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OPEN ACCESS

Arthroscopic surgery for degenerative knee arthritis and meniscal tears: a clinical practice guideline

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What is the role of arthroscopic surgery in degenerative knee disease? An expert panel produced these recommendations based on a linked systematic review triggered by a randomised trial published in *The BMJ* in June 2016, which found that, among patients with a degenerative medial meniscus tear, knee arthroscopy was no better than exercise therapy. The panel make a strong recommendation against arthroscopy for degenerative knee disease.

Box 1 shows all of the articles and evidence linked in this Rapid Recommendation package. The infographic provides an overview of the absolute benefits and harms of arthroscopy in standard GRADE format. Table 1 below shows any evidence that has emerged since the publication of this article.

What you need to know

- We make a strong recommendation against the use of arthroscopy in nearly all patients with degenerative knee disease, based on linked systematic reviews; further research is unlikely to alter this recommendation
- This recommendation applies to patients with or without imaging evidence of osteoarthritis, mechanical symptoms, or sudden symptom onset
- Healthcare administrators and funders may use the number of arthroscopies performed in patients with degenerative knee disease as an indicator of quality care.
- Knee arthroscopy is the most common orthopaedic procedure in countries with available data
- This Rapid Recommendation package was triggered by a randomised controlled trial published in *The BMJ* in June 2016 which found that, among patients with a degenerative medial meniscus tear, knee arthroscopy was no better than exercise therapy

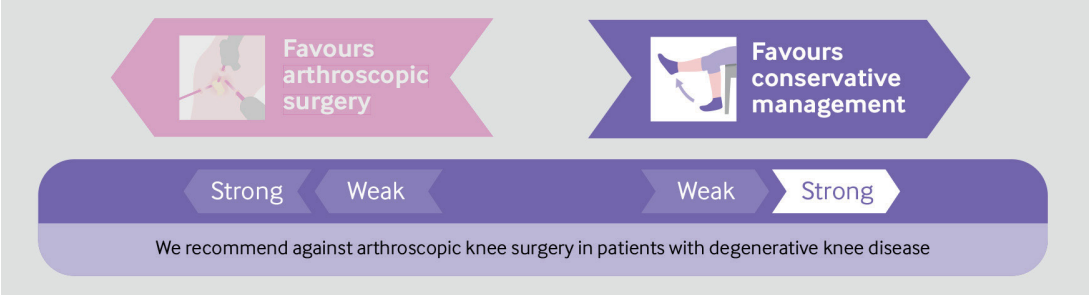
CURRENT PRACTICE

Approximately 25% of people older than 50 years experience knee pain from degenerative knee disease (box 2).[1 2] Management options include watchful waiting, weight loss if overweight, a variety of interventions led by physical therapists, exercise, oral or topical pain medications such as non-steroidal anti-inflammatory drugs, intra-articular corticosteroid and other injections, arthroscopic knee surgery, and knee replacement or osteotomy. The preferred combination or sequence of these options is not clear and probably varies between patients.

Knee replacement is the only definitive therapy, but it is reserved for patients with severe disease after non-operative management has been unsuccessful.[3 4] Some believe that arthroscopic debridement, including washout of intra-articular debris, with or without arthroscopic partial meniscectomy to remove damaged meniscus, may improve pain and function.

Current guidelines generally discourage arthroscopy for patients with clear radiographic evidence of osteoarthritis alone, but several support or do not make clear statements regarding arthroscopic surgery in other common groups of patients (table 2).

Arthroscopic knee surgery for degenerative knee disease is the most common orthopaedic procedure in countries with available data[5] and on a global scale is performed more than two million times



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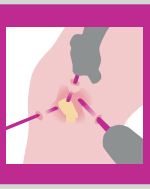
Population

People with degenerative knee disease

Including people with or without:

- Radiographic evidence of osteoarthritis
- Mild to severe osteoarthritis
- Mechanical symptoms
- Acute onset knee pain
- Meniscal tears

Choice of intervention



Arthroscopic surgery

Arthroscopic surgery with or without partial meniscectomy or debridement

or

Conservative management

Any conservative management strategy (exercise therapy, injections, drugs)

Recommendations

Favours arthroscopic surgery — **Favours conservative management**

Strong | Weak | Weak | Strong

We recommend against arthroscopic knee surgery in patients with degenerative knee disease

Comparison of benefits and harms

Favours arthroscopic surgery | No important difference | Favours conservative management

