**Subacromial decompression surgery for adults with shoulder pain: a clinical practice guideline**

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**MAIN INFOGRAPHIC –Including recommendation and main summary of finding**

|  |
| --- |
| **Information for peer-reviewers:** This table highlight elements to appear in our main infographic at the top of the article, just before the plain text.  See example: [Knee arthroscopy BMJ Rapid Recommendations](https://www.bmj.com/content/357/bmj.j1982) |
| **Description of population and interventions**  Will clarify that shoulder pain includes SAPS and Rotator Cuff Disease and excludes traumatic shoulder pain and other differential diagnoses |
| **Recommendation**  In adults with shoulder pain lasting more than 3 months, diagnosed with subacromial pain syndrome or rotator cuff disease, we recommend against subacromial decompression surgery (Strong recommendation) |
| **Summary of findings** (with key outcomes at 1 year to make digestible for readers) |
| **Widgets** to full GRADE Summary of Findings tables in MAGICapp will appear here |
| **Key practical issues for surgery and nonoperative management**  For all patients with SA  - Recovery may take up to 4-6 months, and often results in sick leave  - Guided physical therapy and exercise programmes are frequently offered  - Other nonoperative treatments such as NSAIDs and steroid injections may also be used  For arthroscopic surgery:  - Day surgery with general anaesthesia and/ or nerve block  - Recovery after surgery takes four to six weeks, sick leave typically offered for two weeks  - Avoid heavy lifting for one to three weeks, overhead activities for months  **Values and preferences**  The panel believes that all or almost all patients would place a high value on avoiding even minimal risk of complications and burden from surgery, if it is not helpful. |

**Abstract/ stand first**

Do adults with atraumatic shoulder pain for more than 3 months – diagnosed as subacromial pain syndrome (SAPS) or rotator cuff disease (RCD) - benefit from subacromial decompression surgery? A guideline panel produced this recommendation based on two linked systematic reviews triggered by a recent trial published in The BMJ in July *2018* 1 that found surgery provided no benefit over placebo surgery. The linked systematic reviews place this trial in the context of other studies and found high certainty evidence for no benefit on pain, function and quality of life together with a small risk of harms and burdensome practical issues related to surgery.2 3 The panel quickly and transparently translated this evidence for clinicians and their patients, using standards for trustworthy guidelines and the GRADE system into a strong recommendation against surgery.4

Box 1 shows all of the articles and evidence linked in this Rapid Recommendation package. The Main Infographic provides an overview of the relative and absolute benefits and harms of surgery in standard GRADE format. Table 2 below shows evidence that has emerged since the publication of this article.

**Box-1 Linked articles in this BMJ Rapid Recommendation cluster** (all in submission)

* Vandvik PO, et al. Subacromial decompression surgery for adults with shoulder pain: A clinical practice guideline.5
* Hao Q, et al. Minimal important differences in shoulder condition outcomes: a systematic survey to inform a BMJ Rapid Recommendation.2
* Lähdeoja T, et al. Subacromial decompression surgery for adults with shoulder pain: A systematic review with meta-analysis.3

(An updated Cochrane systematic review was performed in parallel, on subacromial decompression surgery for rotator cuff disease.6

* MAGICapp (insert link + Webappendix 3 ). Expanded version of results with multi-layered recommendations, evidence summaries, and decision aids for use on all devices

**Box-2 What you need to know**

* Shoulder pain is one of the most common musculoskeletal complaints and causes reduced quality of life, health care visits, disability and sick-leave.
* The most frequent symptoms are shoulder pain when lifting the arm; a painful arc; difficulties moving the arm, impaired strength and sleep problems due to pain.
* Subacromial pain syndrome and rotator cuff disease are the most common diagnostic labels
* Surgeons frequently perform subacromial decompression surgery for prolonged symptoms despite compelling evidence that it provides no benefits to patients.
* This guideline makes a strong recommendation against surgery for SAPS based on systematic reviews, triggered by two placebo-controlled trials at low risk of bias
* The recommendation is strong because surgery does not alleviate pain, or improve function or quality of life any more than nonoperative treatment does, and surgery is more inconvenient and causes more harm than nonoperative treatment.

