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Development of a patient decision aid on subacromial decompression surgery and rotator cuff repair surgery

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5 6 7	2	rotator cuff repair surgery
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ABSTRACT Objective: To develop and user test a patient decision aid that presents evidence-based information on the benefits and harms of subacromial decompression surgery and rotator cuff repair surgery, compared to non-surgical options. Design: Mixed-methods study outlining the development of a patient decision aid (guided by

30 the International Patient Decision Aids Standards).

Setting: We assembled a multidisciplinary steering group, and used existing decision aids and
decision science to draft the decision aid.

33 Participants: People with shoulder pain and health professionals who manage people with
34 shoulder pain.

Primary and secondary outcomes: We interviewed participants to gather feedback on the
decision aid, assessed useability (using qualitative and quantitative methods), and performed
iterative cycles of re-drafting the decision aid and re-interviewing participants as necessary.
Interview data were analysed using thematic analysis. Quantitative data were summarised
descriptively.

Results: We interviewed 26 health professionals (11 physiotherapists, 7 orthopaedic surgeons, 4 general practitioners, 3 chiropractors and 1 osteopath) and 14 people with shoulder pain. Most health professionals and people with shoulder pain rated all aspects of decision aid usability as adequate-to-excellent (e.g., length, amount of information, presentation, comprehensibility). Interviews highlighted agreement among health professionals and people with shoulder pain on most aspects of the decision aid (e.g. treatment options, summary of benefits, harms and practical issues, questions to ask a health professional, graphics, formatting). However, some aspects of the decision aid elicited divergent views among health professionals (e.g. causes and symptoms of shoulder pain, evidence on benefits and harms). **Conclusion:** This decision aid could be an acceptable and valuable tool for helping people with

 shoulder pain make informed treatment choices. A randomised controlled trial evaluating
whether this decision aid reduces people's intentions to undergo shoulder surgery and
facilitates informed treatment choices is underway.

Key words: shoulder surgery; subacromial decompression; rotator cuff repair; decision aid;
shared decision making.

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56 Strengths and limitations of this study

This is the first study to rigorously describe the development of a patient decision aid
 that presents evidence-based information on the benefits and harms of subacromial
 decompression surgery and rotator cuff repair surgery, compared to non-surgical
 options

- We developed the patient decision aid with guidance from the International Patient
 Decision Aids Standards, used a mixed methods approach to evaluate useability,
 interviewed a broad range of health professionals and patients, and conducted one-on one interviews which allowed in-depth feedback on the decision aid
- 65 Our decision aid includes several key features recommended to optimise risk
 66 communication (e.g. presenting numeric estimates, presenting uncertainty, using
 67 visuals, tailoring estimates)
 - Limitations include a small sample size for our quantitative useability data, being
 unable to recruit certain groups of health professionals (e.g. rheumatologists, sports
 doctors), and only interviewing people who speak English

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1. Introduction

Subacromial decompression surgery and rotator cuff repair surgery (with or without decompression) are frequently performed for people with subacromial pain syndrome [2-5] – an umbrella diagnosis that accounts for 85% of cases of shoulder pain (including rotator cuff tears) – but evidence suggests these procedures provide limited clinical benefit. Subacromial decompression surgery is not superior to placebo (high-certainty evidence) or non-surgical options, such as exercise and glucocorticoid injections (low- to moderate-certainty evidence), for improving pain and function in people with subacromial pain syndrome [6]. Rotator cuff repair surgery is not superior to non-surgical options for degenerative rotator cuff tears (lowto moderate-certainty evidence) [7]. Serious harms (e.g. infection) are experienced by 6/1000 people that have arthroscopic shoulder surgery [6].

Use of subacromial decompression surgery and rotator cuff repair surgery is increasing globally [2-5] despite the above evidence, suggesting people may not be making informed treatment choices. In Australia, the annual number of subacromial decompression surgeries performed increased from 3,536 to 7,455 between 2000 and 2019, while the number of rotator cuff repair surgeries performed increased from 6,212 to 12,436 during this period [2]. Increases have also been reported in the Unites States [5], England [3, 8] and Finland [4].

Patient decision aids present unbiased information on the benefits and harms of different healthcare options. A decision aid on options for treating subacromial pain syndrome could help patients make informed treatment choices and result in less use of unnecessary surgery. A Cochrane review of 105 studies (n=31,043) found that people exposed to decision aids made more informed choices about their healthcare and had a more active role in decision making, with no negative effects on outcomes or satisfaction [9]. For some conditions, patients were also more likely to choose less invasive treatment options [9].

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95 By eliciting views of key stakeholders, our aim was to develop a patient decision aid that 96 presents evidence-based information on the benefits and harms of subacromial decompression 97 surgery and rotator cuff repair surgery for subacromial pain syndrome (compared to non-98 surgical options).

2. Methods

2.1. Initial decision aid design

We developed a patient decision aid with guidance from the International Patient Decision Aids Standards (IPDAS) [10, 11]. We began by assembling a multidisciplinary steering group (study authors) including topic experts (IH: orthopaedic surgery; RB: shoulder pain; KM, TH, RT and DO: patient decision aids and shared decision making) and health professionals who manage people with shoulder pain (JZ and SK: physiotherapists; RB: rheumatologist). The first draft of the decision aid was created in PowerPoint and based on decision aids for antibiotics [12] and knee arthroscopy [13] which several study authors have developed (TH, KM, RB, DO and IH). Key features adapted from these decision aids included horizontal bar graphs displaying the effects of surgery compared to non-surgical options and placebo, icon arrays to help patients understand probabilities, a statement about the source and quality of the evidence, questions for patients to ask their health professional, and practical issues (e.g. time off work, driving restrictions). Decision science evidence suggests these features improve patient decision making [14-18]. Data from the 2019 Cochrane reviews on subacromial decompression surgery [6] and rotator cuff repair surgery [7] were used to inform numeric estimates of benefits and harms used in the decision aid. The steering group provided feedback on the first draft before we conducted semi-structured interviews with people with shoulder pain and health professionals who manage people with shoulder pain.

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2.2.

Participants

Twenty-six health professionals involved in the management of shoulder pain were recruited through social media, Royal Prince Alfred and Concord Hospitals in Sydney (Australia), and the study authors' collaboration network. Health professionals had to manage/consult at least five people with suspected subacromial pain syndrome per year. Fourteen people with self-reported shoulder pain (hereafter referred to as 'patients') were recruited through social media and referrals from health professionals who participated in the study. Patients had to be ≥ 18 years old and able to understand and communicate in English to participate. Enrolled participants were asked if they had any contacts who met our inclusion criteria (snowballing). We purposively sampled participants to achieve diversity in age, gender and ethnicity. For health professionals, we also purposively sampled to achieve diversity in profession, years of experience and country of practice. All recruitment and data collection procedures were approved by the Sydney Local Health District Human Research Ethics Committee (Reference number: X20-0023).

2.3. Data collection

Box 1 describes the data collection process including the pre-interview questionnaires (used to purposively sample participants), semi-structured interviews and useability questionnaires. In accordance with IPDAS guidance [10, 11], semi-structured interviews were used to assess patients' views on decisional needs and clinicians' views on patients' decisional needs, gather feedback on the draft decision aid, and assess useability of the decision aid. At the end of each interview, participants were given the opportunity to provide any additional feedback or comments. Changes to the decision aid were made throughout the interview process. Modifications were compared to older versions of the decision aid to understand whether changes were useful. We reported the qualitative aspect of this study according to the 32-item Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Supplementary File 1) [19].

Box 1. Data collection process

Pre-interview questionnaires used to purposively sample participants

For health professionals, we gathered data on demographics, profession, years of experience, clinical setting, and number of patients with subacromial pain syndrome seen per year (Supplementary File 2). For patients, we gathered data on demographics (e.g., age, gender), duration and severity of shoulder pain, and previous treatments, previous imaging, and previous sick leave for shoulder pain (Supplementary File 3).

Semi-structured interviews

Interviews were used to gather feedback on the best way to present different aspects of the decision aid, such as treatment options, numeric estimates of benefits and harms, practical issues, and questions to ask a health professional. Participants were then asked to 'think out loud' while they read through the decision aid. They were encouraged to say everything that came to mind (e.g. concepts that might be challenging to understand, what their eye was drawn to) and give feedback on how the decision aid could be improved. The researcher conducting the interview used additional questions to prompt participants who were unsure of what to say. For example, some participants were prompted to give feedback on the relevance, usefulness, formatting, and language of each section, and the use of images.

Useability questionnaires

After the first round of interviews (n=12 health professionals; n=7 patients) and several redrafts, we began assessing useability with a brief questionnaire at the end of each interview because we felt we were getting close to the final version of the decision aid. A separate questionnaire, adapted from The Ottawa Hospital Research Institute [1], was used for health professionals (Supplementary File 4) and patients (Supplementary File 5).

All interviews were conducted via videoconference due to COVID-19. All interviews lasted between 30-60 minutes and were conducted by a researcher with experience in conducting qualitative interviews (CJ). The interviewer was a female PhD candidate and occupational therapist. Two pilot interviews were conducted before recruitment to test the interview guides. During participant interviews, the interviewer took notes to highlight key concepts emerging from the interview and direct further questioning. All interviews were audio-recorded (with verbal consent obtained from participants) and transcribed verbatim for analysis. All participants had the opportunity to review the transcript of their interview prior to data analysis if they wished. Health professionals and patients and who completed an interview were compensated for their time with a \$100 and \$50 supermarket gift card, respectively.

2.4. Data analysis

Pre-interview and useability questionnaire responses were summarised using descriptive statistics (means and standard deviations [SD], counts and percentages). For the health professional useability questionnaire (Supplementary File 4), a 5-point Likert scale (strongly agree = 5; strongly disagree = 1) was used to assess agreement with various statements. We presented Likert scores as the percentage of responses for each category and as means (SD). We also calculated mean (SD) agreement scores for orthopaedic surgeons separately as we anticipated they might have different views on a decision aid for people considering surgery compared to other health professionals. For the patient useability questionnaire (Supplementary File 5), impressions of different sections of the decision aid were dichotomised as 'excellent/good' vs. 'fair/poor'.

All interview data were analysed using thematic analysis; a method for identifying, analysing and reporting patterns within data [20]. Two researchers (CJ and JZ) independently familiarised themselves with the interviews (via audio-recordings or transcripts), recorded initial observations, and identified concepts relevant to the questions asked. The two researchers

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developed a framework to organise concepts into broader themes and sub-themes in Excel [21]. Any disagreements in categorising concepts into themes and sub-themes were discussed and resolved. The mapping of themes and sub-themes was iterative as new data emerged so that the decision aid was continually updated before new interviews were conducted. Interviews stopped once no new feedback was being provided (data saturation) and participants had an overall positive impression of the decision aid. 2.5. **Patient or Public Involvement** Patients and members of the public were not involved in the design of this study. 3. Results

3.1. Adherence to the IPDAS criteria

We determined that the decision aid (Supplementary File 6) met 6 out of 6 criteria to be considered a decision aid, 6 out of 6 criteria to reduce the risk of harmful bias, and 20 and 23 quality criteria according to the IPDASi checklist (v4.0) [22] (Supplementary File 7).

3.2. Participant characteristics and decision aid useability

We interviewed 26 health professionals [11 (42%) physiotherapists, 7 (27%) orthopaedic surgeons, 4 (15%) general practitioners, 3 (12%) chiropractors and 1 (4%) osteopath] and 14 patients. No participant who completed the pre-interview questionnaire refused an interview. Health professional and patient characteristics are in Table 1. There were 15 health professionals and 11 patients that completed the useability questionnaire. All aspects of decision aid useability were rated as adequate-to-excellent (e.g. length, amount of information, presentation, comprehensibility) by most health professionals (Table 2) and patients (Table 3). Figure 1 provides a summary of the development process.

3.3. Feedback on each section of the decision aid

Positive feedback for each section, and for the decision aid overall, largely included agreement with the content, graphics, formatting, amount of information, and presentation of information. Supplementary File 8 provides a summary of themes and sub-themes across sections of the decision aid. Suggestions for improvement (themes) and examples (sub-themes) are summarised below. Although most suggestions were implemented, some conflicted with others or were not possible to implement. Supplementary File 9 outlines feedback we did not incorporate in the decision aid and our justification for this. Feedback from three or more types of health professionals was classified as 'multidisciplinary feedback'.

3.3.1. Who should read this decision aid?

This section covers the title of the decision aid, information about who should read the decision aid, and common causes and symptoms of shoulder pain. Suggestions for improvement (themes) with examples (sub-themes) included:

Improve clarity on the target population (e.g. some GPs wanted this section to be more
 concise, some patients thought softening the exclusion criteria would prevent people
 with overlapping symptoms disregarding the decision aid)

Highlight that patients need to discuss this decision aid with a health professional (multidisciplinary feedback)

- Revise the causes and symptoms of shoulder pain (e.g. multidisciplinary feedback
 suggested this information had a pathoanatomical focus that was inaccurate and that
 this information could drive patients towards surgery)
- Use positive messaging (e.g. some physiotherapists thought the language would cause
 fear among patients)
 - Make this section more concise and relevant (e.g. multidisciplinary feedback suggested
 the explanation of shoulder symptoms might be irrelevant for patients, some

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1 2		
3 4	217	orthopaedic surgeons wanted to emphasise the importance of a proper diagnosis to
5 6	218	guide treatment decisions)
7 8 0	219	Supplementary File 10 highlights changes between the first and final draft of this section.
9 10 11	220	
12		
13 14 15	221	3.3.2. What are the treatment options covered in this decision aid?
16 17	222	This section outlines non-surgical and surgical management options for subacromial pain
18 19	223	syndrome. Suggestions for improvement included:
20 21	224	• Include more detail on non-surgical options and how to progress management (e.g.
22 23 24	225	multidisciplinary feedback suggested balancing the amount of information between the
24 25 26	226	non-surgical and surgical options, some patients wanted more information on 'wait and
27 28	227	see' and how to modify activities)
29 30 31	228	• Change the non-surgical options presented (e.g. some physiotherapists thought it was
32 33	229	inappropriate to include medication and injections as options, some physiotherapists
34 35	230	and chiropractors thought the order of non-surgical options might be inappropriate)
36 37 38	231	• Include indications for surgery (e.g. multidisciplinary feedback suggested the inclusion
39 40	232	of indicators for each surgery like failed conservative management, severe pain, age
41 42	233	and massive cuff tears)
43 44 45	234	• Present evidence of benefits and harms in this section (e.g. multidisciplinary feedback
46 47	235	suggested mentioning the success rate of surgery and non-surgical options, and
48 49	236	emphasise the harms of surgery)
50 51 52	237	• Change the information on surgery (e.g. some patients wanted more detail on surgery
53 54	238	and rehabilitation, while others wanted less detail on the procedures)
55 56	239	• Modify the formatting and graphics (e.g. multidisciplinary feedback suggested listing
57 58	240	non-surgical options first, some patients wanted more space between the options and
60	241	thought the image of surgery was too graphic).

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2 3 4	242	Supplementary File 11 highlights changes between the first and final draft of this section.
6 7	243	3.3.3. What are the likely benefits of surgery compared to non-surgical options?
8 9	244	This section summarises data on the effectiveness of subacromial decompression surgery and
10 11	245	rotator cuff repair surgery compared to non-surgical options from two Cochrane reviews [6, 7].
12 13 14	246	Suggestions for improvement included:
15 16	247	• Revise the description for the certainty of evidence (e.g. some physiotherapists and
17 18	248	chiropractors thought using a green font for high-certainty evidence would drive
19 20 21	249	patients towards surgery)
22 23	250	• Evidence doesn't match experience, more clarification needed (e.g. some orthopaedic
24 25	251	surgeons thought the evidence from Cochrane reviews may not be generalizable,
26 27 28	252	surgery may improve the speed of recovery and surgery may be useful for preventing
29 30	253	tears progressing even if there was no improvement in symptoms, some orthopaedic
31 32	254	surgeons and GPs thought it was important to acknowledge evidence represents
33 34 25	255	averages and careful selection of surgical candidates could yield positive results)
35 36 37	256	• Simplify the statistics (e.g. some physiotherapists and chiropractors thought 'key
38 39	257	messages' could be used instead of a bar graph, some orthopaedic surgeons thought
40 41	258	repetition of statistics was unnecessary and biased against surgery)
42 43 44	259	• Provide more detail or revise the description of the evidence (e.g. some patients wanted
45 46	260	information on the source of the evidence and more explanation about the certainty of
47 48	261	evidence)
49 50	262	• Contextualise the evidence to reflect uncertainty on an individual level (e.g. some
51 52 53	263	patients wanted to highlight the numeric estimates were averages)
54 55	264	• Modify the formatting and language used (e.g. some GPs and patients wanted to
56 57	265	shorten the key messages box and include other information as footnotes, some patients
58 59 60	266	thought the icon array wasn't useful).
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267 Supplementary File 12 highlights changes between the first and final draft of this section.