Long term benefits (1–2 years)	Mean score (0–100, high better)			Evidence quality
Pain	21.9	No important difference	18.8	★★★★ High
Function	13.3	No important difference	10.1	★★★☆ Moderate
Short term benefits (<3 months)	Mean score (0–100, high better)			
Pain	20.4	5.38 higher	15.0	★★★★ High
Function	14.2	4.94 higher	9.3	★★★☆ Moderate
Short term harms (<3 months)	Events per 1000 people			
Venous thromboembolism	5	5 fewer	0	★★☆☆ Low
Infection	2	2 fewer	0	★★☆☆ Low

Key practical issues

Arthroscopic surgery	Conservative management
Performed by a surgeon, in an operating theatre	May be performed in hospital or the community
Recovery typically between 2 to 6 weeks	No recovery time
At least 1–2 weeks off work, depending on speed of recovery and physical demands of job	Time off work may be required for appointments, such as physiotherapy and injections

Interpreting the outcomes

The panel agreed "Minimally important difference" scores for pain and function, which represent what most patients would consider a worthwhile change:

Pain 12 | Function 8

Preferences and values

The panel believes that almost everyone would prefer to avoid the pain and inconvenience of the recovery period after arthroscopy, since it offers only a small chance of a small benefit

Resourcing

Arthroscopy is not cost-effective from a societal perspective

Siemieniuk RAC, *et al*. *Br J Sports Med* 2018;**52**:313. doi:10.1136/bjsports-2017-j1982rep

Box 1 Linked articles in this *BMJ* Rapid Recommendations cluster

- Siemieniuk RAC, Harris IA, Agoritsas T, *et al*. Arthroscopic surgery for degenerative knee arthritis and meniscal tears: a clinical practice guideline. *BMJ* 2017;257:j1982. doi:10.1136/bmj.j1982
  - Summary of the results from the Rapid Recommendation process
- Brignardello-Peterson R, Guyatt GH, Schandelmaier S, *et al*. Knee arthroscopy versus conservative management in patients with degenerative knee disease: a systematic review. *BMJ Open* 2017;7:e016114. doi:10.1136/bmjopen-2017-016114
  - Review of all available randomised trials that assessed the benefits of knee arthroscopy compared with non-operative care and observational studies that assessed risks
- Devji T, Guyatt GH, Lytvyn L, *et al*. Application of minimal important differences in degenerative knee disease outcomes: a systematic review and case study to inform BMJ Rapid Recommendations. *BMJ Open* 2017;7:e015587. doi:10.1136/bmjopen-2016-015587
  - Review addressing what level of individual change on a given scale is important to patients (minimally important difference). The study informed sensitivity analyses for the review on net benefit, informed discussions on patient values and preferences, and was key to interpreting the magnitude of effect sizes and the strength of the recommendation
- MAGICapp (www.magicapp.org)
  - Expanded version of the results with multilayered recommendations, evidence summaries, and decision aids for use on all devices

Box 2 What is degenerative knee disease?

- Degenerative knee disease is an inclusive term, which many consider synonymous with osteoarthritis. We use the term degenerative knee disease to explicitly include patients with knee pain, particularly if they are >35 years old, with or without:
  - Imaging evidence of osteoarthritis
  - Meniscus tears
  - Locking, clicking, or other mechanical symptoms except persistent objective locked knee
  - Acute or subacute onset of symptoms
- Most people with degenerative arthritis have at least one of these characteristics.[14] The term degenerative knee disease does not include patients having recent debut of their symptoms after a major knee trauma with acute onset of joint swelling (such as haemarthrosis)

Table 1 New evidence which has emerged after initial publication

Date	New evidence	Citation	Findings	Implications for recommendation(s)
There are currently no updates to the article				

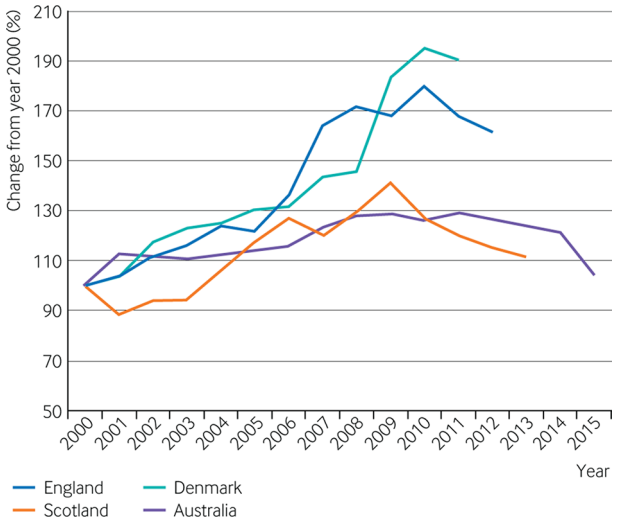


Figure 1 Population adjusted trends in frequency of knee arthroscopy; percent. Arthroscopic knee surgery remains common despite accumulating evidence suggesting little benefit.

