УДК 616.72-089.2:616.728.3-007.2](045)

DOI: http://dx.doi.org/10.15674/0030-59872023456-62

A review of 2021 and 2022 AAOS guidelines for meniscal arthroscopic procedures in osteoarthritis

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For many decades, arthroscopy was considered the least invasive of all existing surgical methods of treating patients with gonarthrosis, however, carried out at the beginning of the XXI century randomized clinical trials (RCTs) demonstrated the futility of isolated lavage and debridement for this category of patients. The purpose of this work is to show trends in the indications for debridement and partial meniscectomy in patients with osteoarthritis in the 2021–2022 AAOS guidelines. Methods. AAOS 2021, 2022 recommendations for the treatment of osteoarthritis (without arthroplasty). The strength of recommendations depends on the number and quality of studies that may or may not recommend surgery. The results. In 2021, the third edition of the AAOS clinical guidelines for the treatment of osteoarthritis was released, which was supported by four studies. They suggest that arthroscopic partial meniscectomy be used for the treatment of meniscal tears in patients with concomitant mild or moderate osteoarthritis in whom physical therapy or other nonsurgical treatments have been ineffective. The 2022 AAOS guidelines reviewed 216 osteoarthritis situations and indications for arthroscopic procedures. The developed criteria are aimed at covering the most common clinical scenarios faced by qualified specialists treating osteoarthritis of the knee joint. The final decision on any particular criterion must take into account all the circumstances presented by the patient, as well as the needs and resources specific to the area or institution. Conclusions. The 2021 AAOS guidelines do not recommend arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis. According to AAOS 2022 recommendations, arthroscopic interventions are suitable for young people with arthrosis of the knee joint in one or 2–3 departments. Arthroscopy as a method of choice for the treatment of terminal gonarthrosis has exhausted itself: most studies prove the ineffectiveness of lavage, debridement, microfracturing of the subchondral bone, and partial meniscectomy.

Артроскопію багато десятиліть вважали найменш інвазивним із усіх наявних хірургічних методик лікування хворих на гонартроз, проте проведені на початку XXI ст. рандомізовані клінічні дослідження продемонстрували марність ізольованого лаважу та дебридменту. Мета. Навести тенденції розвитку показань до дебридменту й часткової меніскектомії у пацієнтів із остеоартитом у рекомендаціях AAOS 2021–2022 рр. Методи. Аналіз Керівництва AAOS 2021, 2022 р. щодо лікування остеоартриту (без ендопротезування). Доцільність показань залежить від кількості та якості досліджень, які можуть рекомендувати / не рекомендувати хірургічне втручання. Результати. У 2021 р. вийшла третя редакція клінічного Керівництва AAOS щодо лікування остеоартриту, яке обґрунтоване чотирма дослідженнями. У них артроскопічну часткову меніскектомію пропонують використовувати для лікування розривів меніска в пацієнтів із супутнім легким або помірним остеоартритом, у яких фізіотерапія чи інший консервативний метод виявилися неефективними. У 2022 р. розглянуто 216 прикладів остеоартриту та показань до артроскопічних втручань. Розроблені критерії спрямовані на охоплення найпоширеніших клінічних випадків остеоартриту колінного суглоба. Остаточне рішення щодо будь-якого конкретного критерію повинно враховувати повний аналіз хвороби, а також досвід лікаря, можливості та ресурси певної установи. Висновки. У керівництві AAOS 2021 р. артроскопія з лаважем та/або санацією в пацієнтів із первинним діагнозом «остеоартрит колінного суглоба» не рекомендована. За рекомендаціями AAOS 2022 р. у разі артрозу колінного суглоба в 1 або 2–3 відділах артроскопічні втручання проводять особам молодого віку. Артроскопія як методика вибору лікування термінальної стадії гонартрозу вичерпала себе: доведена неефективність лаважу, дебридменту, мікрофрактурингу субхондральної кістки та часткової меніскектомії. Ключові слова. Артроскопія, часткова меніскектомія, лаваж, дебридмент, колінний суглоб.

Keywords. Arthroscopy, partial meniscectomy, lavage, debridement, knee joint

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Introduction

For many decades, arthroscopy was considered the least invasive of all existing surgical methods of treating patients with gonarthrosis, however, carried out at the beginning of the 21st century randomized clinical trials (RCTs) demonstrated the ineffectiveness of isolated lavage and debridement for this category of patients. Regarding partial meniscectomy in the case of gonarthrosis, the existing evidence base remains very heterogeneous, which is reflected in the inconsistency or uncertainty of the clinical recommendations of most professional communities dealing with this problem. The most difficult choice of the doctor is endoprosthesis of the knee joint or an attempt to perform a joint-sparing operation (corrective osteotomy, arthroscopy). An arthroscopic attempt to help a patient with such disorders includes lavage, debridement (with lavage), and/or partial meniscectomy.