3.3.4. What are the likely harms of surgery?

This section summarises data on the potential harms of subacromial decompression and rotator cuff repair surgery from two Cochrane reviews [6, 7]. Data on the potential harms of nonsurgical options was not available. Suggestions for improvement included:

- Present both minor and serious harms (multidisciplinary feedback)
- Provide more context for harms (e.g. some physiotherapists and chiropractors suggested comparing the harms of surgery and non-surgical options, some GPs and patients thought presenting harms in a different section to 'benefits' doesn't give an understanding of harm versus benefit)
- Clarify the evidence as it does not match personal experience (e.g. some orthopaedic
 surgeons thought harms were overestimated, some physiotherapists thought harms
 were underestimated)
 - Modify the formatting and language used (e.g. some orthopaedic surgeons and patients thought 'harm' was too negative and suggested replacing it with 'risk').

282 Supplementary File 13 highlights changes between the first and final draft of this section.

3.3.5. Summary of benefits, harms, and other practical issues

This section provides a summary of the benefits, harms, and important practical issues ofsurgery and non-surgical options. Suggestions for improvement included:

- Revise information on costs (e.g. some physiotherapists and GPs wanted specific cost
 information on surgery, some orthopaedic surgeons wanted to soften the language
 emphasising the costs of surgery, some chiropractors and patients wanted information
 on the costs of non-surgical options)
- Revise information on activity restrictions and post-surgical management (e.g. some
 physiotherapists and orthopaedic surgeons suggested alternative timeframes for post-

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3 4	292	surgery activity restrictions, some GPs wanted to emphasise symptoms may improve
5 6 7	293	with or without surgery)
7 8 9	294	• Modify the formatting or language used (e.g. some GPs and patients wanted to separate
10 11	295	the practical issues by type of surgery, while some physiotherapists thought this would
12 13	296	result in too much information).
14 15 16 17 18 19 20 21	297	Supplementary File 14 highlights changes between the first and final draft of this section.
	298	3.3.6. Questions to consider when talking with a health professional
	299	This section outlines questions patients should consider asking their health professional before
22 23	300	deciding to have surgery. Suggestions for improvement included:
24 25 26	301	• Adding questions (e.g. some physiotherapists suggested "How long should I wait
20 27 28	302	before considering surgery?")
29 30	303	• Removing questions (e.g. some orthopaedic surgeons suggested removing "Do I know
31 32	304	enough about my condition" and "Have I considered my individual circumstances?")
33 34 35	305	• Modifying the formatting (e.g. some physiotherapists wanted the heading to be
36 37	306	inclusive of any health professional while others thought these questions were better
38 39	307	suited to GPs).
40 41 42	308	An early version of the decision aid included a section on 'Are there other things I can do?
43 44	309	Suggestions included activity modification, strength, and endurance exercises, seeking advice
45 46	310	from a health professional, and considering surgery if these options don't help. We received
47 48 40	311	positive feedback from patients on this section and helpful suggestions from health
49 50 51	312	professionals to add information to help people try non-surgical options first. However, we
52 53	313	decided to remove this section to save space so we could provide more detail about non-surgical
54 55	314	options on the first page.
56 57 58	315	Supplementary File 15 highlights changes between the first and final draft of this section.
59 60	316	3.3.7. Overall feedback

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317	Overall feedback included:
318	• Reduce the amount of information (e.g. multidisciplinary feedback suggested a 2-page
319	decision aid was ideal, some physiotherapists and orthopaedic surgeons suggested
320	removing the question-asking section and the references)
321	• More detail needed (e.g. some GPs wanted information on imaging and the importance
322	of not missing a serious disease, some patients thought the last page lacked a solution
323	if someone had tried everything)
324	• Formatting and distribution suggestions (e.g. multidisciplinary feedback and feedback
325	from patients suggested separate decision aids for each surgery was needed, some GPs
326	wanted separate decision aids for surgical and non-surgical options, some
327	physiotherapists and chiropractors suggested making a video summary of the decision
328	aid, some physiotherapists and orthopaedic surgeons suggested the decision aid should
329	be provided in clinics, early during treatment, when patients are considering surgery
330	and/or after a patient received a diagnosis, some patients suggested emphasising the
331	question-asking section).
332	Some orthopaedic surgeons felt the decision aid was not balanced and biased against surgery.
	 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332

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 333 Most patients stated that the decision aid had swayed them away from surgery, but some were
 334 swayed towards surgery for various reasons (e.g. have surgery before the risk of complications
 335 increases or the pain gets worse).

4. Discussion

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4.1. Summary of findings

Most health professionals and people with shoulder pain rated all aspects of decision aid useability as adequate-to-excellent (e.g., length, amount of information, presentation, comprehensibility). Interviews highlighted agreement with most aspects of the decision aid (e.g. treatment options, summary of benefits, harms and practical issues, questions to ask a

health professional, graphics, formatting, amount of information, and presentation of information) and some divergent views among health professionals on parts of the decision aid (e.g. causes and symptoms of shoulder pain, evidence on benefits and harms). To understand whether this tool adds value to clinical practice, a randomised controlled trial evaluating whether this decision aid reduces people's intentions to undergo shoulder surgery and facilitates informed treatment choices is underway.

4.2. Strengths and limitations of this study

We developed a decision aid according to the IPDAS criteria, used a mixed methods approach to evaluate useability, interviewed a broad range of health professionals and patients, and conducted one-on-one interviews which allowed in-depth feedback on the decision aid. Our decision aid includes several key features recommended to optimise risk communication (e.g. presenting numeric estimates, presenting uncertainty, using visuals, tailoring estimates) [18]. Limitations include a small sample size for our quantitative useability data, being unable to recruit certain groups of health professionals (e.g. rheumatologists, sports doctors), and only interviewing people who speak English.

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4.3. Meaning of the study

Interviews highlighted high levels of agreement with most aspects of the decision aid among health professionals and patients, although we did find some divergent views among health professionals on parts of the decision aid. Highly consistent feedback included praise for including practical issues for surgery and non-surgical options and a global summary of the benefits and harms of each, praise for including questions to ask a health professional, and a comment that a 2-page decision aid would be ideal if it included all information from the 3-page version. We attempted to create a 2-page version of the decision aid but were not able to do so without comprising useability or removing important information.

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Health professionals and patients largely agreed with the presentation of non-surgical and surgical options, with some patients pleased to have 'wait and see' included as this aligned with their experience of pain that has resolved without treatment. Most health professionals and patients wanted non-surgical options listed before surgery to mimic treatment recommendations in real-life. However, evidence suggests people are more likely to think a decision aid is balanced if options are listed side-by-side [14]. We listed the options side-byside, with non-surgical options on the left ('first'), as a compromise.

A few physiotherapists thought it was inappropriate to include medication and injections as options and wanted physiotherapy-delivered treatments listed earlier. Cochrane reviews on treatments for subacromial pain syndrome show glucocorticoid injections are superior to placebo and provide similar effects to non-steroidal anti-inflammatory drugs [23] and physiotherapy-delivered treatments (e.g. exercise, manual therapy, electrotherapy) [24, 25]. There is no evidence physiotherapy-delivered treatments are superior to placebo [24, 25]. For these reasons, we did not action their suggestions.

We found quite varied feedback on the causes and symptoms of shoulder pain and presentation of benefits. Most health professionals and patients thought the causes and symptoms of shoulder pain were accurate and easy to understand. However, some health professionals (mostly physiotherapists) thought the pathoanatomical description of shoulder pain was inappropriate and used language that could cause fear and drive patients towards surgery. Some health professionals and patients thought the icon array and bar graphs were helpful, which is consistent with evidence suggesting these graphics help people make value-aligned decisions [15]. However, we replaced some icon arrays and bar graphs with a 'key messages' box to address feedback that the statistics needed to be simplified and less repetitive, and because 'fact boxes' are useful risk-communicating tools [26]. We kept numeric estimates in the key

messages box due to evidence suggesting patients prefer numeric estimates over narrative
descriptions of effect sizes (e.g. 'small' effects) [27].

Some orthopaedic surgeons disagreed with evidence from Cochrane systematic reviews and thought the decision aid was biased against surgery. Some believed that, if surgeons selected surgical candidates carefully, surgery could improve the speed of recovery and prevent tears progressing (outcomes not assessed in Cochrane reviews), while minimising the risk of harm. On the other extreme were some physiotherapists, who suggested that Cochrane systematic reviews have underestimated the true harms of surgery. We did not change the evidence presented because it is vital numeric estimates of benefits and harms in decision aids are based on the highest quality available evidence [16, 28].

Nearly 3 in 4 patients thought the decision aid was biased against surgery (Table 3), likely
because the evidence we presented shows subacromial decompression surgery and rotator cuff
repair surgery are not superior to non-surgical management [6, 7]. This suggests tools for
assessing perceived balance of decision aids may not be suitable when a decision aid presents
information that counters prevailing norms.

4.4. Implications for future research

We are currently evaluating a print/online version of the decision aid in a randomised controlled trial including people with shoulder pain considering shoulder surgery. However, feedback from health professionals raised the possibility of future trials evaluating different formats of the decision aid (e.g. video summary, decision aid specific to one shoulder surgery) in different populations (e.g. patients who have consulted with a surgeon and know what surgery they are likely to receive).

5. Conclusion

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By eliciting views of key stakeholders, we developed a patient decision aid that presents evidence-based information on the benefits and harms of subacromial decompression surgery, rotator cuff repair surgery and non-operative treatments for subacromial pain syndrome. Useability testing and interviews with health professionals and people with shoulder pain highlights this decision aid could be an acceptable and valuable tool for helping people with shoulder pain make informed treatment choices. A randomised controlled trial evaluating whether this decision aid reduces people's intentions to undergo shoulder surgery and facilitates informed treatment choices is underway.

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3 4	422	Authors' contributions
5 6	423	All authors critically revised the manuscript for important intellectual content and approved
/ 8 0	424	the final manuscript. Please find below a detailed description of the role of each author:
9 10 11	425	- Joshua R Zadro: conception and design, analysis and interpretation of data, drafting and
12 13	426	revision of the manuscript, and final approval of the version to be published
14 15	427	- Caitlin Jones: conception and design, analysis and interpretation of data, drafting and
16 17 18	428	revision of the manuscript, and final approval of the version to be published
19 20	429	- Ian A Harris: conception and design, interpretation of data, drafting and revision of the
21 22	430	manuscript and final approval of the version to be published
23 24 25	431	- Rachelle Buchbinder: conception and design, interpretation of data, drafting and
25 26 27	432	revision of the manuscript and final approval of the version to be published
28 29	433	- Denise O'Connor: conception and design, interpretation of data, drafting and revision
30 31	434	of the manuscript and final approval of the version to be published
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Table 1. Characteristics of health professionals who manage people with shoulder pain (n=26) and people with shoulder pain (n=14)

Mean (SD) or N (%) (unless specified otherwise)
(unicss specified other wise)
11 (42%)
7 (27%)
4 (15%)
3 (12%)
1 (4%)
40 (11)
8 (31%)
18 (69%)
4 (15%)
2 (8%)
2 (8%)
12 (9)
19 (73%)
164 (167)
Median (IQR): 100 (40-250)
Mean (SD) or N (%)
(unless specified otherwise)
46 (18)
6 (43%)
6 (43%)
8 (57%)
10 (71%)
1 (7%)
1 (7%)
1 (7%)
1 (7%)
9 (64%)
3 (21%)
2 (14%)
8 (57%)
8 (57%)
8 (57%) 96 (117) Median (IOP): 18 (6 180)
8 (57%) 96 (117) Median (IQR): 18 (6-180)
8 (57%) 96 (117) Median (IQR): 18 (6-180)
8 (57%) 96 (117) Median (IQR): 18 (6-180) 3 (21%)
8 (57%) 96 (117) Median (IQR): 18 (6-180) 3 (21%) 3 (21%)

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2 3		<i>Ouite a hit</i>	1 (7%)
4 5		Extremely	1 (7%)
6		Management strategies trialled	
7		Exercise	9 (64%)
8 9		Medication	8 (57%)
10		Rest	7 (50%)
11 12		Massage	6 (43%)
13		Manual therapy	5 (36%)
14 15		Injections	2 (14%)
15 16		Surgery	2 (14%)
17		Other	3 (21%)
18 10		Previously had a scan (X-Ray, MRI, Ultrasound)	8 (57%)
20		Previously had sick leave due to shoulder pain	2 (14%)
21	542	IQR: interquartile range; MRI: magnetic resonance im	aging; N: number of participants; SD:
22 23	543	standard deviation.	
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Table 2. Useability questionnaire for health professionals who manage patients with shoulder pain (n=15; nine physiotherapists, five orthopaedic surgeons and one osteopath)

Useability statements	Strongly agree, N (%)	Somewhat agree, N (%)	Neither agree nor disagree, N (%)	Somewhat disagree, N (%)	Strongly disagree, N (%)	Mean (SD)*	Mean (SD) for orthopaedic surgeons*
It will be easy for me to use	10 (67%)	4 (27%)	0 (0%)	0 (0%)	1 (7%)	4.5 (1.1)	3.6 (1.5)
It is easy for me to understand	12 (80%)	3 (20%)	0 (0%)	0 (0%)	0 (0%)	4.8 (0.4)	4.8 (0.4)
t will be easy or me to experiment with using it before making final decision o adopt it	12 (80%)	3 (20%)	0 (0%)	0 (0%)	0 (0%)	4.8 (0.4)	4.6 (0.5)
The results of using the decision aid will be easy to see	2 (13%)	4 (27%)	7 (47%)	2 (13%)	0 (0%)	3.4 (0.9)	2.6 (0.5)
This decision aid is better than how I usually go about helping patients decide about shoulder surgery	3 (20%)	4 (27%)	4 (27%)	4 (27%)	0 (0%)	3.4 (1.1)	2.8 (0.8)
This decision aid is compatible with the way I think subacromial shoulder pain should be managed	8 (53%)	5 (33%)	2 (13%)	0 (0%)	0 (0%)	4.4 (0.7)	4.2 (0.4)
Compared with my usual approach, this decision aid will result in my patients making more informed decisions	4 (27%)	5 (33%)	4 (27%)	2 (13%)	0 (0%)	3.7 (1.0)	3.6 (0.5)

