deformities, unicompartmental arthroplasty, and total knee arthroplasty. Osteotomy is indicated in younger patients with deformity and degenerative changes on one side of the knee. Unicompartmental arthroplasty is reserved for patients who have degenerative changes in primarily 1 compartment, good motion, knee stability, and no significant deformity. Finally, total knee arthroplasty is indicated in older patients with significant degenerative changes and multicompartment involvement of the knee. The role of arthroscopy in the osteoarthritic knee is not clear.

EVIDENCE

Several studies have been conducted in an effort to examine the effectiveness of arthroscopy in treating OA of the knee (Table 94-1). However, after conducting an evidence-based review of the current literature, we found only 1 study that contained Level I evidence. This study, by Moseley and colleagues,⁷ was a prospective, randomized, placebo-controlled trial of 180 patients with OA who were assigned to receive arthroscopic debridement, arthroscopic lavage, or placebo surgery. Their inclusion criteria included: (1) age < 75 years, (2) OA as defined by the American College of Rheumatology, (3) knee pain despite at least 6 months of conservative management, and (4) no arthroscopy performed on the knee in the previous 2 years. The severity of OA was assessed radiographically and graded from 1 to 4. The scores from all 3 compartments were added for a total of 0 to 12. Of note, patients were excluded for severe deformity, for a score of more than 9 on the scale, or if there was a medical contraindication. Patients and assessors of outcome were blinded to the treatment group assignment, and outcomes were assessed at multiple points over a 24-month period with the use of 5 self-reported scores. The authors conclude that the outcomes after arthroscopic lavage or arthroscopic debridement were no better than those after a placebo procedure.

TABLE 94-1. Recent studies with their respective levels of evidence regarding the treatment of knee osteoarthritis with arthroscopy

STUDY	DESIGN	CASES (N)	LEVEL OF EVIDENCE	POSITIVE RESULTS
Moseley et al. ⁷	Prospective, randomized, placebo controlled	180	I	No difference between arthroscopic group and placebo group
Dervin et al. ⁸	Retrospective case series	126	IV	44%
Jackson and Rouse ¹²	Retrospective case series	68	IV	95%
Chang et al. ¹³	Prospective comparative	32	II	44%
Aaron et al. ¹⁴	Cross-sectional cohort	122	II	65%
Jackson and Dieterichs ¹⁶	Retrospective case series	121	IV	84%
Matsusue and Thomson ¹⁷	Retrospective case series	68	IV	84%
McGinley et al. ¹⁸	Retrospective case series	77	IV	67%

Several details about this study require a more in-depth evaluation because they are certainly relevant to the authors' conclusion that surgical intervention provided no benefit compared with placebo surgery. Forty-four percent of the eligible participants declined to participate in the study, which creates a selection bias; that is, it is possible that the patients who declined to participate had lower grades of OA and, therefore, might have experienced the best outcome.¹⁰ In addition, the presence or absence of joint effusion was not reported. This is significant because some of the indications for knee arthroscopy, such as loose bodies or meniscal tears, can be manifested clinically by a joint effusion. Finally, the method of grading OA may lead to conflicting results. For example, a patient with one severely arthritic compartment may receive the same score as a patient with mild arthritis in all three compartments. These patients are probably not comparable clinically and would most likely have different outcomes after surgical intervention. Despite these criticisms, this investigation is still the only Level I study that addresses the role of arthroscopy in OA; therefore, the authors' conclusion should be acknowledged and taken into account when treating these patients.

