Arthroscopic Partial Meniscectomy or Conservative Treatment for Nonobstructive Meniscal Tears: A Systematic Review and Meta-analysis of Randomized Controlled Trials

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Purpose: To conduct a meta-analysis of randomized controlled trials comparing the outcome of arthroscopic partial meniscectomy (APM) with conservative treatment in adults with nonobstructive meniscal tears and to recommend a treatment of choice. **Methods:** We systematically searched the databases of MEDLINE, Excerpta Medica Database, Cochrane, the National Health Service Centre for Reviews and Dissemination, and Physiotherapy Evidence Database from inception to May 2, 2016. Two authors independently searched the literature and selected eligible studies. The meta-analyses used a random-effects model. The primary outcome was physical function, measured by knee-specific patient-reported outcomes. Secondary outcomes included knee pain, activity level, the progression of osteoarthritis, adverse events, general health, and quality of life. **Results:** We included 6 randomized controlled trials, with a total of 773 patients, of whom 378 were randomized to APM and 395 were randomized to the control treatment. After pooling the data of 5 studies, we found small significant differences in favor of the APM group for physical function at 2 to 3 months (mean difference [MD] = 3.31; 95% confidence interval [CI] = 0.69-5.93; $P = .01$; $I^2 = 0\%$ [Lysholm knee score]), and at 6 months (MD = 3.56; 95% CI = 0.24-6.88; $P = .04$; $I^2 = 0\%$ (Knee injury and Osteoarthritis Outcome Score [KOOS] and Western Ontario and McMaster Universities Osteoarthritis Index); standardized MD = 0.17; 95% CI = 0.01-0.32; $P = .03$; $I^2 = 0\%$ [Lysholm knee score, KOOS, and Western Ontario and McMaster Universities Osteoarthritis Index]). We also found small significant differences for pain at 6 months (MD = 3.56; 95% CI = 0.18-6.95; $P = .04$; $I^2 = 0\%$ [KOOS] and MD = 0.56; 95% CI = 0.28-0.83; $P \leq .0001$; $I^2 = 0\%$ [visual analog scale and numeric rating scale]). We found no significant differences after 12 and 24 months. **Conclusions:** We found small, although statistically significant, favorable results of APM up to 6 months for physical function and pain. However, we found no differences at longer follow-up. **Level of Evidence:** Level I, systematic review and meta-analysis of Level I studies.

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Arthroscopic partial meniscectomy (APM) is the most performed procedure in orthopaedic surgery.[1] However, whether APM is superior to conservative treatment in patients with nonobstructive meniscal tears is controversial.[2,3]

The quality of the menisci decreases with aging: the water content increases, whereas the cellularity, collagen content, and total amount of glycosaminoglycans decrease.[4-6] This results in a meniscus that is more vulnerable to degenerative damage and injuries.

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Not surprisingly, meniscal tears are the most common type of knee injury in middle-aged and older patients.[7,8]

Meniscal tears can occur with or without mechanical obstruction. Although APM for the obstructive meniscal tear is widely accepted, APM for the symptomatic nonobstructive meniscal tear has come under scrutiny.[2,3] Knee symptoms, such as pain, in patients with nonobstructive meniscal tears may not be triggered by the meniscus, but by early stages of osteoarthritis (OA). Knee pain and meniscal function are therefore not always directly related. This is strongly supported by Englund et al.,[9] who identified meniscal tears on magnetic resonance imaging in 61% of asymptomatic volunteers more than 50 years old.

Meniscal tears can be asymptomatic, as shown by Englund et al.[9] The challenge is to determine who are and who are not likely to benefit from a meniscectomy, because surgery might not be beneficial in the asymptomatic group.

Still, APM is the most frequently performed orthopaedic surgical procedure and the numbers continue to rise. Kim et al.[7] showed that the number of APMs increased by 49% to approximately 500,000 between 1996 and 2006 in the United States, two-thirds of which were more than 45 years old. This increase was partially explained by population growth, patient demand, and the practice of defensive medicine.[7]

Recently, 2 meta-analyses were published on the outcome after arthroscopy for degenerative knee complaints (including meniscal injuries).[10,11] Both meta-analyses included studies that did not primarily focus on meniscal injuries. In this meta-analysis, we therefore aimed to summarize all available Level I studies focusing primarily on meniscal injuries.

There is currently no consensus for an evidence-based treatment of choice, being surgical or conservative, for middle-aged patients with nonobstructive meniscal tears. The purpose of this study was to conduct a meta-analysis of randomized controlled trials (RCTs) comparing the outcome of APM with conservative treatment in adults with nonobstructive meniscal tears and to recommend a treatment of choice.

We hypothesized that surgery would be equally effective as conservative treatment in the recovery of physical function in older patients with nonobstructive meniscal tears.

Methods

This meta-analysis followed the preferred reporting items for systematic reviews and meta-analyses guidelines,[12,13] and was performed in accordance with its protocol (Prospero registration number: CRD42012002870).

Eligibility Criteria

We included only RCTs in which at least 1 group of adults with primarily a meniscal injury received either APM or conservative treatment, including all types of nonoperative approach. No restrictions on publication status were imposed. Language restrictions were set to English, German, or Dutch.

We excluded studies on discoid menisci, anterior cruciate ligament injuries, or meniscal repair.

Type of Outcome Measures

The primary outcome was physical function measured by knee-specific patient-reported outcome measures (PROMs). We searched the PROMs for subscales on physical function and presented these as our primary outcome. If PROMs had no subscales, the total score was used for our primary outcome.

Our secondary outcomes included knee pain, change of activity level, the development or progression of OA, the occurrence of complications and adverse events, general health, quality of life (QoL), and return to work.

Literature Search and Information Sources

An independent medical librarian searched the following databases twice from inception to May 2, 2016: the Cochrane Central Register of Controlled Trials, the National Library of Medicine (MEDLINE), the Excerpta Medica Database, the Physiotherapy Evidence Database, and the National Health Service Centre for Reviews and Dissemination. The search strings can be found in Appendix Figure 1 (available at www.arthroscopyjournal.org). We also searched for cross-references and "cited by" articles of the included articles to ensure that no relevant studies were missed. Finally, we searched for any ongoing and unpublished trials by searching for study protocols.

Study Selection

Two members of the project group (V.A.v.d.G. and N.W.) independently assessed the eligibility of the search results with the criteria mentioned above by screening all titles and abstract. Any discrepancies were resolved by consensus.

Data Collection Process

One project member extracted the data into a modified Cochrane Collaboration data extraction form. Another project member checked the extraction forms for accuracy and completeness. Follow-up publications of the same study were included as one. Any disagreements were resolved by consensus.

For continuous outcomes, we extracted the means with standard deviations or the means with 95% confidence intervals (CI). We contacted the corresponding authors for any additionally required data.