1 2									
3 4 5 6		Using this decision aid will save me	2 (13%)	7 (47%)	4 (27%)	1 (7%)	1 (7%)	3.5 (1.1)	3.4 (1.5)
7 8 9		time This decision aid is a reliable	7 (47%)	4 (27%)	1 (7%)	3 (20%)	0 (0%)	4.0 (1.2)	3.4 (1.3)
10 11 12 13 14 15 16		method of helping patients make decisions about shoulder surgery							
17 18 19 20 21 22 23		Pieces or components of the decision aid can be used by themselves	7 (47%)	7 (47%)	0 (0%)	1 (7%)	0 (0%)	4.3 (0.8)	4.2 (1.3)
24 25 26 27 28 29 30 31		This type of decision aid is suitable for helping patients make value laden choices	9 (60%)	4 (27%)	2 (13%)	0 (0%)	0 (0%)	4.5 (0.7)	4.2 (0.8)
32 33 34 35 36 37		This decision aid complements my usual approach	8 (53%)	4 (27%)	2 (13%)	1 (7%)	0 (0%)	4.3 (1.0)	3.8 (1.1)
38 39 40 41 42 43 44 45 46		Using this decision aid does not involve making major changes to the way I usually do things	10 (67%)	2 (13%)	2 (13%)	1 (7%)	0 (0%)	4.4 (1.0)	4.6 (0.5)
47 48 49 50 51 52 53 54 55 56		There is a high probability that using this decision aid may cause/result in more benefit than harm	4 (27%)	8 (53%)	2 (13%)	1 (7%)	0 (0%)	4.0 (0.8)	3.6 (0.9)
56 57 58	546 547	IQR: interquartile *Likert Scale from	e range; N: n m strongly a	umber of par gree (5) to st	rticipants; SE rongly disag): standard de ree (1).	eviation.		
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	Table 3. Useability questionnaire for people with shoulder pain $(n=11)$	
	Useability items	N (%)
	Information presented was 'excellent or good'*	
	Subacromial shoulder pain: should I have surgery?	9 (82%)
	Causes and symptoms of subacromial shoulder pain	8 (73%)
	What are the treatment options covered in this decision aid? (Non-	10 (91%)
	surgical options)	
	What are the treatment options covered in this decision aid?	9 (82%)
	(Surgery)	
	What are the likely benefits of surgery and non-surgical options?	9 (82%)
	<i>What are the likely risks of surgery?</i>	8 (73%)
	What practical issues should I consider?	10 (91%)
	Questions to consider when talking with your health professional	10 (91%)
	Length of the decision aid	
	Just right	8 (73%)
	Too short	1 (9%)
	Z Too long	2 (18%)
	Amount of information	
	Just right	10 (91%)
	Too little information	0 (0%)
	Too much information	1 (9%)
	Presentation	
	Balanced	2 (18%)
	Slanted towards surgery	1 (9%)
	Slanted towards non-surgical options	8 (73%)
	Useful when deciding about surgery	11 (100%)
	Makes decision to have surgery easier	8 (73%)
	Enough information provided	9 (82%)
549	N: number of participants.	
550	*compared to 'fair/poor'	
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1 2		
2 3 1	553	Figure legends
5	554	Figure 1. Flowchart of the development process
$\begin{array}{c} 6\\ 7\\ 8\\ 9\\ 10\\ 11\\ 12\\ 13\\ 14\\ 15\\ 16\\ 17\\ 18\\ 19\\ 20\\ 23\\ 24\\ 25\\ 26\\ 27\\ 28\\ 29\\ 30\\ 31\\ 32\\ 33\\ 45\\ 36\\ 37\\ 38\\ 90\\ 41\\ 42\\ 43\\ 44\\ 56\\ 57\\ 58\\ 59\\ 60\\ \end{array}$	555	tor peer teriew only

2 3	556	Supplementary files
4 5 6	557	Supplementary File 1. Consolidated Criteria for Reporting Qualitative Research (COREQ)
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 20	558	checklist.
	559	Supplementary File 2. Health professional questionnaire.
	560	Supplementary File 3. Patient questionnaire.
	561	Supplementary File 4. Useability questionnaire for health professionals.
	562	Supplementary File 5. Useability questionnaire for patients.
	563	Supplementary File 6. Patient decision aid.
	564	Supplementary File 7. International Patient Decision Aid Standards (IPDAS) checklist.
	565	Supplementary File 8. Themes, sub-themes and example quotes for each section of the decision
	566	aid.
	567	Supplementary File 9. Reasons for not implementing feedback for each section of the decision
30 31 32	568	aid.
33 34 35 36	569	Supplementary File 10. Changes between the first and final draft of 'Who should read this
	570	decision aid?'
37 38 30	571	Supplementary File 11. Changes between the first and final draft of 'What are the treatment
39 40 41	572	options covered in this decision aid?'
42 43	573	Supplementary File 12. Changes between the first and final draft of 'What are the likely
44 45 46	574	benefits of surgery compared to non-surgical options?'
40 47 48	575	Supplementary File 13. Changes between the first and final draft of 'What are the likely harms
49 50	576	of surgery?'
51 52 53	577	Supplementary File 14. Changes between the first and final draft of 'Summary of benefits,
53 54 55	578	harms, and other practical issues.'
56 57	579	Supplementary File 15. Changes between the first and final draft of 'Questions to consider
58 59 60	580	when talking with a health professional.'


Supplementary File 2. Health professional questionnaire

Thank you for your participation in this study, which is investigating what information health professionals feel patients need to know when considering shoulder surgery.

We would like you to answer a few questions before the interview. This should not take more than 5-10 minutes.

First some quick questions about you...

1. Please indicate your gender:

- □ Female
- □ Male
- Prefer not to say
- 2. Please indicate your age: [free text response]
- 3. In which country do you currently practice? [free text response]
- 4. What health profession are you?
 - □ Orthopaedic surgeon
 - □ General practitioner
 - □ Rheumatologist
 - □ Sports medicine doctor
 - □ Physiotherapist
 - □ Other (please specify)
- 5. How many years have you been practicing? [free text response]
- 6. Which clinical setting have you spent the most time practicing in?
 - □ Private practice
 - □ Public hospital
 - □ Private hospital
 - \Box Sports teams
 - \Box Other (please specify) _
- 7. On average, how many patients with subacromial pain syndrome do you manage/review per year? [free text response]

Thank you for completing the questionnaire.

Supplementary File 3. Patient questionnaire

Thank you for your participation in this study, which is investigating what information patients feel is important to know when considering shoulder surgery.

We would like you to answer a few questions before the interview. This should not take more than 5-10 minutes.

First some quick questions about you...

- 1. Please indicate your gender:
 - Female
 - 🗖 Male
 - Prefer not to say
- 2. Please indicate your age: [free text response]
- 3. In which country were you born? [free text response]
- 4. What option best describes your highest level of education?
 - □ Primary school or less
 - □ High school (not completed)
 - □ High school (completed)
 - □ TAFE/Trade
 - □ University- undergraduate degree/s (completed)
 - □ University- postgraduate degree/s e.g. Masters, PhD (completed)
 - \Box Other (please specify)
- 5. What is your employment status?
 - □ Employed part-time
 - □ Employed full-time
 - □ Casual work
 - □ Retired
 - □ Unemployed
 - □ Student
 - □ Sick/disability leave
 - □ Other (please specify) _
- 6. Do you have private health insurance?
 - □ Yes
 - 🗆 No
- 7. How long have you had your shoulder pain (in weeks, months or years)?

^{8.} During the past week, how much did shoulder pain interfere with your normal work (including both work outside the home and housework)?

 \Box Not at all

 \Box A little bit

□ Moderately

 \Box Quite a bit

□ Extremely

9. What treatment options have you tried for you shoulder pain?

□ Rest

□ Medication

 \square Exercise

□ Massage

□ Manual therapy (usually provided by a physiotherapist)

Injections

□ Surgery

□ Other (please specify)

10. Have you previously had a scan on your affected shoulder (e.g Xray, ultrasound, MRI)?

□ Yes

□ No

11. Have you previously taken sick leave due to shoulder pain?

 \Box Yes

□ No

12. If you have . shaving back a bone spun, Thank you for completing the questionnaire. 12. If you have had shoulder surgery, please specify the procedure (i.e. rotator cuff repair,

Supplementary File 4. Useability questionnaire for health professionals

The following set of questions asks about your perceptions of the decision aid you just read. We are interested in your reactions to the decision aid. Please indicate how strongly you agree or disagree with each statement by *circling* the appropriate number.

In general:	Strongly agree		\rightarrow		Strongly disagree
It will be easy for me to use	1	2	3	4	5
It is easy for me to understand	1	2	3	4	5
It will be easy for me to experiment with using it before making a final decision to adopt it	1	2	3	4	5
The results of using the decision aid will be easy to see	1	2	3	4	5
This decision aid is better than how I usually go about helping patients decide about shoulder surgery	1	2	3	4	5
This decision aid is compatible with the way I think subacromial shoulder pain should be managed	1	2	3	4	5
Compared with my usual approach, this decision aid will result in my patients making more informed decisions		2	3	4	5
Using this decision aid will save me time	1	2	3	4	5
This decision aid is a reliable method of helping patients make decisions about shoulder surgery	1	2	3	4	5
Pieces or components of the decision aid can be used by themselves	1	2	3	4	5
This type of decision aid is suitable for helping patients make value laden choices	1	2	3	4	5
This decision aid complements my usual approach	1	2	3	4	5
Using this decision aid does not involve making major changes to the way I usually do things	1	2	3	4	5
There is a high probability that using this decision aid may cause/result in more benefit than harm	1	2	3	4	5

Supplementary File 5. Useability questionnaire for patients

We would like to know what you think about the patient decision aid you have just read.

1. Please rate each section by circling 'poor', 'fair', 'good', or 'excellent' to show what you think about the way the information was presented on:

Subacromial shoulder pain: should I	Poor	Fair	Good	Excellent	
have surgery?					
Causes and symptoms of	Poor	Fair	Good	Excellent	
subacromial shoulder pain					
What are the treatment options	Poor	Fair	Good	Excellent	
covered in this decision aid? (Non-					
surgical options)					
What are the treatment options	Poor	Fair	Good	Excellent	
covered in this decision aid?					
(Surgery)					
What are the likely benefits of	Poor	Fair	Good	Excellent	
surgery and non-surgical options?					
(Key message)					
What are the likely benefits of	Poor	Fair	Good	Excellent	
surgery and non-surgical options?					
(What % of people report treatment					
success?)					
What are the likely risks of surgery?	Poor	Fair	Good	Excellent	
What practical issues should I	Poor	Fair	Good	Excellent	
consider?					
Questions to consider when talking	Poor	Fair	Good	Excellent	
with your health professional					
The length of the decision aid was (che	ck one):				
a. Too long					
b. Too short					
c. Just right					
he amount of information was (check one):					

- 2. The length of the decision aid was (check one):
 - a. Too long
 - b. Too short
 - c. Just right
- 3. The amount of information was (check one):
 - a. Too much information
 - b. Too little information
 - c. Just right
- 4. I found the presentation (check one):
 - a. Slanted towards non-surgical options
 - b. Slanted towards surgery
 - c. Balanced
- 5. Would you find (or would you have found) this decision aid useful when /if you were making your decision about surgery for subacromial shoulder pain?
 - a. Yes
 - b. No
 - c. Comments:
- 6. Did this decision aid/would this decision aid make your decision to have surgery:
 - a. Easy

- b. More difficult c. Comments: 7. Do you think we provided enough information to help people with subacromial shoulder pain decide on whether to have surgery or not? a. Yes b. No c. Comments: tor peer terien ont

SHOULDER PAIN: SHOULD HAVE SURGERY?

All information in this decision aid should be discussed with a health professional

BMJ Oper

Who should read this decision aid?

This decision aid is for people with persisting shoulder pain that is likely due to issues with rotator cuff tendons that move and support the shoulder (eg. inflammation, tears).



This type of pain often occurs around the shoulder. It makes it difficult to do simple tasks that involve lifting your arm above your head (eg. washing hair).

This decision aid does not apply to people who have other causes of shoulder pain like frozen shoulder (which causes pain and severe stiffness), osteoarthritis, or shoulder pain that begins after trauma immediately resulting in loss of movement or strength (eg. sudden rotator cuff tear, fracture, dislocation). If you're unsure of the cause of your pain, see a health professional.

What are the treatment options covered in this decision aid?

NON-SURGICAL OPTIONS

Trying the following non-surgical options is

SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION

recommended before considering surgery:

- Wait to see if your symptoms improve by themselves (roughly half of all people with these symptoms will recover within 6 months) and/or change your activities until the pain settles (eg. avoid carrying heavy grocery bags or take a break from sport if these activities cause pain)
- Take simple pain medicine (eg. paracetamol, anti-inflammatories)
- See a health professional (eg. physiotherapist) for advice on changing some daily activities and/or some muscle strength and endurance exercises
- See a health professional (eg. doctor) for a steroid injection



You may consider surgery if the non-surgical options do not work and you can no longer put up with the pain. Typically surgery is not performed unless you have had symptoms for at least 3-6 months.

Surgery requires staying in hospital, having an anaesthetic and small skin cuts in your shoulder so the surgeon can perform one or both of the following:



Subacromial decompression surgery

Increase the space under the acromion by either shaving back some bone, trimming some ligament and/or removing a bursa



Rotator cuff repair surgery

Reconnecting torn rotator cuff tendons

You will need to have rehabilitation involving exercises for at least 3 months following surgery. Much of this rehabilitation can be done at home.



What are the likely benefits of surgery compared to non-surgical options?

The figures on this page are based on the most up-to-date medical research as of 2020 (see references at the bottom of this page)

BMJ Oper

KEY MESSAGE

On average, patients report that surgery **improves pain and function by** <u>less than</u> **10%** (ie. an improvement in pain or function of less than a 1 point on a 0-10 pain scale) compared to non-surgical options in the short term (6 months after) and longer term (1-2 years after) ^c. Because most patients do not notice these improvements, research concludes:

- Subacromial decompression surgery is not better than placebo or non-surgical options (ie. injections, exercise, medication or no treatment) for people with shoulder pain and no full-thickness rotator cuff tears ^A
- Rotator cuff repair surgery is little-to-no better than than non-surgical options for people with full-thickness rotator cuff tears ^B

These results are averages. Surgery improves pain and function by more than 10% for some patients. But other patients have either **no improvements or worse** pain and function after surgery.

Further information:

^A For subacromial decompression surgery, we are very confident about this key message because research on this surgery is high-quality. This research was mostly conducted on people aged in their 40s, 50s and 60s, but is the best evidence we have for all ages.

^B For rotator cuff repair surgery, we are somewhat confident about this message because there is lack of high-quality research on this surgery. This research was mostly conducted on people aged in their 50s and 60s but is the best evidence we have for all ages. Research on rotator cuff repair surgery does not apply to people who tear a tendon following trauma, or people with a full-thickness tear of the subscapularis tendon.

^c Research suggests exercise or activities that you can do yourself at home may be just as helpful as a supervised exercise program.



Think of each figure as 1 person. We can't predict if you will be one of the people who is harmed. Harms are more common among people with other health conditions (e.g. diabetes, heart disease).

has frozen shoulder or		
minor harms		
has serious problems	<pre>i i i i i i i i i i i i i i i i i i i</pre>	<pre>i i i i i i i i i i i i i i i i i i i</pre>
problems	<pre>i i i i i i i i i i i i i i i i i i i</pre>	<pre>i i i i i i i i i i i i i i i i i i i</pre>
	i i i i i i i i i i i i i i i i i i i	<pre>i i i i i i i i i i i i i i i i i i i</pre>

About 3 people per 100

that have surgery will develop frozen shoulder (which may cause shoulder pain and stiffness for up to 2 years) or minor harms with surgery.

About 1 person per 100

that has surgery will have serious (and potentially life-threatening) problems like infection, nerve injury, heartattack, stroke and pneumonia.

Important information: The information in this decision aid is not intended as medical advice and should not be used as a substitute to seeing a qualified health professional who can determine your medical needs.

References: 1) Karjalainen TV, et al. Cochrane Database Syst Rev. 2019, Issue 1. Art. No.: CD005619;
2) Karjalainen TV, et al. Cochrane Database Syst Rev. 2019, Issue 12. Art. No.: CD013502;
3) Page MJ, et al. Cochrane Database Syst Rev. 2016, Issue 6. Art. No.: CD012224.

+ Summary of benefits, harms, and other practical issues

NON-SURGICAL OPTIONS

Potential benefits

May **improve by itself** (within 6 months half of people will recover) or with non-surgical

SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION



BMJ Oper

May provide slight improvement in pain and function

options (ie. injections, exercise, or medication)

Avoid surgery

Potential harms

- May decide to have surgery later
- **Cost of non-surgical options** (eg. injection, physiotherapy)
- Time to attend health appointments (eg. for physiotherapy)
- Regardless of what treatment you have, your symptoms may not improve

compared to non-surgical options

Potential harms

- Possible surgical harms (eg. frozen shoulder, infection)
- Your symptoms may not improve with surgery
- Symptoms will temporarily be worse after surgery due to the operation (eg. pain when sleeping or moving your arm)
- **Rehabilitation for 3-12 months** after surgery and time to attend rehabilitation
- May take up to 6 weeks after subacromial decompression and **12 weeks** after rotator cuff repair to perform daily activities (eg. reach above your head, lift heavy objects)
- May take **3-4 months** after subacromial decompression and 6-12 months after rotator cuff repair to return to heavy

manual work, exercise, or sport

Out-of-pocket costs are generally higher for surgery than non-surgical options. There may be **costs for rehabilitation** after surgery and due to **time needed off work**

Questions to consider when talking with a health professional...

- Do I need surgery? What happens if I don't have surgery? What happens if I do nothing?
- Is surgery suitable for me? Which surgery is suitable for my diagnosis?
- Can I have surgery later? If so, how long should I wait before considering surgery?
- Have I considered my situation before making any decisions (eg. age, pain severity, activity levels, job demands, insurance coverage, caring responsibilities, involvement in sport, etc)?



Do I understand engugh about my condition and the benefits and harms of having Ê surgery and not having surgery?



