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

Reed A C Siemieniuk,1 2 Ian A Harris,3 4 Thomas Agoritsas,1 5 Rudolf W Poolman,6 Romina Brignardello-Petersen,1 7 Stijn Van de Velde,8 Rachelle Buchbinder,9 10 Martin Englund,11 Lyubov Lytvyn,12 Casey Quinlan,13 Lise Helsing,14 Gunnar Knutsen,15 Nina Rydland Olsen,16 Helen Macdonald,17 Louise Hailey,18 Hazel M Wilson,19 Anne Lydiatt,20 Annette Kristiansen21 22

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 2 below shows any evidence that has emerged since the publication of this article.

Current practice
Approximately 25% of people older than 50 years experience knee pain from degenerative knee disease (box 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. Some believe that arthroscopic debridement, including wash-out 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 1).
**RAPID RECOMMENDATIONS**

**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
- **Conservative management**
  - Any conservative management strategy (exercise therapy, injections, drugs)

**Recommendations**
- **Favours arthroscopic surgery**
  - Strong
  - **Favours conservative management**
    - Weak

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

**Comparison of benefits and harms**

<table>
<thead>
<tr>
<th></th>
<th>Long term benefits (1-2 years)</th>
<th>Evidence quality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean score (0-100, high better)</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>21.9</td>
<td>Strong</td>
</tr>
<tr>
<td>Function</td>
<td>13.3</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Short term benefits (&lt;3 months)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean score (0-100, high better)</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>20.4</td>
<td>Strong</td>
</tr>
<tr>
<td>Function</td>
<td>14.2</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Short term harms (&lt;3 months)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events per 1000 people</td>
<td></td>
</tr>
<tr>
<td>Venous thromboembolism</td>
<td>5</td>
<td>Strong</td>
</tr>
<tr>
<td>Infection</td>
<td>2</td>
<td>Strong</td>
</tr>
</tbody>
</table>

**Key practical issues**

**Arthroscopic surgery**
- Performed by a surgeon, in an operating theatre
- Recovery typically between 2 to 6 weeks
- At least 1-2 weeks off work, depending on speed of recovery and physical demands of job

**Conservative management**
- May be performed in hospital or the community
- No recovery time
- 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.
Arthroscopic knee surgery for degenerative knee disease is the most common orthopaedic procedure in countries with available data and on a global scale is performed more than two million times each year (fig 1). Arthrosopic procedures for degenerative knee disease cost more than $3bn per year in the US alone. 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 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. 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). 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 outcomes—pain, function, and quality of life—as 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 symptoms—for example, a change 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, a characteristic called the minimally important difference (MID). 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.

Understanding the recommendations

The infographic provides an overview of the benefits and harms of arthroscopy in standard GRADE format.

---

Box 1 | Linked articles in this BMJ Rapid Recommendations cluster
- Summary of the results from the Rapid Recommendation process
  - Review of all available randomised trials that assessed the benefits of knee arthroscopy compared with non-operative care and observational studies that assessed risks
  - 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)

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
  - Meniscal 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. 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 | Support from current guidance for arthroscopic surgery in patients with subgroups of degenerative knee disease

<table>
<thead>
<tr>
<th>Lavage or debridement</th>
<th>Partial meniscectomy for meniscal tears</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients with radiographic osteoarthritis</strong></td>
<td><strong>Patients with evidence of osteoarthritis</strong></td>
</tr>
<tr>
<td><strong>Patients without mechanical symptoms</strong></td>
<td><strong>Patients with evidence of osteoarthritis</strong></td>
</tr>
<tr>
<td>AAOSS 22</td>
<td>Against</td>
</tr>
<tr>
<td>NICE 14</td>
<td>Against</td>
</tr>
<tr>
<td>ESSKA 22</td>
<td>Against</td>
</tr>
</tbody>
</table>


Against = Explicit statement that arthroscopy should not be performed in some patients.
Supportive = Seemingly supportive of arthroscopy in some contexts.
Official statement, not guidelines.
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 three months after surgery—this benefit was not sustained at one year. In addition to the burden of undergoing knee arthroscopy (see practical issues below), there are rare but important harms, 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 disease—notably 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. Mechanical symptoms were also a prominent feature for most trial participants, and many had sudden or subacute onset of symptoms. 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.

**Practical issues**

It takes between two and six weeks to recover from arthroscopy, during which time patients may experience pain, swelling, and limited function. 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. 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, and delaying knee replacement is encouraged when possible.

