

Osteoarthritis and Cartilage



Mechanical symptoms as an indication for knee arthroscopy in patients with degenerative meniscus tear: a prospective cohort study

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SUMMARY

Objective: According to prevailing consensus, patients with mechanical symptoms are those considered to most likely benefit from arthroscopic surgery. The aim of this study was to determine the value of using patients' pre-operative self-reports of mechanical symptoms as a justification surgery in patients with degenerative meniscus tear/knee disease.

Design: Pragmatic prospective cohort of 900 consecutive patients with symptomatic degenerative knee disease and meniscus tear undergoing arthroscopic partial meniscectomy (APM) was collected from one public orthopedic referral center specialized in arthroscopic surgery during 2007–2011. The patients' subjective satisfaction, self-rated improvement, change in Western Ontario Meniscal Evaluation Tool (WOMET) score, and patients' ratings of the knee using a numerical rating scale (NRS) was assessed at 1 year postoperatively. Multivariable regression models, adjusted for possible confounders and intermediates, were used to compare the outcomes in those with and without preoperative mechanical symptoms.

Results: The proportion of patients satisfied with their knee 12 months after arthroscopy was significantly lower among those with preoperative mechanical symptoms than among those without (61% vs 75%, multivariable adjusted risk ratio [RR] 0.84; 95% confidence interval [CI] 0.76, 0.92). Similarly, the proportion reporting improvement was lower (RR 0.91; 95% CI 0.85, 0.97). No statistically significant difference was found in change in WOMET or NRS between the two groups. Of those with preoperative mechanical symptoms, 47% reported persistent symptoms at 12 months postoperatively.

Conclusions: Our observational data contradicts the current tenet of using patients' self-report of mechanical symptoms as a justification for performing arthroscopic surgery on patients with degenerative meniscus tear.

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Introduction

Osteoarthritis (OA) of the knee or degenerative knee disease, with associated joint pain and reduced physical function, is the most frequent cause of musculoskeletal disability in the developed world¹. The use of knee arthroscopy to treat degenerative knee

disease is common worldwide². The surgery typically comprises of knee lavage, debridement and most importantly, in a case of torn meniscus, partial meniscectomy. One million knee arthroscopies, 700,000 of them involving the meniscus, are performed annually in the United States (US) alone, making this one of the most common surgical procedures³. Of these, 70% are carried out in patients aged >45 years, i.e., patients typically with a degenerative knee disease³.

Numerous organizations, including the American Academy of Orthopaedic Surgeons (AAOS)⁴, the National Institute for Health and Clinical Excellence (NICE)⁵ and the Osteoarthritis Research Society International (OARSI)⁶ have taken a stand of recommending against performing knee arthroscopy on patients with established knee OA. However, these guidelines still leave an option for

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arthroscopic surgery for patients with a diagnosis of meniscus tear^{5,6} or refrain from any recommendations for such patients⁴. An obvious change in arthroscopic practice has ensued: decline in the incidence of debridements or lavages for knee OA has been compensated for by a commensurate increase in the incidence of meniscal surgeries (meniscectomies)^{7–10}.

Recently published high-quality RCTs challenge even the indications of meniscus surgery, as they have consistently shown that in patients with a degenerative meniscus tear and mild or no OA, arthroscopic partial meniscectomy (APM) does not provide a better outcome than physical therapy or sham surgery^{11,12}. Despite this, the advocates of knee arthroscopy argue that there are subgroups of patients “likely to benefit from APM”, patients with so-called “mechanical symptoms” (sensations of knee catching or locking) being the most obvious candidates^{13–16}. For example, in a recently published survey among orthopaedic surgeons in the US, mechanical symptoms was not even included because the researchers considered that there would be virtual unanimity among orthopaedic surgeons that these patients require surgery¹⁷.

The assertion that patients with mechanical symptoms represent a subgroup with favourable response to APM is plausible. Knee catching or locking is currently believed to result from a mechanical blocking mechanism in the knee – a piece of the joint structure lodging between the articular surfaces. And because degenerative meniscus tears are very common pathologic alterations found by arthroscopy in the knee joints of patients with degenerative knee disease, trimming the torn meniscus should improve the apparent mechanical derangement. However, the actual evidence to support such strategy is lacking.