Discloser: Arthritis Australia provided funding to develop this tool but had no involvement in the development process. The developers of this decision aid include orthopaedic surgeons, rheumatologists, physiotherapists, psychologists and occupational therapists, who have a range of views on the information in this decision aid. 8/11 developers have a PhD. None of the developers will gain or lose anything based on the choices that people make. Feedback from people with shoulder pain and health professionals practicing in various countries was used to refine the information presented in this decision aid

Last reviewed: 27/05/21. Ugdate due 27/05/21.

Lead developer: Dr Joshua Zådro, Institute for Musculoskeletal Health, University of Sydney, Australia.

3 4	Supplementary File 7. International Patient Decision Aid Standards checklist (v4.0)	(IPDASi
5	Oualifying criteria	Answer
7	1. The patient decision aid describes the health condition or problem	Yes
8	(treatment, procedure, or investigation) for which the index decision is	
9	required.	
10	2 The patient decision aid explicitly states the decision that needs to be	Ves
11	considered (index decision)	105
12	3. The national decision aid describes the ontions available for the index	Ves
13	decision	1 05
14	A The national decision and describes the positive features (henefits or	Ves
16	4. The patient decision and describes the positive readines (benefits of advantages) of each option	105
17	5. The notionst decision aid describes the negative features (harms, side	Vac
18	5. The patient decision and describes the negative reatures (namis, side	1 68
19	(The notion of desiring of describes relativistic line to remain a the	Var
20	6. The patient decision and describes what it is like to experience the	Yes
21	consequences of the options (e.g., physical, psychological, social).	•
22	Certification criteria	Answer
25 24	1. The patient decision aid shows the negative and positive features of	Yes
25	options with equal detail (e.g., using similar fonts, sequence, presentation of	
26	statistical information).	
27	2. The patient decision aid (or associated documentation) provides citations	Yes
28	to the evidence selected.	
29	3. The patient decision aid (or associated documentation) provides a	Yes
30	production or publication date.	
3 I 2 2	4. The patient decision aid (or associated documentation) provides	Yes
32	information about the update policy.	
34	5. The patient decision aid provides information about the levels of	Yes
35	uncertainty around event or outcome probabilities (e.g., by giving	
36	a range or by using phases such as "our best estimate is").	
37	6. The patient decision aid (or associated documentation) provides	Yes
38	information about the funding source used for development.	
39	7. The patient decision aid describes what the test is designed to measure.	N/A
40 41	8. If the test detects the condition or problem, the patient decision aid	N/A
42	describes the next steps typically taken.	
43	9. The patient decision aid describes the next steps if the condition or	N/A
44	problem is not detected.	
45	10 The patient decision aid has information about the consequences of	N/A
46	detecting the condition or disease that would never have caused	1 1/1 1
47	problems if screening had not been done (lead time bias)	
48	Quality criteria	Answar
49 50	1. The notion t decision aid describes the natural course of the health	Ves
51	andition or problem if no action is taken (when appropriate)	1 05
52	2. The notion of providing id makes it possible to compare the position of 1	Vac
53	2. The patient decision and makes it possible to compare the positive and	1 85
54	<u>regative reatures of the available options.</u>	V
55	5. The patient decision and provides information about outcome probabilities	Y es
50 57	associated with the options (i.e., the likely consequences of decisions).	X 7
57 58	4. The patient decision and specifies the defined group (reference class) of	Yes
59	patients for whom the outcome probabilities apply.	

3	5. The patient decision aid specifies the event rates for the outcome	Yes
4	probabilities	
о б	6. The patient decision aid allows the user to compare outcome probabilities	Yes
7	across options using the same time period (when feasible).	
8	7. The patient decision aid allows the user to compare outcome probabilities	Yes
9	across options using the same denominator (when feasible).	
10	8. The patient decision aid provides more than 1 way of viewing the	Yes
11	probabilities (e.g., words, numbers, and diagrams).	
12 -	9 The nation decision aid asks nations to think about which positive and	Yes
13 1 <i>1</i>	negative features of the options matter most to them (implicitly or	105
15	explicitly)	
16	10 The patient decision aid provides a step-by step way to make a decision	Ves
17	11. The patient decision aid includes tools like worksheets or lists of	Ves
18	guestions to use when discussing entions with a practitioner	105
19 -	12. The development process included a peeds assessment with alignts or	Vac
20	12. The development process included a needs assessment with chefts of	168
21	12. The development are one included a needs assessment with health	Vaa
22	13. The development process included a needs assessment with health	res
24		V
25	14. The development process included review by clients/patients not	Yes
26 -	involved in producing the decision support intervention.	
27	15. The development process included review by professionals not involved	Yes
28	in producing the decision support intervention.	**
29 30	16. The patient decision aid was field tested with patients who were facing	Yes
31 -	the decision.	
32	17. The patient decision aid was field tested with practitioners who counsel	Yes
33 -	patients who face the decision.	
34	18. The patient decision aid (or associated documentation) describes how	Yes
35	research evidence was selected or synthesized.	
36	19. The patient decision aid (or associated documentation) describes the	Yes
38 -	quality of the research evidence used.	
39	20. The patient decision aid includes authors'/developers' credentials or	Yes
40	qualifications.	
41	21. The patient decision aid (or associated documentation) reports	No
42	readability levels (using 1 or more of the available scales).	
43	22. There is evidence that the patient decision aid improves the match	No*
44	between the preferences of the informed patient and the option that is	
45 46	chosen.	
47	23. There is evidence that the patient decision aid helps patients improve	No*
48	their knowledge about options' features.	
49	24. The patient decision aid includes information about the chances of	N/A
50	having a true-positive test result.	
51	25. The patient decision aid includes information about the chances of	N/A
5∠ 53	having a true-negative test result.	
55 54	26. The patient decision aid includes information about the chances of	N/A
55	having a false-positive test result.	
56	27. The patient decision aid includes information about the chances of	N/A
57	having a false-negative test result.	
58	28. The patient decision aid describes the chances the disease is detected	N/A
59	with and without the use of the test.	
60 -		

N/A: not applicable. *we are in the process of evaluating the decision aid in a randomised controlled trial.

for beer terien only

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njopen-2021

`hemes	Sub-themes	Example quotes (abbreviation for type of health professional comes first, where applicable)
VHO SHOULD READ T	THIS DECISION AID?	ugust 20
	Health professionals	2
	Causes of shoulder pain and graphics were appropriate [PT/OS/OP]	OP, Female 49-49 yrs old – "I think the description really quite good and that's the sort of language tha would usuall usual buse to describe what's happening as well."
D:	Patients	
Positive feedback	Clear explanation of the target population	Female 40-49 yrs old – "I like the way it breaks dow the different types of shoulder pain within the broad subsection of subacromial shoulder pain."
	Helpful graphic of shoulder joint anatomy image	Male 30-39 yes old – "I can understand it clearly, it helps having the picture there to be able to visualise it."
	Health professionals	3
	Make the information more specific to a diagnosis [OS/PT]	OS, Male 40-99 yrs old – "We haven't even reacher the stage where a diagnosis is madeshoulder pair not a diagnoses."
Improve clarity on the target population	Differentiate between degeneration and traumatic rotator cuff tears [OS/OP]	OS, Male 40 9 yrs old – "Sometimes someone ma develop inflammationfrom an acute pinching of bursa or the tendon. Or someone can have a trauma event and actually tear their rotator cuff and it may resemble an impingement problem or they may be older patients and have chronic impingement pain, developing degenerative changes in the tendons in region."
	Make the section more concise [GP]	GP, Female 30-39 yrs old – "There's a lot to look a and sometimes that can be overwhelming for some

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)54(
		natients. I think they'll receive it but then maybe put it
		aside "
	Provide more detail on alternative diagnoses for shoulder nain	OS Male 50-39 yrs old – "You certainly have covered
	PT/OP/OS	some of the key things it can cause shoulder pain but
		the other thing that's missing is that shoulder pain, but
		come from elewhere, for example cervicogenic pain "
	Detionto	
	Patients	M-1-20-20-9-11 UD-t-t-m
	Make it clear the decision and is for people with subacromial	Male $30-39$ ys old – "Rotator cull tears or
	impingement syndrome (e.g. include the diagnosis in the title)	impingement or bursitis should be the title, because
		that's really the patient demographic that you're
		looking at
		vague at this point."
	Simplify 'subacromial shoulder pain' (e.g. 'shoulder pain')	Male 20-29 yes old – "How necessary is it that you
		have subacromial in there? My first reaction was
		"oh wow, these are words that I don't understand,
		maybe this is it for me.""
	Soften the exclusion criteria to avoid people with overlapping	Female 40-49 yrs old – "One of the problems that I
	symptoms disregarding the decision aid	had is that frozen shoulder is not a very clear diagnosis
		and there could be overlap with subacromial shoulder
		pain. It [decision aid] might be still relevant to some
		people who have a potential diagnosis of frozen
		shoulder." 🖞
	Re-word or re-format this information	Female 40-49 yrs old – "'Do not read this form' is
		very clear burpossibly, being in red, sounds quite
		alarmist."
	Health professionals	С С
Hahlaht that a street	Emphasise that patients should discuss the decision aid with a	OS, Female 🔬-59 yrs old – "The more information a
Hignight that patients	health professional [OS/PT/GP]	patient has the better, I would love it if a patient came
need to discuss this		with something like this and said what do you reckon
decision and with a health		and then we would talk about their individual issue."
professional	Title needs to be revised [PT]	PT, Male 40-
		'Shoulder pain should I have arthroscopic surgery?'
	For peer review only - http://bmiopen.hmi.com/site/about/gu	copy right:
	Tor peer review only - http://binjopen.binj.com/site/about/gu	demes.kntm

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21	Revise the causes and	
22	symptoms of shoulder	-
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39	Use nositive messaging	
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		Why is that even a question? W	Vhy can't it be
		'Shoulder pain, should I have a	n professional
		consultation?	
	Health professionals		1 1
	Information has a pathoanatomical focus that is inaccurate	CP, Male $20-\frac{29}{29}$ yrs old – "It do	bes make it sound very
	[P1/OS/CP]	pathoanatomical which it can c	lefinitely be in a lot of
		cases but in that first description	on it almost seems like
		It's a couple of options that it c	ould be, either rotator
		cull tear or borsitis and there s	definitely some other
	Information could drive notion to towards surgery [CD/DT/OS]	DT Mala 20 20 yrrs ald "So t	his first race if I ware to
	information could drive patients towards surgery [CP/P1/OS]	has a patient looking at this I'd l	his first page if I were to
		alaarly pointing at this I d	ving surgery "
	Clarify that shoulder pain can be caused by overuse and work	<u>GP</u> Female 29 30 yrs old "I	find that most of the
	(e.g. heavy lifting) [GP/PT]	G_1 , remark g_2 - G_2 yrs ou - 1	and to be a middle aged
	(e.g. heavy mung) [01/11]	group having used a lot of over	head repetitive
e the causes and		activities "	inead repetitive
oms of shoulder	Re-format or re-word this information [PT/OS]	OS. Male 60-69 yrs old – "I kn	ow it's a lay term, the
pain		'inflamed tendons' but 'degene	erative rotator cuff tears'
		is often what we're dealing wit	h."
	Patients	e e	
	Describe what causes the structural issues associated with	Female 60-69 yrs old – "I supp	ose when somebody
	shoulder pain (e.g. explain why a tendon tears or a bursa gets	gets a sore shoulder you want t	o know, whether it's a
	inflamed)	swollen bursa, whether it's a te	ear, what's actually
		causing it?"	
	Provide more information about potential aggravating	Male 20-29 ygs old – "Or even	just 'your hands above
	activates (e.g. lifting overhead)	your head' or gomething like the	nat."
	Avoid jargon	Male 20-29 yzs old – "Non-me	dical folks are the
		people who haven't been seein	g a doctor or
		You lubing of Googling should	ler pain, are not going
•,• •		to be familiar with this."	
sitive messaging	Health professionals	by	
		öpy	
		righ	
	For peer review only - http://bmjopen.bmj.com/site/about/gui	idelines.xhtml 🙃	

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		Language will cause fear among patients [CP/PT]	CP, Male 20-29 yrs old – "There's a lot of very scary
			language in here too which is very nocebic; inflamed tendons, impligement, tears, swelling, fluid filled. Which for someonesee those things and think there's something very seriously wrong with me when there really very well might not be."
_		Include positive messaging about prognosis and what pain means (e.g. pain doesn't equal damage, pain may get better with time, imaging findings are common in people without symptoms) [CP/PT/OP]	CP, Male $20\overline{2}9$ yrs old – "Having a line like that in there that most people with shoulder pain get better on their own with time - stay positive."
		Health professionals Too much information [PT/CP/OS]	CP, Male 20-29 yrs old – "For the sake of just having a printout to give to somebody definitely the more visual and less words is probably good. I'm just thinking of it from a patient perspective where they want simplicity with direct answers."
	Make this section more concise and relevant	Explanation of shoulder symptoms might be irrelevant for patients [GP/OS/PT]	PT, Female 39-39 yrs old – "I'm just wondering if the line of 'shoulder pain often makes it difficult to do simple everyday tasks' really needs to be there, these people will know that."
		Graphic of pain distribution might be more useful than a graphic of the shoulder anatomy [OS/PT]	OS, Male 40-49 yrs old – "I think a surface-based picture showing a highlighted area of pain going down the lateral part of their arm may be more useful than an anatomical pieture."
		Remove the word 'arthroscopic' from decision aid [OS]	OS, Male 40-99 yrs old – "There's still debate on what's the best surgery for certain things, like open or arthroscopic.
	WHAT ARE THE TREA	TMENT OPTIONS COVERED IN THIS DECISION AID?	uest. Pro
_	Positive feedback	Health professionals	
			ed by copyric
		For poor rovious only http://hmiopon.hmi.com/site/shout/su	idalinas vetral