We analyzed the AAOS recommendations, which are based on a systematic review of published studies and study the treatment of osteoarthritis of the knee joint in adults without endoprosthetic repair [1, 2]. They cite various methods of treating osteoarthritis, namely: self-control programs (unsupervised exercise, tai chi, weight loss, aerobic walking); prescribed physical therapy (supervised exercises, manual therapy, training of the neuromuscular system, etc.); hinged knee brace and/or relief brace, assistive devices (e. g., cane, walker); nonsteroidal anti-inflammatory drugs or acetaminophen; intra-articular corticosteroids; arthroscopic partial meniscectomy; platelet-enriched plasma. These guidelines help practitioners integrate current evidence and clinical practice, and highlight gaps in the literature that require future research. They are intended for use by physicians and clinicians who treat osteoarthritis of the knee, and serve as an informational resource for the developers and practitioners of clinical practice guidelines.

Objective: To show trends in indications for debridement and partial meniscectomy in patients with osteoarthritis in the 2021–2022 AAOS guidelines.

Material and methods

AAOS 2021, 2022 recommendations for the treatment of osteoarthritis (without arthroplasty).

Their feasibility depends on the number and quality of studies that may or may not recommend surgery.

The moderate validity of the recommendations is determined by the informativeness of medium-quality studies or the data of one high-quality study.

According to the age classification adopted by WHO, the young age is 25–44 years, middle age is 45–59, elderly age is 60–74, senile age is 75–90, and long-livers are over 90 years old [3].

Results and their discussion

Lavage/debridement. In 2021, the next, third edition of the AAOS clinical recommendations for the treatment of osteoarthritis [1] was published, which was substantiated by four studies. One of them is of a high level [4], two are moderate [5, 6] and one is low [7].

A. Kirkley with co-authors. arthroscopic surgery, which included lavage and debridement combined with physical therapy and medication, was compared with the latter procedures. This randomized controlled trial showed no benefit of arthroscopic lavage and surgical treatment compared with physical therapy and medical treatment for osteoarthritis of the knee [5].

K. Kalunian et al. compared arthroscopic lavage (3,000 mL) with placebo (250 mL). The experiment was conducted in 4 different institutions and involved a large number of patients with intra-articular crystals in the knee from one institution. The arthroscopes used were smaller than the usual caliber (from 17 to 27 mm). The outcome criteria were WOMAC scores after 12 months. There were no statistically significant differences in WOMAC composite scores between the two treatment groups [6].

As a result of this study, the authors concluded that irrigation may be beneficial in patients with crystals in the knee joint.

Publication of J. Mosley et al. is an RCT comparing arthroscopic debridement, arthroscopic lavage with placebo/sham surgery. Researchers have provided strong evidence that knee arthroscopy with or without repair is no better than, and appears to be equivalent to, a placebo procedure in reducing pain and improving knee function. However, the study raised questions about the limited sample (mostly men), as well as the number of potential study participants who have an unverified assessment of knee pain. In addition, patients with significant deformity (varus or valgus) and people with late stages of the disease, who may have the worst tolerability of surgery [4], were included.

K. Saeed et al. compared hyaluronic acid injections with arthroscopic repair in patients with OA in an RCT that used only the pain component of the knee assessment. In the short term (6 months) arthroscopy did not show a better analgesic effect than injections [7].

Table

Assessment of feasibility of arthroscopic interventions in patients (interpretation of tables of criteria for appropriate use) [2]