each year (figure 1).[6–9] Arthroscopic procedures for degenerative knee disease cost more than $3bn per year in the US alone.[10] A high prevalence of features advocated to respond positively to arthroscopic surgery (such as meniscal tears, mechanical symptoms, and sudden symptom onset) as well as financial incentives may explain why arthroscopic knee surgery continues to be so common despite recommendations against its use for osteoarthritis. Further, patients may be frustrated with their

Table 2 Support from current guidance for arthroscopic surgery in patients with subgroups of degenerative knee disease

	Lavage or debridement			Partial meniscectomy for meniscal tears	
	Patients with radiographic osteoarthritis	Patients without radiographic osteoarthritis	Patients with mechanical symptoms	Patients with evidence of osteoarthritis	Patients without evidence of osteoarthritis
AAOS[24]	Against	Supportive	Supportive	Supportive	Supportive
NICE[25 26]	Against	Against	For	No comment	No comment
BOA[27]*	Against	For	For	No comment	For
AOA[28]*	Against	No comment	No comment	Against	For
OARSI[29 30]	Against	No comment	No comment	Supportive	No comment

For= Explicit statement that arthroscopy should be performed in some patients.
Against= Explicit statement that arthroscopy should not be performed in some patients.
Supportive= Seemingly supportive of arthroscopy in some contexts.
*Official statement, not guidelines.
AAOS, American Academy of Orthopaedic Surgeons; AOA, Australian Orthopaedic Association; BOA, British Orthopaedic Association; ESSKSA, European Society for Sports Traumatology, Knee Surgery and Arthroscopy; NICE, National Institute of Health and Care Extdence; OARSI Osteoarthritis Research Society International.

symptoms, having tried several less invasive management strategies by the time that they see the surgeon, and in many cases this may come with an expectation for surgical management. Moreover, many patients experience important and marked improvements after arthroscopy, which may be erroneously attributed to the effects of the procedure itself instead of the natural course of the disease, co-interventions, or placebo effects.

THE EVIDENCE

The panel requested two systematic reviews to inform the recommendation.[11 12]

The systematic review on the net benefit of knee arthroscopy compared with non-operative care pools data from 13 randomised trials for benefit outcomes (1668 patients) and an additional 12 observational studies for complications (>1.8 million patients).[12] Figure 2 gives an overview of the patients included, the study funding, and patient involvement in the design of the studies.

Panel members identified three outcomespain, function, and quality of lifeas the most important for patients with degenerative knee disease who are considering surgery. Although the included studies reported these patient-important outcomes, it is difficult to know whether changes recorded on an instrument measuring subjective symptoms are important to those with symptomsfor example, a ch ange of three points might have completely different meanings in two different pain scales.

Therefore, a second team performed a linked systematic review addressing what level of individual change on a given scale is important to patients,[11] a characteristic called the minimally important difference (MID).[13] The study identified a range of credible MIDs for each key outcome; this range of MID estimates informed sensitivity analyses for the review on net benefit, informed discussions on the patient values and preferences, and was key to interpreting the magnitude of effect sizes as well as the strength of the recommendation.[11]

UNDERSTANDING THE RECOMMENDATIONS

The infographic provides an overview of the benefits and harms of arthroscopy in standard GRADE format. Estimates of baseline risk for effects comes from the control arms of the trials; for complications, comparator risk was assumed to be nil.

The panel is confident that arthroscopic knee surgery does not, on average, result in an improvement in long term pain or function. Most patients will experience an important improvement in pain and function without arthroscopy. However, in <15% of participants, arthroscopic surgery resulted in a small or very small improvement in pain or function at 3 months after surgerythis benefit was not sustained at 1 year. In addition to the burden of undergoing knee arthroscopy (see practical issues below), there are rare but important harms,