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	Graphic of surgery, details about surgery, non-surgical options are appropriate [PT/CP/OS]	PT, Male 40-99 yrs old – "The thing is with arthroscopic repair you'd never do it justice with type of picture anyway, so any general picture th would be fine It doesn't scare me away, it looks gentle, plus I ⁴ / ₂ / ₂ been in the OR anyway."	any ere
	Important that rehabilitation following surgery is highlighted [PT/OP/OS]	OP, Female 49-49 yrs old – "To talk about rehabilitation] think it is really responsible and important."	
	Patients		
	Order of options, description of options, formatting of information on surgery, including 'wait and see' as an option are appropriate	Male 20-29 yes old – "I do think those non-surgio options are important, that first one 'wait to see i pain goes away'. I read that and go yeah, every s time my pain has eventually gone away."	cal f your ingle
	Important to emphasise the downsides of surgery (e.g. long rehabilitation, anaesthetic)	Male 20-29 yes old – "That's definitely also prett clear. I think the 3 to 12 months rehabilitation br that would kind of freak me out a bit to see that u band there."	.y acket, 1pper
	Graphic of surgery was helpful to understand it is an invasive procedure	Male 30-39 yes old – "I think that does a good jo showing what they're planning on doing and that not something simple."	b of t it's
	Health professionals	ec.	
Include more detail on non-surgical options and how to progress	Balance the amount of information between non-surgical and surgical options [CP/PT/OS/GP/OP]	PT, Female 39-39 yrs old – "I would look at thos options and get there's all this information about surgery and under no surgery there's just a few v surgery must ge the more involved better option because it loogs bigger."	e two vords, for me
management	More detail needed on rehabilitation after surgery [PT]	PT, Male 40-49 yrs old – "It may be the same commitment of greater than conservative rehab, just have to be aware that it's not just fixednov have to follow this rehabilitation protocol."	so you v you
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	Need a flowchart of non-surgical options [PT]	PT, Female 39-39 yrs old – "Yeah maybe even a flow chart of some kindIs it a new event? Yes. Was it a
	Highlight how long patients should try different non-surgical options before surgery [GP/PT]	full rupture? Ses, so you have surgery." GP, Male 50 \$\$9 yrs old – "If they are younger, I won't let them wait for six months, if they're not better within 4 to 6 Speeks I'm probably sending them off to a surgeon if they have a torn tendon."
	More detail is needed on muscle strengthening programs [PT]	PT, Male 20-29 yrs old – "Maybe a greater emphasis on what the corrent evidence showsthat strengtheningecan make a difference and even time with doing the right things could improve it."
	Include evidence for non-surgical options [PT/OS]	OS, Female 59-59 yrs old – "I think it's important for them to know that if they wait long enough it will probably settle on its own, and we know the studies support that."
	Emphasise the need for shared decision making [CP]	CP, Male 20-29 yrs old – "It's always going to be a shared decision making process, it's always going to take into account the patients values and what their lifestyle is like, how much this is impairing them."
	Patients	
	Provide more non-surgical options	Female 50-59 yrs old – "There's not a lot of optionsI think it's telling me in my particular case that it's inevitable that I would have to have surgery eventually." \vec{N}
	Provide evidence for various non-surgical options (e.g. options listed in the decision aid, lifestyle change, TENS, ultrasound, hydrotherapy, massage, diet, acupuncture, Chinese herbs)	Female 60-6 Syrs old – "This has taught me a lot about surgery, whether to get surgery or not, but it hasn't told me a lot about whether cortisone injections are better than not having cortisone injections or whether physio is better than having no physio. "
	Provide more information on activity restrictions and how to modify activities while in pain	Female 60-6% yrs old – "I would like to know if I need to do anything or if it's just going to take time regardless of what you doOr whether you should
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		just continue doing everyday things like vacuuming
		and things like that even though it's a little bit painful." $\overset{\frown}{\succ}$
	Highlight whether delaying surgery or non-surgical treatment is harmful or not	Female 60-6 Eyrs old – "I'd read a lot about that, where they said if you wait too long its irreparable sort of thing, Dr Google again."
	Provide more information on 'wait and see' (e.g. highlight that you can trial non-surgical options while you 'wait and see') Present information in a way that helps patients understand	Male 30-39 yes old – "I think 6 months is a long time to wait and deal with an issue without seeking advice." Male 30-39 ves old – "Is there a recommendation from
	the importance of non-surgical options	the health board or something where it says 'non- surgical option is recommended?"
	Health professionals	
	Inappropriate to mention medication and injections as options [PT/CP]	PT, Male 40- 5 9 yrs old – "Personally I balk at the steroid injection option because the evidence for that is so poor. There's reasonably strong emerging evidence that its adverse effects are pretty high."
	Re-format or re-word information on non-surgical options [OS/PT]	PT, Female $39-39$ yrs old – "Rather than saying 'see a doctor for a corticosteroid injection' I would say 'discuss the options of a corticosteroid injection with the doctor."
Change the non-surgical options presented	Label 'no surgery' as something more positive (e.g. conservative, exercise-based) [PT]	PT, Male 40-89 yrs old – "I wouldn't call it 'no surgery', I would call it either 'conservative', 'exercise' "Physio exercise therapy', 'strengthening therapy'"
	Do not mention specific exercises in the decision aid [GP]	GP, Female 39-39 yrs old – "Generally [patients] won't do [exercise] if they didn't pay money [to see a physiotherapiet], if they didn't invest time into it they're not going to take on board the advice as much."
	Mention the benefits of ultrasound for diagnosis and guiding injections [GP]	GP, Female 69-69 yrs old – "The other thing would be usefulness of altrasound for the diagnosisespecially if you do ultrasound guided steroid injections."
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1 2 3 4		Waiting 6 months might be too long for patients to do nothing [PT/OP]	$\vec{9}$ OP, Female 49-49 yrs old – "I think to wait six months, which is really the implication of that first
5 6			one, would be a long time for people in pain."
7 8 9 10		Order of non-surgical options might be inappropriate [CP/PT]	CP, Male 20-29 yrs old – "The order of the bullet points, I mean hopefully they're not in any sort of order of priority, to go straight to anti-inflammatories, I'm biased towards non-pharmacological first."
11		Health professionals	OW NOT
13 14 15		Include indications for each surgery (e.g. failed conservative management, severe pain, age, rotator cuff tear, impingement, elite sports participation, massive cuff tears) [GP/OS/CP/PT]	GP, Female 30-39 yrs old – "Maybe in the decision making tool jast clearly outlining the reasons for why you'd then become a surgical candidate."
16 17 18 19		Highlight that imaging findings in isolation aren't indications for surgery [PT/OS]	OS, Female 59-59 yrs old – "It's not relevant to me what the imaging says, it's relevant what the patient's symptoms and signs are."
20 21 22		Important for patients to know which procedure they are most likely to receive as this could influence recovery and rehabilitation needs [OS]	OS, Male 40 9 yrs old – "That's what I say to a lot of my patients, by by it's very much dependent on the diagnosis and the anatomy of what's going on."
23 24 25 26	Include indications for surgery	Re-format or re-word indications for surgery [PT]	PT, Male 30-39 yrs old – "I guess putting option one and two there kind of implies that they have to have surgery afterwards."
20 27 28 29 30 31 32 33		Highlight that surgery may improve symptoms or anatomy but not address the cause [PT/OS]	OS, Female 50-59 yrs old – "I say to them their rotator cuff has got a headache, the surgery can take the hammer away but you will still have the headache and that headache will take time to improve. Unless you do the anti-inflate matories and the rehabilitation therapy that headache won't go away even if you have surgery."
34 35		Patients	est
36 37 38		Provide more detail on the indications for surgery (e.g. worsening pain)	Male 20-29 yrs old – "I wonder about in that first underlined sectenceif the above options don't work, if you can't live with the pain, or something like the
40 41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/guid	by copyright. delines.xhtml

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		above option ware not feasible you can't rest becaus
		vou have to work."
	Health professionals	
	Make the uncertainty of options clear [PT/OS]	OS, Female 2.59 yrs old – "By 6 months 75% are much better than they were before surgery. But would they have been there without surgery as well? Don't know. I think it's a hard question and we all think as
Present evidence of	For the second s	surgeons that our surgery does wonderful things, that one of the downsides of talking to surgeons we'll say we're fantastic and everything works really well."
benefits or harms in this section	Mention the success rate of surgery and non-surgical options [GP/PT/OS]	OS, Male 60–59 yrs old – "When I'm talking about the things that will help them and then get onto surgery, but also talk them about things a lot of people sper a lot of money on, there's no evidence that they work as well."
	Emphasise the harms of surgery [PT/CP/GP]	CP, Male 20-29 yrs old – "A 1% chance of you potentially dying from the surgery when it's no bette than anything else that's a big risk but it doesn't sour like a lot."
	Health professionals	on
Change information	Provide more detail on rehabilitation (e.g. time frames, will determine success, can be performed at home) [PT/OS/GP]	GP, Female 39-39 yrs old – "Surgery by itself is useless, if yog re going to go through surgery expect lot of rehab and if you can't commit to the rehab you're better off not going through surgery."
surgery	Include more details about the procedures [PT/OP/OS]	PT, Male 40-99 yrs old – "You could even explain a little more about the surgery, I think it's even ok to sa a little more."
	Re-format or re-word information on surgery [PT/OS]	OS, Male 40 9 yrs old – "I think again there's too much writing having lines like 'pain you can't deal with' is pushing the patientagain it's too wordy, so you would just say 'surgery is an option.'"
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			120
1			
2			054
3		Include details on receivery comparing surgery to non	PT Male 20 80 yrs old "One example recently I had
4		surgical antions [DT/CD/OS]	a should read and they get surgery and regretted it
5		surgical options [r 1/Cr/OS]	They were selence they didn't know how much they
6			would go have been been and how long it would take and
7			the restriction will be the sector of the se
8 0		Detiente	
5 10			
11		Provide less information on surgery	Male 20-29 yrs old – "The two different procedures, I
12			haven't been to a doctor or physic about this, these are
13			big words. Am I one? Am I the other? I don't really
14			know. Do I care? Is it important?"
15		Provide more information on surgery and rehabilitation	Female 40-49 yrs old – "Perhaps an explanation of
16 17			what rehabilitation means, I'm not sure I would really
17			know what the means."
19		Health professionals	
20		Modify the presentation of the two surgical options [GP]	GP, Female $\frac{39}{30}$ -39 yrs old – "I wonder in the surgery
21			part, the box that has subacromial decompression and
22			rotator cuff repair, if it would be easier to just have it
23			listed as two got points instead of two separate
24			columns." ₹
25 26		List non-surgical options first [PT/CP/OS]	OS, Male 40- $\frac{2}{4}$ 9 yrs old – "Usually when we're talking
27			about treatmentwe're mentioning no surgery first. I
28	Modify the formatting or		think therefore that should be put first instead of
29	graphics		having surgery first because it doesn't make sense to
30	graphics		talk about surgery first when I'm seeing a patient."
31		Patients	202
32		Improve the graphics (e.g. current image makes it appear	Female 50-5 Syrs old – "You might want to fine tune
33 34		surgery is less invasive than it is, current image of surgery too	that one pictume is there another one you can put
35		graphic, remove clock image, put image of person doing	that's not so karsh?"
36		exercise on the left so it stands out more)	ר ע
37		Improve the formatting of surgical options (e.g. list	Male 20-29 yes old – "Potentially on the first page you
38		procedures side by side, highlight procedures in a different	could have subacromial on the left and rotator cuff on
39		colour, put a clear dividing line or increase space between the	the right to h_{av} continuity in that sense."
40 41			<u> </u>
42			pyri.
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	procedures, list surgical options before non-surgical options due to previous positive experience with surgery, replace '12	-2021-0034032 011 SC	
	Re-word or re-format this section	Female 40-49 underlining p stop."	yrs old – "Again a small thing, the obably needs to finish next to the full
WHAT ARE THE LIKEI	Y BENEFITS OF SURGERY COMPARED TO NON-SURG	GICAL OPTIO	NS?
	Health professionals		
Positive feedback	Icon array, statistics, footnotes and colour scheme are clear and appropriate [PT/CP/GP/OP]	OP, Female 4 really quite ge would usually well."	9-49 yrs old – " I think the description is od and that's the sort of language that I use to describe what's happening as
	Patients	Ċ	
	Key messages box, bar graphs, icon array, description for certainty of evidence, explanation of placebo and formatting is appropriate	Female 60-69 when I read th	yrs old – "I think the layout is good, is it seemed simpler too."
	Health professionals		
	Remove the description of the certainty of evidence [PT/OS]	OS, Male 40- patients how hard thing to	9 yrs old – "So we're trying to teach interpret correct evidence and that is a o."
Revise description for the certainty of evidence	Using green font for high-certainty evidence will drive patients towards surgery [PT/CP]	CP, Male 20- interpret the h but when you decompression	9 yrs old – "Some people might gh certainty evidence as a better thing, actually read it, subacromial is little to no better than placebo."
	Describe certainty of evidence as 'strong' instead of 'high- certainty' [PT]	PT, Male 40-4 and figure out evidence, som that's one wor confusing."	9 yrs old – "I would drop the certainty another adjective or just 'strong' ething like that, maybe a stronger word d or two words. Low moderate is
	Health professionals		5 2 7

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1 2 3 4 5		Evidence doesn't match experience (e.g. careful patient selection will yield better outcomes) [OS/GP]	GP, Male 50-39 yrs old – "If you select the patient well enough often the result is not as bad as 3 percent, probably significantly higher."
7 8 9 10 11		Evidence from Cochrane reviews may not be generalizable to patients [OS]	OS, Male 40 9 yrs old – "We don't really want to generalise the patient's condition because some patients may have pain that's caused by a specific problem that doesn't fit in with what these studies were looking at."
12 13 14 15 16 17 18 19		Highlight that surgery may increase the speed of recovery or yield better long-term outcomes [OS]	OS, Female 59-59 yrs old – "I agree that at 12 months you're probably the same as if you didn't have surgery, but what's the patient journey in that 12 months between the two groups? That doesn't come out in this. Set if the surgical group are sleeping and are back at work and are comfortable sooner then that's relevant."
20 21 22 23 24	Evidence doesn't match experience, more clarification needed	Acknowledge that statistics represent averages and individual results may vary [GP/OP]	OP, Female 49-49 yrs old – "[Suggested to write] 'Some patiens report a better result than these statistics would show but plenty don't'or something like that."
25 26 27 28 29		Add outcomes or provide further explanation for existing outcomes (e.g. include quality of life, define treatment success, emphasise pain results) [GP/PT/OP]	PT, Female 39-39 yrs old – "They fix what's inside and they might get range, but their pain is still ongoing and that was the reason they wanted the surgery in the first place."
30 31 32 33 34 35 36 37		Mention the population and time points of the evidence [PT/CP/OS]	PT, Male 30-39 yrs old – "I know a lot of people would, especially in layman's terms, read this and say "well that doesn't apply to me, I could heal better than that or it wouldn't affect me." It might be nice to put the patient population in these two studies just so people can say oh cool, it was mostly older people or mostly younger people. "
38 39 40		Appears negative towards surgery but agrees the statistics are supported by evidence [PT/OS]	OS, Female - 59 yrs old – "If they're cut and paste from a Cochrane review then that's the best evidence
41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	idelines.xhtml

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1 2 3 4 5			that we've goves we can't dispute it, I just don't like it."	3
6 7 8 9 10 11		Highlight that surgery may be useful for preventing tears progressing even if there was no improvement in symptoms [OS]	OS, Male 40 9 yrs old – "In that group, a single tendon tear has become a one and a half to a two tendon tear, so the acute component which is just a to has extended to involve the next adjacent tendons. I don't think that's covered well by any study."	ear
12 13 14 15 16		Emphasise the uncertainty of the statistics [OS]	OS, Male 50-₹9 yrs old – "I think using 'somewhat confident' is an overstretchthe literature presents many unknownsthat's why there's a strong need for better studies?	`or
17		Health professionals		
19 20 21 22		Avoid numeric estimates (e.g. 3% could be framed as 'small') [PT]	PT, Female 39-39 yrs old – "I'd even take out the numbers and sust have "on average surgery has less pain and better function but not by much" or something."	
23 24 25		Replace bar graphs with a 'key messages' box [PT/CP]	CP, Male $20-\overline{2}9$ yrs old – "I do like those boxes, I think that's probably even a little bit more helpful the bar graphs themselves."	an
26 27 28 29 30 31	Simplify the statistics	Choose one way to summarise the data (e.g. bar graph or key messages box but not both) [PT/OS]	PT, Male 40-89 yrs old – "I think as a patient you might lose somebodya lot of numbers and words together and graphs, that's a lot, it's a busy slide or it a busy section, and they're both together so it's a lot information on both sides."	t's of
32 33 34 35 36		Repetition of evidence is biased against surgery [OS]	OS, Female 59-59 yrs old – "I think you need either the chart or the box or one of them, but all three to m is just repetition saying "don't have surgery", "don't have surgery", "don't have surgery.""	ne t
37 38		Statistics might be hard for patients to understand [PT/GP/OS]	GP, Female 39-39 yrs old – "I think they would experiment that it's a yestor no answer, we know it or we don't."	ect "
39 40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml	