Patients with symptomatic OA of the knee have a reported incidence rate of meniscal tears in up to 91% of magnetic resonance imaging (MRI) scans.¹¹ Some surgeons have proposed that patients who have pain secondary to clinically significant meniscal tears will benefit from arthroscopic meniscal debridement. Dervin and investigators,⁸ in a Level IV study, attempted to elicit preoperative factors that would predict a successful outcome after arthroscopy for OA of the knee. They conclude that three variables were significantly associated with clinical improvement: the presence of medial joint line tenderness, a positive Steinman test, and the presence of an unstable meniscal tear at arthroscopy. Jackson and Rouse,¹² in a Level IV study, reported 95% good to excellent results obtained with arthroscopic partial meniscectomy for clinically significant meniscal tears in the setting of substantial OA. Although Chang and colleagues¹³ (Level II) conclude that patients with OA did not experience consistent relief after arthroscopy, they do point out that the subset of patients with anterior two-thirds medial meniscal tears and any lateral meniscal tears did improve sig-

nificantly. It can be difficult to determine which meniscal tears are clinically significant; many authors will use the term *mechanical symptoms*, which includes locking and catching, and generally refers to unstable meniscal tears. Some authors have attempted to determine whether mechanical symptoms are a prognostic factor associated with a positive outcome after arthroscopic debridement. The results have been mixed. Chang and colleagues¹³ conclude that patients with mechanical symptoms tended to benefit, whereas Aaron and coworkers¹⁴ (Level II) and Livesley and coauthors¹⁵ found that the type of symptoms did not predict outcome. The term *mechanical symptoms* has a different meaning for different clinicians. Mechanical locking, which is when the knee becomes suddenly stuck in one position requiring manipulation that allows the knee to suddenly unlock, generally indicates the presence of a loose body or an unstable flap of meniscus or articular cartilage. Arthroscopy reliably eliminates this phenomenon even in the presence of arthritis. However, arthritis symptoms may not be relieved by the procedure. Lastly, the term *mechanical symptoms* is not specific to this type of locking.

Several authors have proposed that patients with low-grade OA can have substantial and long-lasting improvement after knee arthroscopy, whereas patients with high-grade OA fare less well. For example, Jackson and Dieterichs,¹⁶ in a Level IV study, note 91% excellent results at 4 to 6 years after debridement for knees in which degenerative change was limited to fibrillation, which they rate as stage 2. When the disease progressed to fragmentation of the cartilage (stage 3), results deteriorated to 77% fair or good. Aaron and coworkers¹⁴ and Livesley and coauthors¹⁵ note similar trends: Patients with low grades of OA had acceptable pain relief that lasted up to 3 years, while patients with higher grades of OA had significantly worse results. Aaron and coworkers¹⁴ also note that patients who had a joint space of 3 mm or larger on radiographs improved after arthroscopic debridement, whereas those with a joint space less than 2 mm rarely had a substantial relief of symptoms. It is fair to say that joint space directly correlates with the varying stages of OA; therefore, this finding supports the notion that patients with mild OA or larger joint spaces have better outcomes than those with higher grades of OA or smaller joint spaces. Matsusue and

Thomson¹⁷ (Level IV) stratified their results of meniscal tear debridement based on coexisting degenerative changes within the involved compartment. They found that patients with early degenerative changes, classified as grade I or II, had 87% excellent results, whereas only 7% of the patients with grade III or IV changes experienced an excellent result. Finally, McGinley and coworkers¹⁸ (Level IV) note that greater than 80% grade 4 changes within a single compartment was a risk factor for total knee arthroplasty within 2 years. Although it is difficult to compare and contrast these different studies, because many of the investigators used a different system for grading the severity of OA, there certainly seems to be a trend toward patients with early OA having better outcomes than those with advanced OA.

In a Level V article, Stuart and Lubowitz¹⁹ propose that loose bodies within the knee joint is another prognostic factor associated with a positive result after arthroscopy in patients with OA. However, we have been unable to find data to support this statement. Aaron and coworkers¹⁴ were unable to find an association between having loose bodies and a good result after arthroscopy, although only 9 of 122 patients in their study were identified as such.