**Current practice**

Up to one quarter of adults have experienced shoulder pain over the past year and it represents the third most common musculoskeletal problem7 87 8.7 8 Subacromial pain accounts for up to 70% of all shoulder pain and can impair the ability to work and do household tasks.9-11 Most patients presenting with subacromial pain receive a diagnosis of subacromial pain syndrome (SAPS), shoulder impingement or rotator cuff disease – each of these labels describe the same condition. In this Rapid Recommendation, we use the term SAPS.

The most frequent symptoms of SAPS are shoulder pain when lifting the arm (classically a painful arc through shoulder abduction), difficulty moving the arm (especially with forward flexion, external rotation and abduction), reduced strength and sleep problems due to pain.12 13 Key differential diagnoses include adhesive capsulitis (“frozen shoulder”), full thickness rotator cuff tear and glenohumeral osteoarthritis.13 14 Patients with SAPS can have degeneration and partial-thickness rotator cuff tears or abnormalities in the subacromial bursa on imaging. However, these imaging findings are also common in people without symptoms.15

First line treatment options for SAPS include simple analgesia, non-steroidal anti-inflammatory drugs (NSAIDs), glucocorticoid injections, exercise therapy and other physical therapy interventions.13 Cadaver studies suggested that pain might occur from rotator cuff tendons being caught (“impinging”) between the acromion or coracoacromial ligament and the humerus.16 These studies provided the initial rationale for subacromial decompression surgery, including removal of the subacromial bursa (bursectomy) and removal of bone from the undersurface of the acromion (acromioplasty).

Surgeons initially performed subacromial decompression surgery as an open procedure, with an incision through the skin and underlying soft tissues. It evolved to less invasive keyhole surgery: arthroscopy. Despite trials dating back to 1993 failing to demonstrate benefit from surgery,17 the number of arthroscopies performed has - with substantial geographical variation - risen dramatically.18 19 There were 21,000 procedures performed in NHS hospitals in 2010, which cost approximately £50 million.19 Current guidelines provide inconsistent recommendations for subacromial decompression surgery (Table 1).13

**Table 1.** Major guideline recommendations on subacromial decompression surgery for SAPS\*

|  |  |
| --- | --- |
| **Organisation** | **Recommendation** |
| European Society for Surgery of the Shoulder and the Elbow | **No recommendation** for or against subacromial surgery |
| **United Kingdom**  British Elbow & Shoulder Society/British Orthopaedic Association 2015  [Statement upcoming update 2018](http://www.bess.org.uk/media/CSAW-Statement/BESS-BOA-C-SAW-CCG-Statement-FINAL.pdf) \*\* | **Recommended** in the absence of a rotator cuff tear, if impingement symptoms fail to resolve with nonoperative treatment |
| **The Netherlands**  Dutch Orthopaedic Association 201420 | **Not recommended** |
| **United States**  American Academy of Orthopaedic Surgeons 2010 ([AOA guidelines](http://www.orthoguidelines.org/topic?id=1007)) | **No recommendation** for or against subacromial surgery, suggests initial non-operative management |
| **Australia**  Australian Orthopaedic Association 2017  [AOA Statement 2017](https://www.aoa.org.au/docs/default-source/advocacy/aoa-sesa-statement---subacromial-impingement-treatments-in-the-lancet-and-media-reports.pdf?sfvrsn=71dac504_4) | **Recommended** for significant and persistent symptoms unresponsive to nonoperative management (including injections and physiotherapy) |
| **Canada**  The Canadian Medical Association and Canadian Orthopaedic Association-Arthroscopy Association of Canada | **No recommendation** for or against subacromial decompression surgery |

\*These guidelines have not included new evidence captured in our Rapid Recommendation.