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1 2 3 4		Difference between surgeries might be hard for patients to understand [PT/CP]	PT, Male 20-29 yrs old – "Again it's like do they really know the difference between rotator cuff repair,
6 7 8 9		Include the same comparison group when describing the evidence for both surgeries (e.g. remove placebo comparison) [PT/CP/OS]	subacromial & compression?" CP, Male 20 29 yrs old – "I don't think people really understand the concept of placebo surgeries, that seems super weird to some people when I've told them
10 11 12 13 14			about thatmaybe just [say] "subacromial decompression doesn't seem to be better than some of the other options in terms of changes in pain and function.""
15 16 17 18 19 20		Re-word the certainty of evidence statement [PT]	PT, Male 30- $\frac{3}{9}$ yrs old – "I'm wondering if there's a different way to phrase that, we are very certain, that almost seems like it's an ad on a TV or something. I think that maybe "we are confident in these results as these were high quality studies" or something like
21 _ 22		Patients	
23 24		Provide information on the source of the evidence	Female 50-59 yrs old – "Then you get this percentage, I don't know how you got this percentage."
25 26 27 28		Provide more explanation about the certainty of evidence	Female 60-69 yrs old – "When you say this research on surgery is high quality, I wouldn't know what low quality is."
29 30 31 32 33	Provide more detail or revise the description of the evidence	Including both the 'key messages' box and icon array is confusing	Interviewer — "What about the percentage of people reporting treatment success in the four with the green and grey people?" [icon array for benefits that was removed]
34 35 36			Male 20-29 $y_{\overline{b}}$ sold – "So is that coming out of a different set of research?"
37 38 39		Adding the age range of research participants is not necessary unless being outside this range would influence the benefits of surgery	Male 20-29 ys old – "I'm 20. I'm not sure if there would be anything different on younger people. Even
40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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		the ages of the participants, I'm not sure if that really
	Provide more detail on the non-surgical comparison groups	Female 40-4 Syrs old – "I guess under subacromial
		decompressice surgery you haven't given any
		alternatives to surgery, whereas under the rotator cuff
		injections, physiotherapy etc. Would those alternatives
	Clarify whether the evidence applies to those with severe pain	Male 20-29 ves old – "I know it's very difficult to do.
		but if there was some table about scales of pain and
		severity of inpuries, as to whether you should be going
	Patients	for surgery opnon-surgery therapies."
	Clarify that numeric estimates are averages and that some	Male 30-39 ves old – "I think that's important because
	people will experience better or worse outcomes	I need to know what the average outcome is and then l
		can then speak to my GP or surgeon or someone to
		find out if mysparticular case is likely to be better than average or worse than average "
Contextualise the	Emphasise that surgery may help but it will not be a cure	Male 40-49 yrs old – "It will help but it's not perfect. I
evidence to reflect		guess that would probably be more relevant than stats
uncertainty on an		about success?"
individual level	Statistics shouldn't influence treatment decisions as they are averages and natients should trust their health professional's	for me at all The stats are obviously for a large
	advice	selection of the population, that's an average, it
		doesn't necessarily apply to my specific situation. So i
		it was determined by a health professional or medical
		state would not be a consideration whatsoever "
	Health professionals	
Modify the formatting or language used	Mention the findings before the certainty of evidence [CP]	CP, Male 20-39 yrs old – "So starting off with 'subacromial decompression is little to no better than
		d by
		copy
		ri. ght
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		placebo' and then following it up with there's high
		certainty evidence for this."
	Shorten the 'key messages' box and include other information	GP. Female $30-39$ vrs old – "I like the version two
	as footnotes [GP]	where it's a staller box there and it's cut out some of
		the text and put it below as well."
	Make the bar graphs vertical [PT/CP]	CP, Male 20- 39 yrs old – "I think that would make
		sense to a lot $\vec{\Theta}$ people. Maybe even just going in a
		vertical sense might also help some folks but I don't
		think there's to much trouble with that."
	Modify the colour scheme and presentation [PT]	PT, Female 49-49 yrs old – "I was just wondering if
		you could change the colour of different procedures so
		that they can see more difference."
	Reduce the amount of text [PT/OS]	OS) Male $40\frac{3}{4}9$ yrs old – "I think the second page, the
		likely benefits is just a bit wordy. I think a patient will
		get to that and just think, ugh, they will probably just
		be captured by the green men [icon array which was
		later remove
	Patients	
	Shorten 'key messages' box and include other information as	Male 30-39 yrs old – "I think having a smaller box and
	footnotes	just having these couple of pointsmakes it quicker to
		read to get the basic information and the important
		information."ភ្ន័
	Limit footnotes as they slow the reading pace	Male 30-39 y [₽] s old – "Almost every single line you're
		going back down and then you're going back up. It's
		really not easy, it doesn't flow well and it's not easy to
		read that." $\frac{\omega}{g}$
	Suggested strategies to reduce text (e.g. not repeating	Male 20-29 yas old – "A lot of text, I'm wondering if
	information in each column, move some information to a	you could make it more infographic I mean the
	'further reading' section, replace words with graphics)	boxes are good if you read it, but again I'm wondering
		if you can make it more easily digestible from a
		picture?" 👸
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	Icon array is not useful (e.g. confusing, prefers bar graph, icon	Male 30-39 yrs old $-$ "I'd	probably just neg all this and
	array takes focus off key messages)	go straight to a bar thing	.condense it all down, crack
		on, it's just too much word	ds and too much extra stuff."
	Address inconsistency between headings, figures and text	Male 20-29 yēgs old – "Are	those first two really
		benefits?" [highlighting th	at there are actually no
		benefits of suggery]	
	Mention benefits before harms as benefits are the crux of the	Female 40-49 yrs old Will	iams – "I was just thinking
	decision aid	about the order starting wi	th complications and then
		going to benegits, you nor	mally would see it the other
		way around."🞅	
	Numeric estimates, surgical options and footnotes are	Male 60-69 $y_{\overline{FS}}$ old – "Sub	acromial decompression
	confusing //	surgery, what does that me	ean?"
		ttp:	
WHAT ARE THE LIKI	ELY HARMS OF SURGERY?	//br	
	Hoalth professionals	<u>2</u>	
	Presentation of harms is appropriate [PT/OS/OP]	PT Male 30-39 vrs old	'Again they're simple
	resentation of names is appropriate [1 1/05/01]	graphic and visual easy to	read and certainly makes
		you reconsider surgery so	veah that looks good "
	Patients	you reconsider surgery, so	
	Clear figures and text which would make notion to think hard	Eamola 40 40 Erra ald "I	think the image is useful
	before having surgery	remare 40-49 yrs old -1	unnk the image is useful
Positive feedback	Statement of each distance have been been been and a mith	Male 20 20 - The UThe	
	statement about the risk of narms being nighter in people with	Male 30-39 ys old – The	but not that much. It would
	other health conditions is valuable	possible it might deter me	, but not that much. It would
		depend obviously on my p	bersonal condition and my
		personal scenariothen I	can tell if I m one of those
		average people, or if I'm t	better or worse than the
		average personI think the	hat's nice and clear, I can get
		a lot of information out of	that quite quickly."
	Health professionals	rote	
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1 2 3		Distinguish between surgical complications, complications	\dot{N} \dot{N}
4 5		specific to the procedure (e.g. frozen shoulder) and poor outcomes [GP/OS/PT/OP]	unsuccessful dutcomes so again, they have to be separated out?
6 7 8 9		Mention revision surgery as a possible adverse event [OS]	OS, Male 40 9 yrs old – "So discussion about the need for re-do surgery is usually about poor healingWhat I'm talking about there is failure of
10 11 12 13 14	Present minor and		repair. There are other needs to do revision surgery when the repair has healed well but, for example, the patient may have a recalcitrant adhesive capsulitis or frozen should be "
15	serious harms	Patients	ਤੋਂ
16		Important to know both minor (e.g. loss of movement and	Male 30-39 væs old – "Recovery time would be very
17		strength) and serious harms	important to me in a trade. Probably if there's other
19			side effects as possible loss of range of motion or
20			strength because that would severely impact my work
21			and day to day life."
22 23 24 25 26		Definition of minor and serious adverse event is problematic because severity is subjective	Male 30-39 yrs old – "Saying a serious problem versus a non-serious problem, I think that's very relative to the patient begause that becomes a material assessment "
27		Health professionals	
28 29 30 31 P 32	Provide more context for	Presenting harms in a different section to 'benefits' doesn't give an understanding of harm vs. benefit [GP]	GP, Female (a)-69 yrs old – "When you compare them [harms] to the benefits being very minimal, then the harms outweigh the benefitsthe graphics don't really show that aspect."
33 34 35 36	harms	Compare the harms of surgery and non-surgical options [PT/CP]	CP, Male 20-29 yrs old – "One in one hundred people who are going through something like this, that's big. We look at rates of adverse reactions in manual therapies, your re looking at like 1 in 3 million."
37 38 <u> </u>		Patients	
39 40 41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gu	idelines.xhtml

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		1-20:	
		21-0	
		05 4C	
	Presenting harms in a different section to 'benefits' doesn't	Interviewer: $\mathbf{\hat{P}}$ it did get to a point where y	you needed
	give an understanding of harm vs. benefit	to consider that [surgery], what would you	ı most wan
		to know while you're weighing up that ch	oice.
		Male 30-39 $y_{\Xi}^{\overline{2}}$ old – Probably the risks in	volved and
		the chance of Success in comparison to that	at risk.
	Emphasise surgery involves a general anaesthetic	Female 60-69 yrs old – "Again you've got	t to count
		into that anaesthetic, do I really want to go	o under
		anaesthetic for it as well?"	
	Health professionals	de e	
	Harms might be overestimated [OS]	OS, Male $40-\frac{4}{2}9$ yrs old – "I would say de	ep infectior
		in my practice, and having done arthrosco	pic surgery
		for more than 10 years, it might be 1 in 10),000. That
		doesn't relate to me in my practice, so I w	ouldn't giv
		my patients those statistics."	0 11 1
Evidence doesn't match	Harms might be underestimated [P1]	PT, Female 39-39 yrs old – "My only othe	er feedback
experience, more		about the harms of arthroscopic surgery. I	would loo
clarification needed		at that and think It's not likely I m goin	g to be
		having any problems I in 100 makes it	100K 11Ke 1t
	Histlicht wardet wardet wardet de sonstaat viele ofte war	not that likely but actually 1 in 100 is quit	e high."
	Highlight populations who are at the greatest risk of narms	CP, Male 20- $\frac{1}{2}$ 9 yrs old – "I know it takes	up more
	(e.g. diabetes, other co-morbidities) [CP]	space to add more information always, bu	t letting the
		nrohlems or för frozen shoulder, comerbic	or serious
		conditions if any "	uity
	Health professionals		
	Format the harms section so it is consistent with the benefits	OS Male 40,49 yrs old - "Veah and pres	ent them in
	section [PT]	the same way Whatever format you choose	se "
Modify the formatting or	Move harms to practical issues section [CP]	CP Male 20-29 yrs old $=$ "So going back"	to what voi
language used	here harms to practical issues section [of]	were saving. what do we use for visuals to	ables are
		probably real so good This [presenting har	ms in
		practical issues section is just another wa	y of showi
		<u> </u>	<u></u>
		уруг	
		ig ht	
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the differences, this might even be another way whe we're comparing the harms of arthroscopic surgery versus conservative care that might even be another way to compare the two so people can see." CP, Male 20-29 yrs old – "To say that it's based on most up to date medical evidence is probably really
the differences, this might even be another way whe we're comparing the harms of arthroscopic surgery versus conservative care that might even be another way to compare the two so people can see." CP, Male 20-29 yrs old – "To say that it's based on most up to date medical evidence is probably really
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 we're comparing the harms of arthroscopic surgery versus conservative care that might even be another way to compare the two so people can see." CP, Male 20-29 yrs old – "To say that it's based on most up to date medical evidence is probably really
versus conservative care that might even be another way to compare the two so people can see." CP, Male 20-29 yrs old – "To say that it's based on most up to date medical evidence is probably really
CP, Male 20-29 yrs old – "To say that it's based on most up to date medical evidence is probably really
most up to date medical evidence is probably really $\frac{1}{2}$
most up to date medical evidence is probably really
important "
OS Female S0-59 vrs old $-$ "So this one I found eve
more emotive harm is in red and underlined I
wonder if there might be a different word. I know
vou're avoidi ng risks, vou're using the word harms
rather than risks, I don't know what other word mig
be better. "
PT, Male 20-29 yrs old – "Maybe with this graphic
because the percentage is so small, it takes up a lot of
space to do that. I guess it can be a good graphic to
show how if you look at this you'd think I'd be pret
unlikely to get a problem is what you take away from
that. The graphic does its job but if you think there's
only half a person getting a serious problem that's
probably not going to be me."
Male 40-49 y≇s old – "'Harms' seems dangerous. I
suppose I think risk is interred with those kinds of
procedures. I on just thinking there's maybe a better
Mala 20, 20 yes ald "I don't know how much the
nicture does for me if you just had a big 4% there the
might get the same message across "
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UMMARY OF BENEFI	TS, HARMS, AND OTHER PRACTICAL ISSUES	on 30	
	Health professionals	Au	
	The whole section is appropriate [GP/PT/OS/OP]	PT, Female 39-39 yrs old – ' at the end about the practical consider."	'I like the idea of the table l issues that they should
	Being vague about costs is appropriate because as patients in the public system may not have any out-of-pocket costs [PT]	PT, Female 39-39 yrs old – ' many people so surgically as conservative hysiotherapy of	'I feel like that's why so s opposed to going along a driven pathway, because
Positive feedback		they've got to pay privately injections bugthey get their s hospital and then will often g	for physiotherapy and surgery done for free at the go into the public system
	Patients		
	Content, layout, and discussion about costs and recuperation after surgery is appropriate	Male 40-49 yes old – "I'm lo different lensthis time and I spot on."	ooking at them through a think they're pretty much
	Global summary would be helpful for people without time to read the entire decision aid	Female 70-79 yrs old – "I this Some people who won't read neat and tidy and it takes you	ink that it's very good. d through things. This is so u a minute or so to read."
	Health professionals		
Revise information on costs	Include the cost of non-surgical options (e.g. time, effort, cost without insurance coverage) [CP]	CP, Male 20-29 yrs old – "If paying out of pocket because it might actually be more exp care from a physio or a chirc go get a surgery because that through their msurance "	E this is just somebody e they have shoulder pain pensive for them to seek o than it would be to just t's going to be covered
	Be specific about costs to emphasis the true cost of surgery [PT/GP]	GP, Female 30-39 yrs old – actual cost itself, which is ve decision aid. Eknow dependi	"I think [include] the ery hard for you to put in a ing on which area, which
		ed by copyrigh	
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			1-20
1			21-0
2			05 40
3			surgeon it could be very different but just giving an
4			idea of how much these costs are "
5		Include costs related to time off work [OS/PT]	OS Male 40-79 vrs ald "Out of packet costs correct
6		include costs related to time on work [OD/1 1]	there's the other costs are not working so if someone
/ 8			has used up their sick leave whether it's surgery or no
9			surgery then they're on leave without pay so that's
10			another cost to consider as well "
11		Soften the language emphasizing the posts of surgery [OS]	OS Mala 50 \$0 yrs ald "When you say the out of
12		Solicit the language emphasising the costs of surgery [03]	nocket costs for surgery are generally high I think
13			that's a value statement. I would say they are generally
14			higher than n g n-operative treatment. Some surgeons
16			don't charge anything there's no out of pocket paying
17			cost for some nations, there is no out of poolet paying
18		Patients	
19		Be more specific about costs (e.g. time off work, add "speak	Male 70-79 ves old – "How much is going to cost in
20		to your GP and insurance provider to understand exact costs"	the hospital? Am I covered by medical benefits? How
21		costs of non-surgical options non-surgical options might	much am I covered for my medical benefits? How long
23		equally expensive in some countries)	am I going tobe in hospital? What are the charges?"
24		Highlight that waiting times are long and costs are higher	Male 30-39 ves old – "What I want to do and other
25		without private insurance	factors finangial factors as well and how long I have
26		without private insurance	to wait for the sort of stuff all these things "
27		Health professionals	
28		Revise timeframes for post-surgical activity restrictions	OS Male 50.59 yrs old "Practical issues after
30		[OS/PT]	decompression I would suggest avoiding heavy lifting
31	Revise information on		usually for si ^N for twice that long that's a bit short
32	activity restrictions and		They may elevate above their head at 1.3 weeks but
33	nost_surgical		we would not let them heavy lift for 6-8 weeks "
34	management	Include timeframes for returning to normal function (e.g.	PT Male 30- $\frac{1}{2}$ 9 yrs old $-$ "I guess that's what people
35 26	management	sports activities of daily living pre-injury function) but also	want to know will I be able to play nick up hall
37		acknowledge the possibility nations won't return to normal	again " \hat{Q}
38		[PT/CP]	
39			
40			зу о
41			ору
42			righ
43		For peer review only - http://bmjopen.bmj.com/site/about/gu	idelines.xhtml 芹
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Highlight that symptoms may improve, with or without	\tilde{B} \tilde{B}		
surgery [GP]	frame, it makes it sound like with surgery you will just always have symptoms whereas without surgery you won't have symptoms. I understand that is correct, I'm trying to say, symptoms may come and go until rehabilitation is completed? I don't know how to word that."		
Mention that people who do not have surgery will still have their usual symptoms and their improvement will depend on	OS, Female 59-59 yrs old – "If you don't have surgery there's no surgery to recuperate from, but you still		
the success of the non-surgical options they try [OS]	have your primary symptoms, so you're not pain free."		
Emphasise that symptoms will get worse following surgery due to the procedure [PT/OS]	don't fully conceptualise that, you can't even use the		
	muscles in your shoulder for 6 weeks. That's a pretty big consideration."		
Add a row for 'social support' (e.g. getting dressed, dishes, transport to appointments) [PT]	PT, Female 39-39 yrs old – "The other thing I would put in there is people getting to rehab if they don't have someone, social support. Who's going to help them get dressed or do their dishes, take them to appointments?"		
Highlight that people must do exercises following surgery [PT/OS/CP]	OS, Male 40–49 yrs old – "I tell them that their shoulders wile be stiff and will have deconditioned because they be been waiting for their tendons to heal and the structures to heal. It usually takes that extra 3 months of work to rehabilitate them enough that they can get back boto manual labour type activities."		
Define 'heavy lifting' [PT]	PT, Female 39-39 yrs old – "I think I'd try to be a little more specific with that, because heavy lifting is so specific to different people."		
Include activity restriction timeframes for non-surgical options [PT]	PT, Male 30-39 yrs old – "Do you have anything in there for 'no gurgery' as well, like most people do well in 6 weeks or expect 12 weeks?"		
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1 2 3 4 5 6 7		Highlight that recovery is influenced by the severity of a patients' pre-intervention symptoms [OS]	OS, Male 50-99 yrs old – "I think just recognising that there is a spectrum of severity of symptoms, that they're not all the same. Therefore, people with lower symptoms are generally more likely to improve."
8		Patients	IST
9 10		Emphasise driving restrictions	Male 70-79 yes old – "I would rather see 'you can't drive for 6 weeks' rather than 'you can.'"
11 12 13 14		Emphasise that patients may need treatment after surgery (e.g. physiotherapy, injections, exercise, etc.)	Male 40-49 yes old – "I guess my experience is even after surgery there's still lots of injections, lots of medication
15 16 17 18 19 20 21 22 23 24		Highlight the need for patients to consider their individual circumstances before making any decisions (e.g. pain levels, social aspects, insurance, job demands, caring responsibilities, age, activity levels, sports participation, etc)	Male 40-49 yss old – "I think that's probably a lot more important to consider with stats; where would you be without this if you can't go back to doing the things you want to do again? In another non-sporty point, if it affects a tradesman ability to earn income it affects their entire family's quality of life. So I think that's probably the more responsible point to make in it, rather than you'll get 9 or 6% less pain and that sort of stuff."
25 26		Add a column for 'no treatment'	Female 60-69 yrs old – "Are you allowed to have a column that says 'no treatment?'"
27		Health professionals	3
29 30 31 32 33	Modify the formatting or	Separating practical issues by type of surgery results in too much information [PT]	PT, Male 20-29 yrs old – "Do they really know the difference between rotator cuff repair, subacromial decompression? I guess it's really only if they've been told that's what appropriate for them that they then go, which one and I?
34 35 36 37	language used	Split the practical issues section by type of surgery [GP]	GP, Female $3\overline{2}$ -39 yrs old – "Then the third page I guess the text books like instead of lines we split something in two columns."
38 39 40		Discuss 'Follow-up with surgeon' in 'Recuperation' section [GP]	GP, Female 30-39 yrs old – "Maybe talk about the follow up in gecuperation. I think that suits
40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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	racuparation $racuparation$ more than it does procedure, in my tr
	of thought an way."
Could use a checkbox to reduce the number of words in the 'Activity restrictions' section (e g. sling (tick); 3-4 weeks off work (tick), etc.) [CP]	CP, Male 20-29 yrs old – "If we were to reduce ho many words are present, the row with all the activi restrictions and time off, it seems like that could be either a checkbox yes or no 'do you require a sling
Include a summary of whole decision aid in the practical issues table in case people don't want to read the whole decision aid [CP]	CP, Male 20-29 yrs old – "That might be helpful if someone doesn't want to read three pages and they just got one thing to glance at, we could direct ther just the one table."
Change title of this section to "What will my recovery look like after surgery and non-surgical options" to reduce bias against surgery [PT]	PT, Male 30-39 yrs old – "It's very heavily biased towards don' have surgeryMaybe instead of 'wh practical issues should I consider' it might be bette have something along the lines of 'what would my recovery look like' or something like that, or 'what these processes look like?'"
Remove this page entirely as patients will be losing interest by this point [OS]	OS, Male 40-39 yrs old – "I thought there shouldn" a third page ag all to be honest, by then the average punter is losing interest."
Patients	<u> </u>
Present practical considerations for the two types of surgery in separate columns to match the second page	Female 20-29 Fyrs old – [Shown two surgeries in separate columns as option #2] "I feel like I'm bein super biased But I'm going to say the second one a well because that breaks down each surgery[and seems a little Bit clearer."
Make the headings and sub-headings clearer	Male 20-29 yes old – "So just in terms of the layou thought that was the subheading and the next chart table was related to the what are the likely harms. S maybe a thicker bit in between might separate thos ideas, just a begger space or something like that."
Do not mention insurance as this is not relevant for people treated in the public system	Male 30-39 y sold – "Just the first part where you 'and insurance provider' I get a little bit offended t
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			anyway because it automatically presumes that I have
			private health insurance or that this is a work cover
		A almostiladas that time from as an assure as a motion to don't	thing. It makes an assumption of the reader."
		acknowledge that time rames are averages so patients don't get disheartened when they don't reach a milestone on time	you don't hit that 21-day average- unfortunately
		get disheartened when they don't reach a milestone on time	whatever affects your body affects your mind."
		Change the colour of table to match other sections of the	Female 40-49 yrs old – "This table is quite clearly laid
		decision aid	outgood use of shading and colour, although the
		í Or	blue is a different shade to what's used in the whole rest of the leader."
(QUESTIONS TO CONSI	DER WHEN TALKING WITH A HEALTH PROFESSION	AL Ton
		Health professionals	
		All questions are important [GP/PT/OS/OP]	OP, Female 49-49 yrs old – "I think that's really good
		e.	because you can tick through that and make sure that they've understood the really important points."
		Patients	<u> </u>
	Positive feedback	All questions are important	Male 20-29 yes old – "Especially the last one [about]
			Information and support. I think that's often one that I've seen some of my friends sometimes den't lesk
			So I think that's an amazing one to have in there."
		Agrees that patients should be directed to ask questions	Female 20-29 gyrs old – "I think they're good because
			when you're in an appointment setting for me I get
			really nervous and I don't always think."
		Health professionals	$\frac{22}{2}$
	Adding and removing	shoulder?": "What level of activity can Light to if L have	that going to mean it keeps tearing and then I need
	questions	surgery versus not?": "How much non-surgical management	surgery later on and it gets worse?' that sort of thing."
		should I try before considering surgery?") [OP/PT/OS]	
			tecte
			b b
			/ cop
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1 2 3 4 5 6 7 8 9		Remove questions (e.g. "Do I know enough about my condition"; "Have I considered my individual circumstances") [OS]	OS, Male 40 49 yr question to asy bec practitioner to read considered my spe something a Health format."	rs old – "I don't think that's a good cause you're asking the health d the patient's mind. 'Have I ecific situation?' Again, that's not n professional can answer in that
10		Patients		
11 12 13 14 15 16 17		Add questions (e.g. "Can I have surgery later?"; "What is my diagnosis? Are there any other surgeries performed for this type of shoulder pain?"; "What other treatment options do I have/who else can I see?"; "How will my individual circumstances impact me?"; "What happens if I don't do anything?")	Male 20-29 yes old diagnosis.'"	d – "Maybe add in there 'what is my
18		Health professionals	://b	
19 20 21 22 23		Increase the size of this section [PT/CP]	PT, Female 39-39 things that I can do that box 'other thir that first page under	yrs old – "Can we make the 'other o 17 times bigger?' I almost think ngs I can do' needs to be up there on er no surgery."
24 25 26 27		Could replace "Questions to consider when talking with your doctor" section with "Any further questions, ask your doctor" to save space [GP]	GP, Female 30-39 out, I would ent ou to your doctog?"	yrs old – "If you needed to cut that at and say any 'further questions talk
28 29 30	Modify the formatting	Change the heading of this section so it applies to any health professional [PT]	PT, Male 20-29 yr talking to your doc for your doctor or	s old – "Then the 'questions when ctor' are what we were saying before physio."
31 32 33 34 35 36 37 38 39 40		Change the heading of this section so it applies to GPs [PT]	Interviewer - Sin v direct people who keeping it open lik professional, know people. Do you thi your physio of eve depending on who	which case do you think we need to to ask these questions to, rather than the that? We've just said health wing that could be a whole number of ank we should say 'ask your GP', ask en just subcategories the questions they're asking."
41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gu	idelines.xhtml	