Patients with fixed varus or valgus deformity, particularly valgus deformity, have consistently demonstrated poor results after arthroscopic debridement.^{14,20} Likewise, patients with bilateral disease are considered poor candidates and were reported to undergo total knee arthroplasty at a greater rate (64%) when compared with a similar group of patients with unilateral disease (33%).¹⁸

GUIDELINES

The orthopedic surgeon has many tools to treat OA of the knee, one of which is arthroscopy. It is understandable why arthroscopic debridement is so commonly performed; it is relatively safe, is an outpatient procedure, and does not preclude later definitive surgery. Unfortunately, a consensus on the role of arthroscopy in the treatment of OA still has not been established. Some patients may benefit from arthroscopy, but the challenge remains identifying which patients are likely to benefit and which ones will not.

It is important for the clinician to keep in mind that OA of the knee is not a single entity but encompasses a spectrum of pathology. It is important for future investigations to stratify the severity of OA based on functional disability and radiographs. In addition, the specifics of physical examination and clinical symptoms should also be carefully documented. These factors are instrumental in developing guidelines to determine the type of surgical candidates who will experience predictable relief after arthroscopy.

Future studies, preferably with Level I or II evidence, will need to be conducted in an effort to determine indications, or lack thereof, for arthroscopic debridement of the osteoarthritic knee. These studies should be prospective, randomized, and have a

high percentage of patient follow-up. In addition, the results should be categorized by history, physical examination, presence of loose bodies, presence of meniscal tears, and degree of OA present both radiographically and by intraoperative visualization. This will help in identifying subgroups that are amenable to arthroscopic debridement and those that are not.

RECOMMENDATIONS

Currently, insufficient evidence-based data are available to definitively recommend specific indications for the use of arthroscopy in the treatment of OA. Many of the prospective randomized studies in the literature lack stratification of arthritis severity, have poor enrollment, and have a small sample size. Other studies are retrospective in nature, lack randomization or a control group, have a selection bias, and lack a quantifiable outcome measure between groups. However, despite these limitations, we do believe that there is a role for arthroscopy in select patients with knee OA.

The senior author's (R.G.M.) current indications for arthroscopic surgery for patients with OA of the knee includes either patients who have clear mechanical locking as described earlier, or patients who have not responded successfully to conservative management, including at least non-steroidal anti-inflammatory drugs or acetaminophen as appropriate, chondroitin, and glucosamine, as well as physical therapy, and who also have mechanical symptoms (i.e., locking), meniscal tears confirmed by MRI that are believed to be symptomatic based on patient history and physical examination, mild arthritis as defined by a joint space of 3 mm or larger, and persistent pain with a mild deformity (i.e., varus < 10 degrees). We believe that arthroscopic debridement should generally not be performed in patients who have severe arthritis as defined by a joint space of less than 2 mm, fixed limb malalignment (>10 degrees), particularly valgus knees, and bilateral disease. Although we do not believe that the natural history of the arthritis can be significantly altered by arthroscopy, associated conditions such as new onset of pain from a meniscal tear or locking caused by a loose body can often be treated by arthroscopy in an arthritic knee with good results. Patients should be counseled that the degree of arthritis is probably best assessed intraoperatively, and that their clinical outcome will often depend on the severity of cartilage lesions that are seen during the arthroscopy procedure. As a result, it may not be possible to truly estimate the likelihood of success until after the operation.

Lastly, we counsel patients that arthritis symptoms tend to worsen over the long term, and that this is what they can expect over years in the future after arthroscopy in this setting. Table 94-2 provides a summary of recommendations.

TABLE 94–2. Grades of Recommendation for Summaries or Reviews of Orthopedic Surgical Studies

STATEMENTS	LEVEL OF EVIDENCE/GRADE OF RECOMMENDATION
1. Knee arthroscopy for symptomatic meniscal tears in the setting of osteoarthritis	C
2. Arthroscopic debridement for knee pain in the setting of osteoarthritis	I
3. Knee arthroscopy for loose body removal in the setting of osteoarthritis	C

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