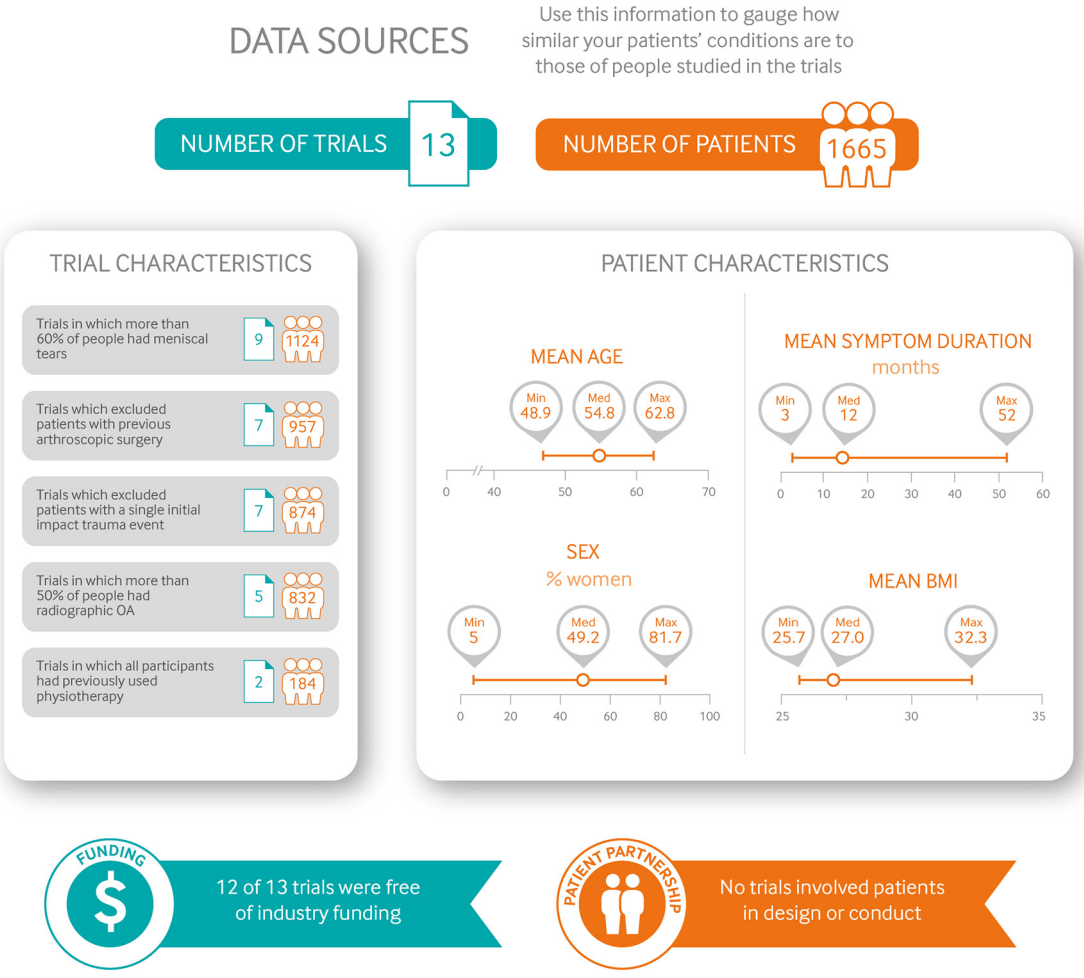


Figure 2 Characteristics of patients and trials included in systematic review of arthroscopic knee surgery.