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1 2 3			PT, Male 40-49 yrs old – "Put great faith in GPs, they
4			really care for their patients."
6		Patients	о >
7 8		Remove this whole section to create space	Male 20-29 yes old – "I don't think it adds a lot for me just because Ethink they're kind of obvious in a sense
9			I think questions would naturally arise from this."
10		Modify the formatting for the bullet points (e.g. words don't	Female 40-49-yrs old – "In the third one, the spacing
11 12 13		line up with the bullet points, too cramped, put questions in speech bubbles)	of the lettering is quite different to the spacing in the fourth one." $\frac{1}{2}$
14 15 16		Change to "Questions to consider when talking with <u>a</u> health professional" (instead of "your health professional")	Male 40-49 yes old – "So when I just see the way that heading looksI'm wondering if that's pointing them too specifically just to one person."
17 18 19 20		Combine the first two questions	Male 40-49 yes old – "Am I clear about the benefits and the harms? That's the same as "Do I know enough about the benefits and harms?"
21 22 23 24 25		Categorise questions based on which health professional should answer them	Male 40-49 ys old – "I'm wondering if there should just be more specifics around health professionals. I mean they're all health professionals, but some I've found to be more valuable than others."
26 27	ARE THERE OTHER TH	HINGS I CAN DO?*	n Decem
20 29		Patients	ber
30 31 32	Positive feedback	"Other things I can do" box is great (1) [PT/CP]	PT, Male 40-49 yrs old – "So you make up for it by highlighting that which is cool, for saying the ongoing commitments I like that you're putting that there."
33		Health professionals	ý Q
35 36 37 38 39	Modify information to help people choose non- surgical options first	Move this section to the first page and make it clear surgery is a last resort [PT/CP]	CP, Male 20-29 yrs old – "Obviously really good advice, I think that should almost be at the forefront. These are pretty good options that they're probably going to have to try even before considering surgery becausesuggery is often a last resort."
40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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	Description is the formula in the form	20 22 1-05 540 55 1-05 1-05 1-05 1-05 1-05 1-05 1-05
	Be specific about what exercises can be done [P1/CP]	broad spectrum of things, from a physical therapy standpoint obviously I might include beyond just strength and endurance exercises, strength, flexibility, endurance exercises."
	Emphasise that there is often no need for early surgery and no harms in delaying surgery [OS/PT]	PT, Male 20-29 yrs old – "It was more a fear of 'if I don't do it now then what happens in the future?'"
OVERALL FEEDBACK		
	Health professionals	Ф О
	The graphics will assist non-English speaking people [PT/OS]	PT, Female 39-39 yrs old – "A lot of my clients don't speak Englisher so I'll always go with pictures and graphics and really easy to understand things."
Positiva feedback	The decision aid will be an important tool for busy clinicians [PT/OS]	OS, Male 40-49 yrs old – "Assuming that the GPs have some musculoskeletal background and know a little bit about this problemthen having that information sheet [decision aid] certainly is helpful and I can assess the patient, they already know some o that information and I don't have to rehash everything."
I USITIVE ICCUDACK	There is no information that is not important in this decision (aid [PT/OS/GP]	PT, Male 30-39 yrs old – "Maybe you could take- that's the proglem it's all pretty useful."
	Patients	
	Language, flow. explanations, content, length, and disclosure statement are appropriate	Male 30-39 yrs old – "That seems fairly straight forward as well, there doesn't seem to be anything in there that I don't either understand or isn't visually represented."
	References are important but should be provided on request	Male 30-39 yrs old – "You could maybe just say 'references can be provided via emailing this address.' I don't know of you need to put all those references in there."
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1 2 3 4 5		The decision aid will be an important tool for patients who do not receive enough information in a consultation	Male 40-49 yrs old – "My surgeon, wonderful guy, really nice guy and he's done a great job, he never really explained a lot to me."
6 <u> </u>		Health professionals	
8 9 10 11 12 13 14		A 2-page decision aid is ideal [PT/CP/GP]	GP, Female 39-39 yrs old – "I don't know if this is possible, but Ethink two pages. So being able to print it double sided and have just one piece of paper given to the patient it feels in my head less overwhelming than a bunch of paper being stapled together and saying here, read it all."
15 16 17 18	Reduce amount of information	The decision aid includes too much information [GP/OS/PT]	OS, Male 40–49 yrs old – "I thought it was a bit too busythere's so much writing now I can't tell. If you're going to give that to the general public you've got to be like it's pretty straight forward."
20 21 22		Create a simplified version of the decision aid for patients [PT]	PT, Male 20-29 yrs old – "Maybe you give this one to the health practitioner and you do a separate for patients to take with them."
23 24 25 —		Remove some sections (e.g. questions to ask a health professional, references, rotator cuff repair surgery) [PT/OS]	PT, Male 30-39 yrs old – "Do the patients care specifically about references?"
25 26 27 28 29 30		Health professionals Include a section on diagnostic imaging (X-Ray, MRI, Ultrasound) and the importance of not missing a serious disease [GP]	GP, Female (9)-69 yrs old – "You don't want to miss arthritis or tugours or things like that. I think that would be useful tounderstand the roles of each, of the x-ray ultrasound and MRL."
31 32 33	More detail needed	More detail is needed if the decision aid will be used without input from a health professional [PT]	PT, Male 20-29 yrs old – "I think the one that would be sent home you would want a little bit more detailed versus one that you are with a patient going over it."
34 35 36 27		Acknowledge who made this decision aid so patients can evaluate the quality of the information [OS]	OS, Male 50-59 yrs old – "Acknowledge what the background of the people constructing it is"
37 38 39		Last page lacks a solution if a patient has tried everything	Male 20-29 yes old – "I don't know if that exists or not but to give people a new solution."
41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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	Encourage people to seek a second opinion or further information	Male 70-80 yrs old – "Do I have enough informatio and if not what do I do? I guess, if I answer that as I	n no,
		next, I've already spoken to the doctor."	
		Interviewer: $\stackrel{\text{D}}{\text{Ent}}$ a good point, maybe some links further resources might be helpful.	to
		Participant: Y ah."	
	Health professionals		
	Improve the colour scheme or layout (e.g. improve consistency, space out information) [GP/PT/OS]	PT, Male 40-49 yrs old – "I feel so critical, it's a bit gloomy."	t
	Create separate decision aids for each procedure [CP/OS/GP]	OS, Female 59-59 yrs old – "It's too much covering decompression and rotator cuff repair on the one handout because they are two separate conditions and they're offered for different reasons and they should separated."	g nd d be
Formatting or distribution suggestions	Create separate decision aids for surgical and non-surgical options [GP]	GP, Female 60-69 yrs old – "Having surgery as a separate one decision aid], because you wouldn't to them about [Surgery] straight awayI think it's too much information at the beginning, most people wo get a bit alarmed if you talked about surgery at the beginning."	ell o ould
	Create a video summary of the decision aid [PT/CP]	CP, Male 20-29 yrs old – "I feel like people nowada don't have a great attention spanI almost wonder somehow like video, they could access it on Youth or something free like that."	ays if ube
	Include citations in the decision aid [CP]	CP, Male 20-29 yrs old – "I don't see a citation."	
	Acknowledge that treatment decisions might be influenced by the health professional the decision aid is discussed with [PT/OS]	OS, Female 59-59 yrs old – "In my experience, those who fail non-gurgical do really well with surgery an so most of mg patients do better, but I haven't got a	se nd
	For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml	