Arthrosis stage	Mechanical symptom		Age			Compliance rating
	present	absent	young	middle	elderly	
1	2	3	4	5	6	7
Development of arthrosis in one department						
0–1	∨	—	∨	—	—	Suitable (7)
	∨	—	—	∨	—	Suitable (7)
	∨	—	—	—	∨	Can be suitable (5)
	—	∨	∨	—	—	Rarely suitable (3, +)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	—	—	—	∨	Rarely suitable (2, +)
2–3	∨	—	∨	—	—	Suitable (7)
	∨	—	—	∨	—	Can be suitable (5, –)
	∨	—	—	—	∨	Can be suitable (4)
	—	∨	∨	—	—	Rarely suitable (3, +)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)
Development of arthrosis in one department with restriction of movements						
2–3	∨	—	∨	—	—	Suitable (7)
	∨	—	—	∨	—	Can be suitable (6)
	∨	—	—	—	∨	Can be suitable (4)
	—	∨	∨	—	—	Rarely suitable (3)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)
4	∨	—	∨	—	—	Can be suitable (4)
	∨	—	—	∨	—	Rarely suitable (3)
	∨	—	—	—	∨	Rarely suitable (2, +)
	—	∨	∨	—	—	Can be suitable (4)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)
Development of arthrosis with damage to 2–3 departments						
0–1	∨	—	∨	—	—	Suitable (7)
	∨	—	—	∨	—	Suitable (7)
	∨	—	—	—	∨	Can be suitable (5)
	—	∨	∨	—	—	Rarely suitable (3)
	—	∨	—	∨	—	Rarely suitable (3, +)
	—	∨	—	—	∨	Rarely suitable (3, +)
2–3	∨	—	∨	—	—	Suitable (7)
	∨	—	—	∨	—	Can be suitable (5)
	∨	—	—	—	∨	Can be suitable (4)
	—	∨	∨	—	—	Rarely suitable (3)
	—	∨	—	∨	—	Rarely suitable (3 +)
	—	∨	—	—	∨	Rarely suitable (3 +)
Development of arthrosis with damage to 2–3 departments with restriction of movements						
	∨	—	∨	—	—	Suitable (7)
	∨	—	—	∨	—	Can be suitable (5)

Continuation of Table

1	2	3	4	5	6	7
2–3	∨	—	—	—	∨	Rarely suitable (3)
	—	∨	∨	—	—	Rarely suitable (3)
	—	∨	—	∨	—	Rarely suitable (3, +)
	—	∨	—	—	∨	Rarely suitable (3, +)
4	∨	—	∨	—	—	Can be suitable (4)
	∨	—	—	∨	—	Rarely suitable (3)
	∨	—	—	—	∨	Rarely suitable (2, +)
	—	∨	∨	—	—	Rarely suitable (3, +)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)
Isolated patellofemoral joint injury						
0–1	∨	—	∨	—	—	Can be suitable (6)
	∨	—	—	∨	—	Can be suitable (6)
	∨	—	—	—	∨	Can be suitable (5)
	—	∨	∨	—	—	Rarely suitable (3, +)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)
2–3	∨	—	∨	—	—	Can be suitable (5)
	∨	—	—	∨	—	Can be suitable (5)
	∨	—	—	—	∨	Can be suitable (4)
	—	∨	∨	—	—	Rarely suitable (3, +)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)
Isolated injury of the patellofemoral joint with limitation of movements						
2–3	∨	—	∨	—	—	Can be suitable (6)
	∨	—	—	∨	—	Can be suitable (5, –)
	∨	—	—	—	∨	Rarely suitable (3)
	—	∨	∨	—	—	Rarely suitable (3, +)
	—	∨	—	∨	—	Rarely suitable (3, +)
	—	∨	—	—	∨	Rarely suitable (3, +)
4	∨	—	∨	—	—	Can be suitable (4)
	∨	—	—	∨	—	Rarely suitable (3)
	∨	—	—	—	∨	Rarely suitable (2, +)
	—	∨	∨	—	—	Rarely suitable (2, +)
	—	∨	—	∨	—	Rarely suitable (2, +)
	—	∨	—	—	∨	Rarely suitable (2, +)

Note. Each procedure contains information on feasibility (i. e., *suitable*, *may be suitable*, or *rarely suitable*) for each clinical course of the disease, the median rating, and whether it is agreed "+" or not "–".

Because of the lack of convincing evidence to support the clinical benefit of surgical lavage combined with the increased risk of surgery, the task force decided not to recommend arthroscopic debridement and/or lavage in patients with a primary diagnosis of knee osteoarthritis.

Partial meniscectomy. The 2021 AAOS guidelines suggest that arthroscopic partial meniscectomy be used for the treatment of meniscal tears in patients with concomitant mild to moderate osteoarthritis who have failed physical therapy or other nonsurgical treatments.

The three studies discussed below compare outcomes after arthroscopic partial meniscectomy with physical therapy and demonstrate that knee arthroscopy with partial meniscectomy is as effective as physical therapy. In Questionnaire No. 5 (Population, Intervention, Comparison, and Outcome), the working group recommended exercising with or without physician supervision [2].