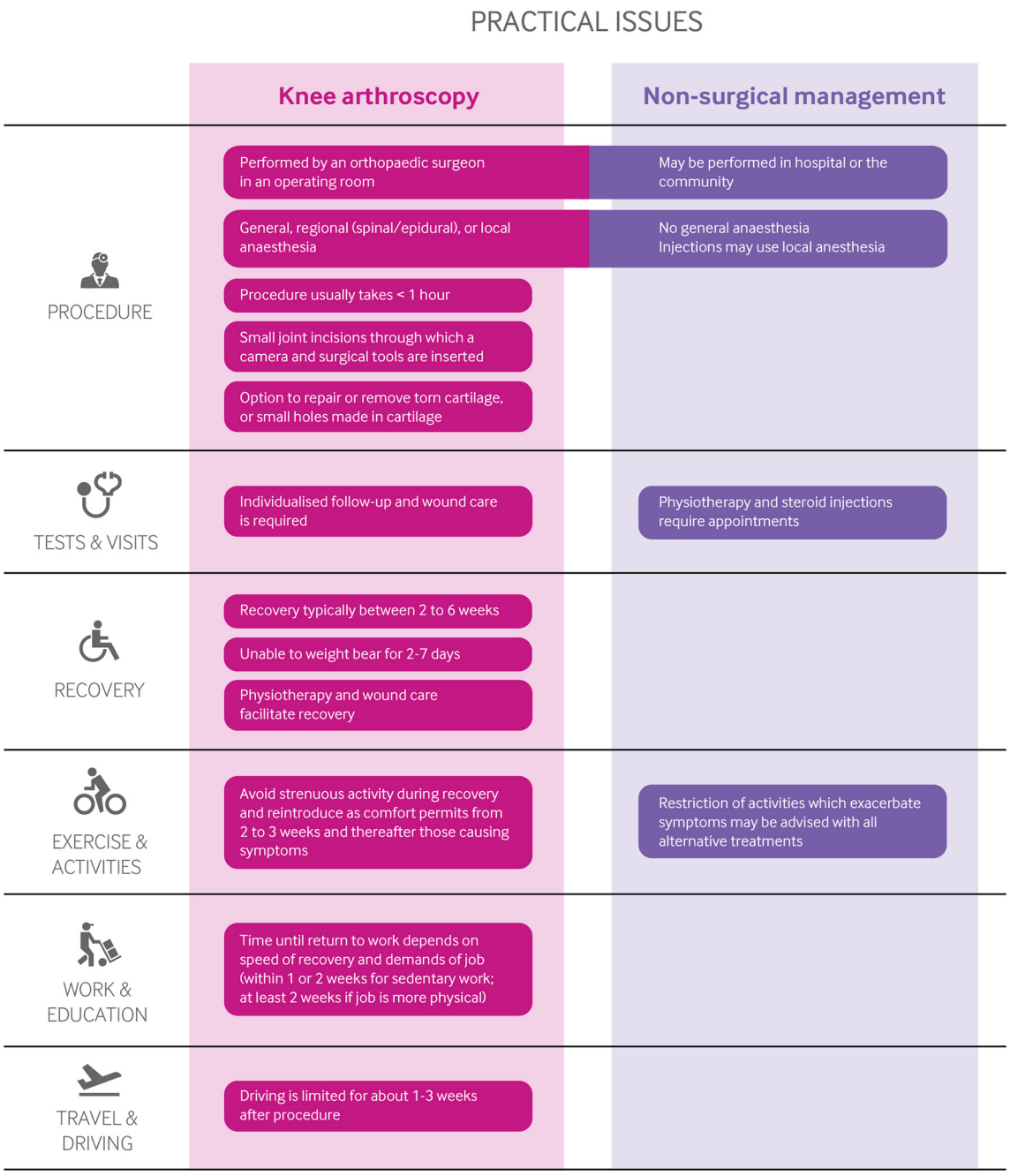


Figure 3 Practical issues about use of arthroscopic knee surgery versus non-surgical management for degenerative knee disease.

although the precision in these estimates is uncertain (low quality of evidence).

It is unlikely that new information will change interpretation of the key outcomes of pain, knee function, and quality of life (as implied by high to moderate quality of evidence).

The panel is confident that the randomised controlled trials included adequate representation from groups commonly cited to derive benefit from arthroscopic knee surgery for degenerative knee diseasenotably those with meniscal tears, no or minimal radiographic evidence of osteoarthritis, and those with sudden but non-traumatic symptom onset. Thus the recommendation applies to all or almost all patients with degenerative knee disease. Further, the evidence applies to patients with any severity of mechanical symptoms, with the only possible exception being those who are objectively unable to fully extend their knee (that is, a true locked knee). We did not consider young patients with sports related injuries or patients with major trauma in any age.

Trials that enrolled a majority of patients without radiographic osteoarthritis showed similar effect sizes to trials enrolling patients with radiographic evidence of osteoarthritis. Most of these trials exclusively included patients with meniscus tears. Meniscus tears are common, usually incidental findings, and unlikely to be the cause of knee pain, aching, or stiffness.[14] Mechanical symptoms were also a prominent feature for most trial participants, and many had sudden or subacute onset of symptoms.[15–18] Given that there is evidence of harm and no evidence of important lasting benefit in any subgroup, the panel believes that the burden of proof rests with those who suggest benefit for any other particular subgroup before arthroscopic surgery is routinely performed in any subgroup of patients.