**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 one 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...
### RAPID RECOMMENDATIONS

#### PRACTICAL ISSUES

<table>
<thead>
<tr>
<th>Knee arthroscopy</th>
<th>Non surgical management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROCEDURE</strong></td>
<td></td>
</tr>
<tr>
<td>Performed by an orthopaedic surgeon in an operating room</td>
<td>May be performed in hospital or the community</td>
</tr>
<tr>
<td>General, regional (spinal/epidural), or local anaesthesia</td>
<td>No general anaesthesia</td>
</tr>
<tr>
<td>Procedure usually takes &lt; 1 hour</td>
<td>Injections may use local anaesthesia</td>
</tr>
<tr>
<td>Small joint incisions through which a camera and surgical tools are inserted</td>
<td></td>
</tr>
<tr>
<td>Option to repair or remove of torn cartilage, or small holes made in cartilage</td>
<td></td>
</tr>
<tr>
<td><strong>TESTS &amp; VISITS</strong></td>
<td></td>
</tr>
<tr>
<td>Individualized follow-up and wound care is required</td>
<td>Physiotherapy and steroids injections require appointments</td>
</tr>
<tr>
<td><strong>RECOVERY</strong></td>
<td></td>
</tr>
<tr>
<td>Recovery typically between 2 to 6 weeks</td>
<td></td>
</tr>
<tr>
<td>Unable to weight bear for 2-7 days</td>
<td></td>
</tr>
<tr>
<td>Physiotherapy and wound care facilitate recovery</td>
<td></td>
</tr>
<tr>
<td><strong>EXERCISE &amp; ACTIVITIES</strong></td>
<td></td>
</tr>
<tr>
<td>Avoid strenuous activity during recovery and reintroduce as comfort permits from</td>
<td>Restriction of activities which exacerbate symptoms may be advised with all alternative treatments</td>
</tr>
<tr>
<td>2 to 3 weeks and thereafter those causing symptoms</td>
<td></td>
</tr>
<tr>
<td><strong>WORK &amp; EDUCATION</strong></td>
<td></td>
</tr>
<tr>
<td>Time until return to work depends on speed of recovery and demands of job within</td>
<td></td>
</tr>
<tr>
<td>1 or 2 weeks for sedentary work; at least 2 weeks if job is more physical</td>
<td></td>
</tr>
<tr>
<td><strong>TRAVEL &amp; DRIVING</strong></td>
<td></td>
</tr>
<tr>
<td>Driving is limited for about 1-3 weeks after procedure</td>
<td></td>
</tr>
</tbody>
</table>

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

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?

Updates to this article
Table 2 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 judgment on to what extent it is expected to alter the recommendation.

We thank Alison Hoens for critical review of the recommendation and manuscript. We also thank Tahira Devji for expertly leading the systematic review of minimally important differences. Funding: This guideline was not funded.

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 I. 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.

Transparency
R Siemieniuk affirms that the manuscript is an honest, accurate, and transparent account of the recommendation being reported; that no important aspects of the recommendation have been omitted; and that any discrepancies from the recommendation as planned (and, if relevant, registered) have been explained.

RAPID RECOMMENDATIONS

Published by the BMJ Publishing Group Limited. For permission to use (where not already granted under a licence) please go to http://group.bmj.com/group/rights-licensing/permissions

This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/

Web extras on bmj.com

- Appendix 1: Full list of authors’ declarations of interests
- Appendix 2: Methodology for development of BMJ Rapid Recommendations
- Appendix 3: All electronic multilayered information available on the MAGICapp


Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Ontario, Canada L8S 4L8

Department of Medicine, University of Toronto, Toronto, Ontario, Canada

South Western Sydney Clinical School, UNSW, Australia

Whitlam Orthopaedic Research Centre, Ingham Institute for Applied Medical Research, Liverpool, NSW 2170, Australia

Division General Internal Medicine & Division of Clinical Epidemiology, University Hospitals of Geneva, CH-1211, Geneva, Switzerland

Department of Orthopaedic Surgery, Joint Research, OLVG, Amsterdam, The Netherlands

Faculty of Dentistry, Universidad de Chile, Independencia, Santiago, Chile

Norwegian Institute of Public Health, Nydalen, N-0403 Oslo, Norway

Department of Epidemiology and Preventive Medicine, School of Public Health & Preventive Medicine, Monash University, Melbourne, Vic 3004, Australia

Monash Department of Clinical Epidemiology, Cabrini Institute; Suite 41 Cabrini Medical Centre, Malvern Vic, 3144, Australia

Clinical Epidemiology Unit, Orthopaedics, Department of Clinical Sciences Lund Faculty of Medicine, Lund University, SE-221 85 Lund, Sweden

Oulu University Hospital, Blindern 0317 Oslo, Norway

Richmond, Virginia, USA

Clinical Effectiveness Research Group, Institute of Health and Society, University of Oslo, Blindern 0317 Oslo, Norway

University Hospital North Norway, 9038 Tromsø, Norway

Department of Occupational Therapy, Physiotherapy and Radiography, Faculty of Health and Social sciences, Bergen University College, 5020 Bergen, Norway

BMI Editorial, BMA House, London WC1H 9JR, UK

Nuffield Orthopaedic Centre, Oxford University Hospitals NHS Foundation Trust, Oxford OX3 7HE, UK

London, Ontario, Canada

Ingersoll, Ontario, Canada NSC 3N1

Department of Health and Science, University of Oslo, Oslo, Norway

Department of Medicine, Hospital Innlandet Trust, Gjøvik, Norway