There are currently no studies comparing outcomes (knee pain and function) after arthroscopic partial meniscectomy with physical therapy alone in patients who failed to improve after an initial course of physical therapy. It is important to clearly define the relevant indications for arthroscopic surgery. This procedure should be used in patients with mild to moderate knee OA and an MRI-confirmed meniscal tear who have previously received conservative treatment (physical therapy, corticosteroid injections, and a course of nonsteroidal anti-inflammatory drugs) that has failed.

J. Katz et al. conducted a multicenter randomized controlled study of patients aged 45 years and older with a meniscus tear and signs of mild or moderate osteoarthritis of the knee joint [8]. The effectiveness of arthroscopic partial meniscectomy compared with standardized physical therapy in these patients was determined.

351 persons were divided into 2 groups:

I — surgical treatment and postoperative physiotherapy were carried out;

II — received only physiotherapeutic treatment with the possibility of transition to surgical intervention (at the discretion of the patient and the surgeon).

The condition of the patients was evaluated after 6 and 12 months. The main outcome was the difference in changes in physical function of the knee joint between groups according to the WOMAC osteoarthritis index. The value of improvement of this indicator after 6 months was the same in both groups. After 6 months 51 patients from group II (30 %) underwent surgery. The authors concluded that their analysis by treatment did not reveal significant differences in functional improvement of the knee in 6 months after grouping, however, 30 % of patients who received only physical therapy had to undergo surgical treatment. These patients were analyzed in their original group.

V. Van de Graaf et al. conducted a multicenter RCT to determine whether physical therapy is inferior to arthroscopic partial meniscectomy (APM) in improving knee joint function (according to patients with meniscal tears) [9]. Randomly, 321 patients were referred to APM or a predetermined protocol of physical therapy. Exclusion criteria were as follows: knee lock; previous operations on the knee joint; instability due to rupture of the anterior or posterior cruciate ligament; severe osteoarthritis (4 points on the Kellgren–Lawrence scale) and a body mass index of more than 35 kg/m^2. During 24 months patients reported changes in knee joint function according to the IKDC scale. This information was used as the primary outcome. During the 24-month follow-up, 47 patients (29 %) who received physiotherapy treatment underwent APM. The authors noted a similar level of improvement in knee joint function between the APM and physical therapy groups. They concluded that physical therapy is not inferior to APM in improving knee joint function in patients with non-obstructive meniscal injuries.

In 2007, S. Herrlin et al. conducted a prospective randomized study to compare knee joint function and physical activity after APM followed by physical exercise under the supervision of a physician or independently in patients with non-traumatic medial meniscus tear [10].

The characteristics of 90 patients were carried out according to the following scales: KOOS (assessment of the consequences of knee injuries and osteoarthritis); evaluation of the knee joint according to Lysholm; activity according to Tegner; VAS (visual analogue scale of pain). Evaluation was carried out before surgery, after 8 weeks of exercises and in 6 months after the intervention. The authors found that after surgery, both groups reported decreased pain, improved knee function, and satisfaction with the outcome ($p < 0.0001$). Thus, when analyzing knee function and quality of life improvement, they concluded that in terms of reducing pain and improving knee function, APM was no better than physician-supervised exercise.

Given the risks associated with surgery, treatment should be performed only in patients with appropriate indications, and partial meniscectomy is considered in mild to moderate knee osteoarthritis.

Three studies show that knee arthroscopy with partial meniscectomy is as effective as physical therapy. Future studies should attempt to compare outcomes (confirmed by MRI) in patients with mild to moderate osteoarthritis of the knee who underwent partial meniscectomy in the absence of improvement after a course of conservative treatment (NSAIDs, steroid injections, and physical therapy) with those who underwent surgery without conservative treatment.

The AAOS 2022 best-evidence guidelines synthesize collective expert opinion — the “gold standard”

of RCTs is missing or insufficiently detailed to identify specific patient types. 216 cases of osteoarthritis and indications for arthroscopy are given. Criteria have been developed to cover the most common clinical cases faced by qualified specialists who treat osteoarthritis of the knee joint. The final decision in any particular case must take into account all aspects related to the patient. It is also important to state that such criteria do not need to be taken into account as qualifications and experience of the doctor [2].

72 cases of osteoarthritis and indications for arthroscopic interventions were considered (Table).

These studies have proven that it is during changes in the tibio-femoral joint that interventions on the menisci should be approached with caution, as they can contribute to the development of arthrosis. The patellofemoral joint is affected less in the case of interventions on the menisci [11]. Therefore, we considered situations with damage to one or 2–3 parts of the knee joint and isolated joint damage [12].