\*\* Accredited by National Institute of Clinical Excellence (NICE). An upcoming guideline update – based on the CSAW trial - has recently been announced.21

**How this recommendation was created**

Our international panel included patients with lived experience of shoulder pain and surgery, orthopaedic surgeons, physiotherapists, a rheumatologist, general internists, a general practitioner, epidemiologists and methodologists. No person had financial conflicts of interest; intellectual and professional conflicts were minimised and managed (Web Appendix 1). The panel initially decided on the scope of the recommendation and the outcomes that are most important to patients. Box-3 describes how patients were involved.

The panel identified the following important outcomes: Pain, patient global perceived effect, physical function, participation in work and recreation activities, health-related quality of life, development of full-thickness rotator cuff tears and potential harms from surgery (e.g., frozen shoulder, death, infection, venous thromboembolism and anaesthesia-related events). This selection was also informed by the Outcome Measures in Rheumatology (OMERACT) preliminary shoulder trial core domain outcome set.22

To inform the recommendation the panel members requested two systematic reviews addressing the following questions:

1. What are the minimally important differences in pain, function and quality of life that patients would require in order to undergo surgery for SAPS?

2. What are the benefits and harms of subacromial decompression surgery in patients with SAPS, as compared to placebo and non-operative management strategies?

Parallel teams conducted these systematic reviews.2 3 Another team updated a Cochrane systematic review synchronized with this BMJ Rapid Recommendation.6 The panel asked to the review team to explore potential subgroup effects according to risk of bias and types of non-operative management strategies.

The panel, informed by evidence summaries from the systematic reviews and following *BMJ* Rapid Recommendations procedures for creating a trustworthy recommendation, including the GRADE approach, met by videoconference to discuss the evidence and formulate a recommendation (Web Appendix 2).4 23 The panel considered the balance of benefits, harms, and burdens of surgery versus placebo surgery and non-operative treatments, the certainty of the evidence for each outcome, typical and expected variations in patient values and preferences, as well as feasibility and acceptability (practical issues).24 Recommendations using GRADE can be strong or weak, for or against a course of action.23 The recommendation takes a patient-centred perspective that de-emphasises public health, societal, and health payer points of view. Health care systems can adapt these recommendations by including costs and other key issues of relevance, contextualised to national and local circumstances.24

**Box-3 How patients were involved in the creation of this article**

Four people with lived experience of SAPS and surgery were full panel members. These panel members identified important outcomes, participated in the teleconferences and email discussions on the evidence and the recommendation. They also contributed to the identification of practical issues related to the decision to get surgery, and met all authorship criteria for the present article.

**The evidence**

*Systematic survey on minimally important differences*

The identified trials on subacromial pain surgery applied a variety of instruments to measure pain, function and quality of life in patients with SAPS.3 As such patient reported outcomes measures (PROMs) are challenging to interpret, the panel requested a systematic survey to identify the smallest change in each PROM instrument that patients with shoulder conditions consider important - the minimally important difference (MID).

The survey of MIDs identified 22 original studies involving 5562 patients that reported results for 74 MID estimates of variable credibility.2 Highly credible median estimates were identified for pain (visual analogue scale 0-10, MID 1.5 units) and function (Constant score (0-100 scale, MID 8.3 units). There were low credibility estimates for health related quality of life (EQ 5-D, MID 0.07 units). These MID estimates were used to help interpret the results of the systematic review as outlined below (Main infographic).

*Benefits and harms of subacromial decompression surgery*

The systematic review and meta-analysis of subacromial decompression surgery pooled data from seven randomised controlled trials with 1014 participants diagnosed with SAPS.3 In general, patients included in the trials were considered representative of patients with SAPS presenting to primary health care centres and outpatient clinics (Infographic 2).