How the recommendation was created

A randomised controlled trial published in *The BMJ* in June 2016 found that, among patients with a degenerative medial meniscus tear, knee arthroscopy was no better than exercise therapy.[32] This study adds to the body of evidence suggesting that the benefits of arthroscopy may not outweigh the burden and risks.[33 34] The *RapidRecs* executive felt that the study, when considered in context of the full body of evidence, might change practice.[35]

Our international panel including orthopaedic surgeons, a rheumatologist, physiotherapists, a general practitioner, general internists, epidemiologists, methodologists, and people with lived experience of degenerative knee disease (including those who had undergone and those who had not undergone arthroscopy) met to discuss the evidence. No person had financial conflicts of interest; intellectual and professional conflicts were minimised and managed (see online appendix 1 on bmj.com).

The panel followed the *BMJ* Rapid Recommendations procedures for creating a trustworthy recommendation[35 36] and used the GRADE approach to critically appraise the evidence and create recommendations (see online appendix 2).[37] The panel considered the balance of benefits, harms, and burdens of the procedure, the quality of evidence for each outcome, typical and expected variations in patient values and preferences, and acceptability. Recommendations can be strong or weak, for or against a course of action.

Education into practice

- Project: how many arthroscopic procedures are scheduled in your organisation for degenerative knee disease?
- Based on the information you have read in this article or in this package of Rapid Recommendation articles, is there anything which you might alter your practice?
- To what extent might you use information in this article to alter the conversations you have with patients with degenerative knee disease, or those considering arthroscopic surgery?

Practical issues

It takes between two and 6 weeks to recover from arthroscopy, during which time patients may experience pain, swelling, and limited function.[19 20] Most patients cannot bear full weight on the leg (that is, they may need crutches) in the first week after surgery, and driving or physical activity is limited during the recovery period.[19] Figure 3 outlines the key practical issues for those considering arthroscopic knee surgery versus non-surgical management for degenerative knee disease.

Degenerative knee disease is a chronic condition in which symptoms fluctuate. On average, pain tends to improve over time after seeing a physician for pain,[12 21] and delaying knee replacement is encouraged when possible.[3]

Values and preferences

Our strong recommendation against arthroscopy reflects a low value on a modest probability (<15%) of small or very small improvement in short term pain and function that does not persist to 1 year, and a higher value on avoiding the burden, postoperative limitations, and rare serious adverse effects associated with knee arthroscopy. The panel, including the patient participants, felt that almost all patients would share these values. The recommendation is not applicable to patients who do not share these values (that is, those who place a high value on a small, uncertain, and transient reduction in pain and function, and a low value on avoiding the burden and postoperative limitation associated with arthroscopy).

Costs and resources

The panel focused on the patient perspective rather than that of society when formulating the recommendation. However, implementation of this recommendation will almost certainly result in considerable cost savings for health funders. A rigorous economic analysis found that knee arthroscopy for degenerative knee disease is not close to cost effective by traditional standards, even in extreme scenarios that assume a benefit with arthroscopy.[22] The panel made a strong recommendation against arthroscopy, which applies to almost all patients with degenerative knee disease, implying that non-use of knee arthroscopy can be used as a performance measure or tied to health funding.[23]

Future research

Key research questions to inform decision makers and future guidelines are:

- Randomised trials—Does arthroscopic knee surgery benefit patients who are objectively unable to fully extend their knee or who have persistent, severe, and frequent mechanical symptoms?
- Implementation studies—What are the most effective ways to reduce the overuse of arthroscopic surgery for degenerative knee disease?

How patients were involved in the creation of this article

Three people with lived experience of osteoarthritis, one of whom had arthroscopic knee surgery, were full panel members. These panel members identified important outcomes and led the discussion on values and preferences. Pain was weighed as higher importance for most patients: for example, the patient panel members felt that a possible small benefit to function without a reduction in pain would be unimportant to almost all patients. Those with lived experience identified key practical issues including concerns with cost and accessibility for both arthroscopy and interventions provided by physiotherapists. The members participated in the teleconferences and email discussions and met all authorship criteria.

UPDATES TO THIS ARTICLE

Table 1 shows evidence which has emerged since the publication of this article. As new evidence is published, a group will assess the new evidence and make a judgement on to what extent it is expected to alter the recommendation.

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Competing interests All authors have completed the BMJ Rapid Recommendations interests disclosure form, and a detailed, contextualised description of all disclosures is reported in appendix 1. As with all BMJ Rapid Recommendations, the executive team and The BMJ judged that no panel member had any financial conflict of interest. Professional and academic interests are minimised as much as possible, while maintaining necessary expertise on the panel to make fully informed decisions.

Provenance and peer review Not commissioned; externally peer reviewed.

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