As can be seen from the table, the main criteria for indications for arthroscopic interventions are: mechanical symptom (MS) (locking of the knee joint), age and stage of gonarthrosis. For stages 0–1 — one part of the joint is affected with MS, arthroscopic interventions are performed on young and middle-aged persons, the compliance rating is *suitable (7)*, and for elderly people, it *may be suitable (5).* In the case of the same stage of gonarthrosis without this symptom, the rating is *rarely suitable* for young, middle-aged and elderly patients *(3+, 2+).* For stages 2–3 of gonarthrosis with MS, the rating of conformity in young people is *suitable (7)*, in middle-aged and elderly people, it *can be suitable (5–, 4)*, respectively. In the absence of MS, the rating of indications for arthroscopic interventions in young, middle-aged and elderly people is *rarely appropriate (3+, 2+).* During restriction of movements in the knee joint and stages 2–3 gonarthrosis in young people with MS, the rating of compliance is *suitable (7)*, in middle-aged and elderly people, it *may be suitable (6, 4).*. In the absence of blocking of the knee joint (regardless of age), the rating is *rarely suitable (3, 2+).*

For stage 4 gonarthrosis with limitation of movements in the knee joint in young patients, regardless of the presence of MS, the indication for arthroscopy *may be suitable (4)*, in middle-aged and elderly people it is *rarely suitable (3, 2+).*

Indications for arthroscopic interventions of the knee joint in case of arthrosis of 2–3 parts of the joint. For stages 0–1 gonarthrosis with MS in young and middle-aged people, interventions are *suitable (7)*, in elderly people — *may be suitable (5).* In the absence of MS in all age groups of patients — *rarely suitable (3, 3+).* During restriction of movements in the knee joint and arthrosis of stages 2–3 arthroscopic interventions are *suitable* for young people *(7)*, and *may be suitable* for middle-aged patients *(5).* Elderly patients, despite the presence of MS, are *rarely suitable (3)*, in the case of its absence in patients of all age groups, it is *rarely suitable (3, 3+).* For stage 4 gonarthrosis, when 2–3 parts of the joint are affected and there are movement restrictions, as well as MS, then these interventions *may be suitable* for young people *(4)*, *rarely suitable* for middle-aged and elderly people *(3, 2+).* In the absence of MS in patients of all age groups, arthroscopic interventions are *rarely suitable (3, 2+).*

Isolated patellofemoral joint injury. In the case of stages 0–1 gonarthrosis and MS arthroscopy in all age groups *may be suitable (6, 5).* In the absence of MS, these interventions are *rarely suitable* in all age groups *(3+, 2+).* During the 2–3 centuries according to MS, it *may be suitable*, although the rating is lower *(5, 5, 4).* In the absence of MS — *rarely suitable (3+, 2+, 2+).*

Under the conditions of arthrosis of the patellofemoral joint of stages 2–3 with limited knee motion and MS, arthroscopic intervention *may be appropriate* in young and middle-aged individuals *(6, 5)*, but *rarely* in elderly patients *(3).* In the absence of a mechanical symptom, arthroscopic interventions are *rarely appropriate* in all age groups *(3+, 3+, 3+).*

For stage 4 arthrosis and MS, arthroscopy *may be suitable (4)* only for young people, and for middle-aged and elderly people, it is *rarely suitable (3, 2+).* In the absence of MS, arthroscopic interventions are *rarely suitable* in all age groups *(2+, 2+, 2+).*

Conclusions

In the 2021 AAOS guidelines, arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis is *not recommended.*

Arthroscopic partial meniscectomy can be used to treat meniscal tears with associated mild to moderate osteoarthritis that have failed physical or nonsurgical treatment.

According to the AAOS 2022 guidelines, for single or 2-3 compartment knee osteoarthritis, arthroscopic interventions can be used in young people (more often in the presence of a mechanical symptom), middle-aged and elderly patients *may* or *may not be suitable.*

Under the conditions of isolated injury of the patellofemoral joint, arthroscopic interventions (lavage, partial meniscectomy) at different stages of arthrosis

and different age groups *may be suitable* or *rarely suitable*.

Arthroscopy as a treatment for gonarthrosis has exhausted itself: most studies prove the ineffectiveness of lavage, debridement, microfracturing of the subchondral bone, and partial meniscectomy.

It is necessary to conduct high-quality multicenter studies that will reveal a specific group of patients with a certain phenotype of gonarthrosis in whom knee arthroscopy can be effective.

Conflict of interest. The authors declare no conflict of interest.

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The article has been sent to the editors 14.11.2023

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