**Infographic 2:** Data sources – Characteristics of patients and trials included in the systematic review of the effects of surgery

|  |  |  |  |
| --- | --- | --- | --- |
| **Trial characteristics: 7 randomised clinical trials that enrolled 1014 patients** | | | |
| Setting | Hospital outpatient clinics | | |
| Follow-up duration | 1 trial (313 participants) 1 year  1 trial (193 participants) 2 year  1 trial (125) 2,5 years  1 trial (72) 4 years  1 trial (84) 4-8 years  1 trial (140) 12 years  1 trial (87) 14 years | | |
| Funding | Two trials reported specifically no industry funding, all other trials did not specify funding | | |
| Patient involvement | No trials involved patients in design or conduct | | |
| **Patient characteristics** | | | |
|  | | *Median* | *Range across trials* |
| Number of patients enrolled | | 125 | 72 - 313 |
| Mean age | | 49.1 | 44 – 58 |
| Sex (% women) | | 57% | 36% - 70% |
| Mean symptom duration | | 2.1 years | 1.6 – 2.6 years |

Two trials included placebo surgery, in which patients received all aspects of the surgical intervention (anaesthesia, pre-, peri- and post-operative care) except the acromioplasty and/or bursectomy considered to have a direct effect on symptoms.1 21 These trials were judged to be at low risk of bias. Five unblinded trials compared surgery to nonoperative management and were all judged at high risk of bias.

Meta-analysis of the two trials comparing surgery and placebo-surgery found generally consistent results at different points of follow up (Main infographic), here shown at 6 months:

* high certainty evidence for little or no effect on pain (mean difference (MD) -0.26, 95% CI -0.84 to 0.33, MID 1.5), function (MD 2.8, 95% CI -1.4 to 6.9, MID 8.3) and health related quality of life (MD -0.03 points, 95% CI -0.11 to 0.06, MID 0.07)
* moderate certainty evidence for little or no global perceived effect (RR 1.04, 95% CI 0.81-1.34)
* low certainty evidence for little or no effect on return to work (RR 1.05, 95%CI 0.89-1.23)

The systematic review also includes a secondary comparison of subacromial decompression surgery versus exercise therapy alone. Seven trials reported such comparisons, all judged at high risk of bias due to lack of blinding and some with imprecise estimates of effect. Meta-analyses provide low to moderate certainty evidence for no benefit of surgery on pain, function and quality of life, global perceived effect and return to work (link SoF-table MAGICapp).3

While surgery does not affect the prognosis, about a third (32%) of the patients continued to have more than minor symptoms at one year following treatment. The average pain scores in the trials at two years were 1.6 to 3.0 units (0-10 scale).

Harms were variably reported in the trials, with the two placebo-controlled trials providing low certainty evidence for 12 more frozen shoulders per 1000 patients undergoing subacromial decompression surgery. To better inform the panel about potential harms from surgery, the systematic review also included 57 observational studies of 27,762 patients.3 A recent registry-based study of 15015 patients readmitted within 30 days following arthroscopic shoulder surgery in the United States was selected as the best body of evidence for serious adverse events (moderate certainty evidence, rated down for indirectness).25 This study reported 6 serious complications per 1000 patients (95% CI 5-7), including major bleeding, deep infections, serious anaesthetic complications, venous thromboembolism and peripheral nerve injury.

**Understanding the recommendation**

The panel concluded that almost all well-informed patients would decline surgery and therefore made a strong recommendation against subacromial decompression surgery. The panel was confident that surgery provides no important benefit on pain, function and quality of life and global perceived effect, informed by moderate to high certainty evidence. Moreover, surgery comes with burdens and the risk of harm (see Main Infographic).

Clinicians should not offer patients subacromial decompression surgery unprompted, and clinicians, public health care providers, and others should make efforts to educate the public regarding the ineffectiveness of surgery. Although we did not take costs and resources into account beyond direct costs to patients (e.g. out-of-pocket costs) surgery cannot be cost-effective given the lack of important benefit and associated costs.