We hypothesized that if mechanical symptoms do indeed constitute a valid indication for knee arthroscopy, then we should be able to show that patients with mechanical symptoms benefit from APM more than those without these symptoms.

Methods

Study sample

As a part of our ongoing initiative to study the efficacy of APM in patients with degenerative knee disease¹⁸, all patients undergoing knee arthroscopy at a single orthopaedic institution between January 2007 and December 2011 were asked to take part in a prospective follow-up (so called pragmatic cohort design). During the entire 5-year sampling period, all 22 surgeons had complete independence over indications for knee arthroscopy, preoperative imaging, and procedures deemed necessary at arthroscopy. The research group was only responsible for the execution of the follow-up of the patients. From an overall cohort of 2090 surgeries, for this analysis, we selected those with a clearly non-traumatic onset of symptoms and an arthroscopically verified meniscus tear requiring partial meniscectomy (900 patients/932 surgical procedures, Fig. 1). The protocol was approved by the Institutional Review Board of Pirkanmaa Hospital District (R06157) and has been described in detail elsewhere¹⁸.

Knee arthroscopy

Knee arthroscopy was carried out using anterolateral and anteromedial portals and a standard 4 mm arthroscope. Arthroscopic evaluation included recording of the presence of intra-articular pathology (meniscus tears, loose bodies and characterization of chondral lesions of both tibiofemoral and patellofemoral chondral surfaces). Intraoperatively, cartilage degeneration of all three knee compartments was graded by the operating surgeon using a modification of the International Cartilage Repair Society

(ICRS) system¹⁹, the assessment basing only on the depth (but not size) of the lesion(s). These intraoperative findings on cartilage degeneration were then converted into three category grading (no changes, early OA, or OA) (For details, see Table II). Following diagnostic arthroscopy, the procedures deemed necessary by the operating surgeon were carried out. The joint was then carefully irrigated and evacuated. No knee immobilizer was used post-operatively, and range-of-motion exercises and gait were allowed as tolerated, except for patients undergoing microfracture ($n = 25$, 2.7% of the entire cohort).

Outcome measures

All patients completed a questionnaire that was used to document information on their knee status and presence of mechanical symptoms preoperatively and at 12-month follow-up. Four outcomes were used to assess different aspects of the outcome after surgery, including a query eliciting patients' subjective satisfaction and perceptions on possible improvement (both only 12 months postoperatively), a disease-specific health-related quality of life instrument Western Ontario Meniscal Evaluation Tool (WOMET), and a simple numerical rating scale (NRS) for knee pain. However, no single primary outcome was defined *a priori*.

In addition to these queries carried out preoperatively and 12 months after surgery, a sub-group of 482 consecutive patients (all patients undergoing surgery in 2007 and 2008, 487 procedures) also responded to the question about mechanical symptoms at two and 6 months postoperatively to provide information on the possible fluctuation of these symptoms.

Patient satisfaction

Patients' global assessment of satisfaction with their knee 12 months after arthroscopy was elicited using the following question: “How satisfied are you with your knee at present?” on a 5-point Likert scale (Supplementary Table 1.1). As before²⁰, the responses “Very satisfied” or “Satisfied” were categorized as satisfied, while responses “Neither satisfied nor dissatisfied”, “Dissatisfied” and “Very dissatisfied” were categorized as dissatisfied.

Self-rated improvement

We also elicited patients' opinions on the success of arthroscopy using a standard global impression of change question: “How do you rate your knee now, 12 months after arthroscopy?” on a 5-point Likert scale (Supplementary Table 1.2). Similarly to satisfaction, the responses “Much better” and “Better” were considered to indicate improvement, while responses “Unchanged”, “Worse” or “Much worse” were deemed not improved.

The WOMET

WOMET is a disease-specific tool designed to evaluate health related quality of life (HRQoL) in patients with meniscal pathology²¹ and was recently validated for patients with degenerative meniscus tear²². Scores range from 0 to 100, with 0 indicating the worst possible situation and 100 the best. If there were 1–3 items missing, we substituted the missing value(s) with the average value for the answered items according to the protocol described previously for the Western Ontario and McMaster Universities Index (WOMAC)²³, a similar outcome tool for established knee OA. This procedure was carried out for 55 and 21 surgeries at the preoperative and 12-month follow up assessment points respectively. If more than three items were missing, total score was not calculated and was defined as missing. However, for the analyses, this data

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