**Infographic 3:** Practical issues for surgery and conservative management

|  |  |  |
| --- | --- | --- |
| **Category of practical issue** | **Surgery** | **Physical therapy and exercise programme (also offered following surgery)** |
| Medical routine: | Day surgery performed in an outpatient clinic | Guided physical therapy and exercise programme offered at outpatient clinics, for example by physiotherapists. Other treatments may also be offered, for example NSAIDS or steroid injections in the shoulder |
| Test and visits: | Need for outpatient visit to an orthopedic surgeon before surgery | Guided physical therapy and exercise programme, performed at home with outpatient clinic visits every few weeks. Visit to general practitioner for referral is needed. |
| Procedure and device: | General anaesthesia and/ or local nerve block during keyhole surgery. Recovery period of 2-10 hours with numbness up to 24 hours after surgery |  |
| Recovery and adaptation: | Recovery directly related to surgery takes four to six weeks You may use a sling a few days after surgery | Recovery typically takes up to 4-6 months |
| Coordination of care: | You may need someone to drive you home after surgery |  |
| Costs and access: | out of pocket costs for surgery is generally high | Costs depend on health policy and health insurance |
| Exercise and activities: | Avoid heavy lifting for 7-21 days Avoid overhead activities such as racket sports, front crawl for 3 months, golf for 6 weeks | A guided physical therapy and exercise programme include daily exercises, often performed daily at home |
| Work and education: | Sick leave is typically offered the first few weeks after surgery | Potential sick leave depending on symptoms, kind of work and health care visits |
| Travel and driving: | You can start driving as soon as you feel able to steer, normally after one week |  |

**Uncertainty**

Clinicians and patients might question what other therapies could be offered to patients diagnosed with SAPS or Rotator Cuff Disease, and whether any therapy is effective. A recent systematic review provides low certainty evidence for moderate to small short-term benefits of steroid injections and NSAIDs on shoulder pain when compared to placebo.26 Exercise and manual therapy is also of uncertain benefit to patients compared to watchful waiting and guidelines (Table 1) vary in their recommendations.13 26 27 Current practice typically includes a combination of interventions not well studied in placebo-controlled trials, as reflected in trials included in systematic reviews.22 26 Other key elements of non-operative management should also be considered, such as a holistic approach to care with appropriate communication, including reassurance and education.28

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

* What are the most efficient strategies to de-implement inefficient and potentially harmful subacromial decompression surgery for SAPS?
* How can we educate patients and clinicians to understand and adopt evidence, particularly when it goes against ‘traditional’ accepted beliefs?
* What are the effects of novel combinations of manual therapy and exercise, which better reflect current practice than single interventions?

**Box-4 Education into practice**

Questions

• What would be your approach to managing SAPS, based on the information you have read in this article?

• How can this article help you explain the new evidence to patients considering surgery for their shoulder pain? How should you respond if patients ask about surgery?

• What would you tell your colleagues about best practice for managing SAPS?

**Updates to this article**

Table 2 shows evidence that 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 the extent it is expected to alter the recommendation.

**Table 2 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 | | | | |

**Footnote**

This BMJ Rapid Recommendation article is one of a series that provides clinicians with trustworthy recommendations for potentially practice changing evidence. BMJ Rapid Recommendations represent a collaborative effort between the MAGIC group ([www.magicproject.org](http://www.magicproject.org)) and The BMJ. A summary is offered here and the full version including decision aids is on the MAGICapp (www.magicapp.org), for all devices in multilayered formats. Those reading and using these recommendations should consider individual patient circumstances, and their values and preferences and may want to use consultation decision aids in MAGICapp to facilitate shared decision making with patients. We encourage adaptation and contextualization of our recommendations to local or other contexts. Those considering use or adaptation of content may go to MAGICapp to link or extract its content or contact The BMJ for permission to reuse content in this article.

**Data supplements on bmj.com**

Web Appendix 1: Full list of authors and their declarations of interests

Web Appendix 2: Methodology for development of BMJ Rapid Recommendations

Web Appendix 3: All electronic multilayered information available on the MAGICapp

**Competing interests**

All authors have completed the BMJ Rapid Recommendations interests disclosure form and a detailed, contextualised description of all disclosures is reported in Web 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.

**Funding**

The Dutch Orthopaedic Society has provided the MAGIC Foundation with 35 000 Euros to support development of two rapid recommendations for orthopaedic surgery, including the recommendation on shoulder surgery which will be adapted into an updated recommendation in their guidelines.20

**Transparency declaration**

Rudolf Poolman and Per Olav Vandvik affirm 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.

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