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	group to compare them to so I've got a very biased
	view of surgery because that's all I see."
Distribution suggestions for the decision aid (e.g. in a clinic,	OS, Male 40 9 yrs old – "The most useful thing that
early in treatment, when a patient is considering surgery, after	we're talking about surgery vs. no surgery, is at the
a diagnosis is made) [PT/OS]	junction where surgery is being considered and that is
	in the special ist's office, to me that would make the
	most sense." §
Improve readability of the decision aid [PT/OS]	PT, Male 40-∰9 yrs old – "I think the challenge with
	language is, let's say your aim is to get the FKMG
	score of a reading literacy score down to year 8 or year
	6. A message that details enough to be satisfactory for
	a consumer, but without getting there's a lot of words
	on this page.
Patients	
Include page numbers	Male 70-79 ys old – "I kept looking for more pages,
	only because thought it would have been a longer
	thing for no reason other than why won't it go page
	down anymore. So maybe 'page 1 of 3' or something
C_{rest}	like that on the top." $M_{11} = 20 - 20 = 0$
Create several decision aids (e.g. one for each surgery, one for	Male $30-39$ yes old – "It's like half of that is not
Datients and one for nearin brotessionals)	relevant to the first have subacronnial decombression
partents and the for nearth professionals)	surgery and the other half is not relevant to me if I
partente una one fer neuron professionails)	surgery and the other half is not relevant to me if I
parteneo ana ene fer nearm professionale)	surgery and the other half is not relevant to me if I have a rotatorcuff injury. It's like well give me the one that's relevant for me "
Improve readability (e.g. increase the font size space out the	surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me." Male 30-39 vits old = "I think a lot of the text is too
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages use a	surgery and the other half is not relevant to me if I have a rotatorcuff injury. It's like well give me the one that's relevant for me." Male 30-39 yes old – "I think a lot of the text is too small
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages, use a consistent design across pages use a darker grey background)	surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me." Male 30-39 yrs old – "I think a lot of the text is too smallI know it's a draft, I just think it's a bit- it doesn't easily flow well "
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages, use a consistent design across pages, use a darker grey background) Patients should read the decision aid before or after a	surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me." Male 30-39 yes old – "I think a lot of the text is too smallI know it's a draft, I just think it's a bit- it doesn't easily flow well." Male 30-39 yrs old – "You have to be able to ask
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages, use a consistent design across pages, use a darker grey background) Patients should read the decision aid before or after a consultation with a health professional so they don't waste a	surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me." Male 30-39 yrs old – "I think a lot of the text is too smallI know it's a draft, I just think it's a bit- it doesn't easily flow well." Male 30-39 yrs old – "You have to be able to ask questions to semebody, so a health professional it
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages, use a consistent design across pages, use a darker grey background) Patients should read the decision aid before or after a consultation with a health professional so they don't waste a health professional's time and can ask questions	surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me." Male 30-39 yes old – "I think a lot of the text is too smallI know it's a draft, I just think it's a bit- it doesn't easily flow well." Male 30-39 yes old – "You have to be able to ask questions to semebody, so a health professional it could be an Off, a physio, a nurse or a doctorbut
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages, use a consistent design across pages, use a darker grey background) Patients should read the decision aid before or after a consultation with a health professional so they don't waste a health professional's time and can ask questions	surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me." Male 30-39 yrs old – "I think a lot of the text is too smallI know it's a draft, I just think it's a bit- it doesn't easily flow well." Male 30-39 yrs old – "You have to be able to ask questions to smebody, so a health professional it could be an OFT, a physio, a nurse or a doctorbut probably not as a one-on-one, face-toface thing. It
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		would be sit in the waiting roc have any questions jot a little	om, "read this, if you note, then when you
	Remove 'disclosure' section	Male 30-39 yes old – "That we whole funding thing as well no conflict of interest or say n nothing to declare."	Duld then take out the You declare that there's othing to disclose or
	Emphasise the question asking section and de-emphasise others (e.g. harms, causes of shoulder pain, references)	Male 40-49 yes old – "Yeah, a beginning one"who should think maybe that's too much. wordyThe yery last one [qu probably too #ttle[we need]	and maybe the very read this decision aid", I I think it's very doctor-y lestions section] I think is a little bit of balance
	Move 'Important information' to above the references so patients are more likely to read it	with the very ast one and the Male 30-39 yrs old – "It blend down the page, if I saw it I wo gets lost in references straight	very first one." ls in. As I'm coming ould read that. Whereas it away."
	Health professionals	.bmj	
	Thought the decision aid's underlying goal is to reduce the use of surgery and thought it should be more balanced [OS]	OS, Male 40 49 yrs old – "Rea to do is get them to not have the	ally what you're trying he surgery."
	Believes evidence is changing and the decision aid may become irrelevant overtime [OS]	OS, Male 40-49 yrs old – "I m view, and in gyear's time that	nean that's the current t might change."
Suspects bias or questions relevance of the decision aid	Unsure of the applicability of the decision aid when patients don't have a diagnosis or when they have tried all the non- surgical options listed [OS]	OS, Male 40-29 yrs old – "The we're talking about, surgery v junction where surgery is bein in the special st's office. To m most sense. Before that no one no one's really talking about s hearsay and things like that, th but at that time you may not e imaging etc. Often when I see already done of few of those co which have not worked, which	e most useful thing that s no surgery, is at the ig considered and that is ie, that would make the e knows what's going on, surgery, there might be here might be guesses, ven have a diagnosis or the patients they've onservative measures h is why they're in my
		giydc	

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1 2 3 4 5 6 7 8			officeI guess if the decision aid is hitting them at the point where surgery vs no surgery, because there's not so much difference in the short to medium term, then it has to be done after the diagnosis is made I think, or surgery is being considered."
9		Patients	202
10 11 12 13 14 15 16	Decision aid swayed patients away from surgery	Swayed towards surgery because it might be beneficial (e.g. pain might get worse, small improvements in pain and function might be important for work, the risk of complications gets higher as you age, subacromial decompression might work if someone has tried all other options)	Female 50-59 yrs old – "It's not too bad for me to consider a shoulder surgery yet, but it's also making me think, maybe it's something I should have before it gets too bad."
17		Swayed away from surgery (e.g. would only have surgery if it	Female 40-49 yrs old – "To me you read that and
18		was a guaranteed solution as time off work and cost is a major	think, I'm probably not going to go down that route."
19		inconvenience)	
21 22	CP: chiropractor; GP: gener *: this section was removed	al practitioner; PT: physiotherapist; OP: osteopath; OS: orthopaed from the decision aid to save space so we could provide more deta	ic surgeon. ail about non-surgical options on the first page.
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unnlementary File 9 Reas	ons for not implementing feedback for each section of the decisio	n aid N
Themes	Sub-themes	Reason for mot implementing feedback
VHO SHOULD READ T	HIS DECISION AID?	0 Augu
	Health professionals	20
	Make the information more specific to a diagnosis [OS/PT]	Identifying a structural nociceptive cause of
		subacromial impingement syndrome is not possible,
Improve clarity on the		we decided to keep the diagnosis broad (i.e.
target population		subacromial impingement syndrome)
	Patients	
	Make it clear the decision aid is for people with subacromial	Opposing feegback to remove the term 'subacromial
	impingement syndrome (e.g. include the diagnosis in the title)	impingement _a yndrome'
	Health professionals	S://b
	Clarify that shoulder pain can be caused by overuse and work	Potential causes of shoulder pain were removed as
Revise the causes and	(e.g. heavy lifting) [GP/PT]	they were too speculative
symptoms of shoulder	Patients	
pain	Describe what causes the structural issues associated with	This information would have been too speculative du
	shoulder pain (e.g. explain why a tendon tears or a bursa gets	to a lack of evidence on this issue
	inflamed)	<u>9</u>
	Health professionals	
	Language will cause fear among patients [CP/PT]	Opposing positive feedback from patients on our
		explanation of shoulder pain
Use positive messaging	Include positive messaging about prognosis and what pain	Beyond the scope of this decision aid
	means (e.g. pain doesn't equal damage, pain may get better	202
	with time, imaging findings are common in people without	а С С
	symptoms) [CP/P1/OP]	 و ـ
	Health professionals	
Make this section more	Explanation of shoulder symptoms might be irrelevant for	opposing positive reedback on our explanation of
concise and relevant		Shoulder symptoms
	graphic of the shoulder anatomy [OS/PT]	anatomy
		8
		Vrigt
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WHAT ARE THE TREAT	FMENT OPTIONS COVERED IN THIS DECISION AID?	52 on 30
	Health professionals	Aug
	Need a flowchart of non-surgical options [PT]	Opposing positive feedback on the layout of non- surgical options
	Highlight how long patients should try different non-surgical options before surgery [GP/PT]	There is no evidence to guide timeframes on trying various non-surgical options. This could depend on treatment success and patient preferences
	More detail is needed on muscle strengthening programs [PT]	Beyond the scope of this decision aid
	Include evidence for non-surgical options [PT/OS]	This decision aid was developed for people considering surgery. We only included one treatment decision (i.e. surgery vs. non-surgical options) and
		hence, the evidence for surgery compared to non-
Include more detail on		surgical options
non-surgical options and	Patients	oppe
how to progress management	Provide more non-surgical options	Opposing positive feedback that our decision aid covers all potentially valuable options
	Provide evidence for various non-surgical options (e.g. options listed in the decision aid, lifestyle change, TENS, ultrasound, hydrotherapy, massage, diet, acupuncture, Chinese herbs)	This decision aid was developed for people considering sgrgery. We only included one treatment decision (i.e. surgery vs. non-surgical options) and hence, the evelence for surgery compared to non- surgical options
	Highlight whether delaying surgery or non-surgical treatment is harmful or not	There is not enough evidence to address this issue. We suggested patients ask a health professional the following question: "Can I have surgery later? If so, how long should I wait before considering surgery?"
	Provide more information on 'wait and see' (e.g. highlight that you can trial non-surgical options while you 'wait and see')	Opposing positive feedback on the description of non- surgical options
Change the non-surgical options presented	Health professionals	
	Inappropriate to mention medication and injections as options [PT/CP]	Cochrane reverse on treatments for subacromial pain syndrome show glucocorticoid injections are superior
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		to placebo any provide similar effects to non-steroida
		anti-inflammatory drugs (22) and physiotherapy-
		delivered treatments (e.g. exercise, manual therapy,
		electrotheraps (23, 24)
	injections [GP]	Beyond the scope of this decision and
	Waiting 6 months might be too long for patients to do nothing [PT/OP]	Opposing positive feedback on the description of nor surgical options
	Order of non-surgical options might be inappropriate [CP/PT]	Opposing positive feedback on the order of non-
	Health professionals	<u> </u>
	Highlight that imaging findings in isolation aren't indications for surgery [PT/OS]	Peripheral to the main purpose of this decision aid
Include indications for	Important for patients to know which procedure they are most	Too dependent on an individual's symptoms
	likely to receive as this could influence recovery and	2. 9
surgery	rehabilitation needs [OS]	
	Highlight that surgery may improve symptoms or anatomy but	Adding this information might be considered biased
	not address the cause [PT/OS]	against surgery as non-surgical options might also no
		address the cause of symptoms
	Health professionals	
	Mention the success rate of surgery and non-surgical options	we only included data on pain and function from the
Drosont oxidonao of	[GP/P1/OS]	two Cochrangreviews of shoulder surgery. Including
honofits or horms in this		applicated with foodback to avoid repetition of
section		statistics
Section	Emphasise the harms of surgery [PT/CP/GP]	Adding this information would be biased against
		surgery. The presentation of benefits and harms in
		decision aids a seed to be balanced
Change information on	Patients	ਦ ਦ
surgery	Provide less information on surgery	Opposing positive feedback on the level of detail abo
		surgery e
		l by
		ç
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		Provide more information on surgery and rehabilitation	Opposing positive feedback on the level of detail about surgery and rehabilitation
WHATAK	E THE LIKEI	JY BENEFITS OF SURGERY COMPARED TO NON-SURG Uselth professionals	
Revise des the certaint	scription for ty of evidence	Remove the description of the certainty of evidence [PT/OS]	Opposing positive feedback for acknowledging the certainty of evidence
		Health professionals	
		Evidence doesn't match experience (e.g. careful patient selection will yield better outcomes) [OS/GP]	We did not change the evidence presented because it is vital numeric estimates of benefits and harms in
Fuidonao d	oogn't motoh	Evidence from Cochrane reviews may not be generalizable to patients [OS]	decision aids are based on the highest quality available evidence $(15, 27)$
Evidence doesn't match experience, more	yield better long-term outcomes [OS]	//bmj	
clarificat	clarification needed	Add outcomes or provide further explanation for existing outcomes (e.g. include quality of life, define treatment success, emphasise pain results) [GP/PT/OP]	We limited outcomes to pain and function from the two Cochrane reviews of shoulder surgery to avoid repetition
		Highlight that surgery may be useful for preventing tears progressing even if there was no improvement in symptoms [OS]	We limited the potential benefits of surgery to data presented in the two Cochrane reviews of shoulder
		Health professionals	Ce
Simplify t	he statistics	Avoid numeric estimates (e.g. 3% could be framed as 'small') [PT]	Opposing positive feedback on the presentation of numeric estimates
		Patients	20
Provide mo clarify th	ore detail and ne evidence	Adding the age range of research participants is not necessary unless being outside this range would influence the benefits of surgery	Opposing feedback to mention the population of the evidence \leq
Context	ualise the	Patients	est.
evidence	e to reflect	Statistics shouldn't influence treatment decisions as they are	We did not clange the evidence presented because it is
uncertai individ	inty on an lual level	averages and patients should trust their health professional's advice	vital numeric estimates of benefits and harms in
			у соругі
		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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		decision aids are based on the highest quality available evidence (15,27)
Modify the formatting or	Health professionals	Ö
language used	Make the bar graphs vertical [PT/CP]	We removed the bar graphs due to negative feedback
WHAT ARE THE LIKEL	Y HARMS OF SURGERY?	st 2021.
	Health professionals	D
Prosont minor and	Mention revision surgery as a possible adverse event [OS]	Not a direct harm of surgery
serious harms	Patients	5a
serious narms	Definition of minor and serious adverse event is problematic	Opposing feed back to separate minor and serious
	because severity is subjective	harms g
Provide more context for	Health professionals	http://www.analysis.com
harms	Compare the harms of surgery and non-surgical options	Data on the petential harms of non-surgical options
	[PT/CP]	was not available
	Health professionals	
Evidence doesn't match	Harms might be overestimated [OS]	We did not cligange the evidence presented because it i
experience, more	Harms might be underestimated [PT]	vital numeric estimates of benefits and harms in
clarification needed		decision aids are based on the highest quality available (1507)
	Haalth musfaceionals	evidence (15,527)
	Health professionals	
	Move harms to practical issues section [CP]	Opposing feegback to use the same format when
	Danlage therm! with a loss amotive word (a g 'right'	'Horm' is a prove accurate term then 'righ' and is used
Modify the formatting or	(complication') [OS]	more frequently in the decision aid literature
language used	Patients	
	Change the terminology used (e.g. 'harms' too negative	'Harm' is a more accurate term than 'risk' and is used
	change 'harms' to 'risk', change 'person' to 'people', define	more frequently in the decision aid literature
	'frozen shoulder')	
SUMMARY OF BENEFIT	ΓS, HARMS, AND OTHER PRACTICAL ISSUES	rotectec
	Health professionals	by
		copyrigh
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1 2 3 4 5 6 7		Include the cost of non-surgical options (e.g. time, effort, cost without insurance coverage) [CP] Be specific about costs to emphasis the true cost of surgery [PT/GP]	Costs vary to much to include an accurate figure $- \qquad \qquad$
8 9 10 11 12	Revise information on costs	Patients Be more specific about costs (e.g. time off work, add "speak to your GP and insurance provider to understand exact costs", costs of non-surgical options, non-surgical options might	Costs vary too much to include an accurate figure
13 14 15		Highlight that waiting times are long and costs are higher without private insurance	This might not apply to all health systems
16 17 18 19 20 21 22 23 24 25 26 27 28 20	Revise information on activity restrictions and post-surgical management	Health professionals Add a row for 'social support' (e.g. getting dressed, dishes, transport to appointments) [PT] Include activity restriction timeframes for non-surgical options [PT] Highlight that recovery is influenced by the severity of a patients' pre-intervention symptoms [OS] Patients Emphasise driving restrictions Add a column for 'no treatment'	Information mostly covered already Activity restriction timeframes varied by health professional too much Suggestion was not relevant to this section Driving restriction timeframes varied by health professionals too much 'No treatment is covered in the 'non-surgical options' column
30 31 32 33 34 35 36 37	Modify the formatting or language used	Health professionalsSeparating practical issues by type of surgery resulted in toomuch information [PT]Split the practical issues section by type of surgery [GP]Could use a checkbox to reduce the number of words in the'Activity restrictions' section (e g. sling (tick); 3-4 weeks offwork (tick), etc.) [CP]	Opposing feedback to separate practical issues by type of surgery g Opposing positive feedback on the layout of this section
38 39 40 41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gui	ted by copyright. delines.xhtml

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	Change title of this section to "What will my recovery look like after surgery and non-surgical options" to reduce bias against surgery [PT]	We removed the	e headings to save space
	Remove this page entirely as patients will be losing interest by this point [OS]	Opposing poseti	ve feedback on this section
	Patients	202	
	Acknowledge that timeframes are averages so patients don't get disheartened when they don't reach a milestone on time	We included $\frac{1}{10}$ n comment	neframe ranges to address this
QUESTIONS TO CONSIL	DER WHEN TALKING WITH A HEALTH PROFESSIONA	NL nloadec	
	Health professionals	fror	
Adding and removing questions	Remove questions (e.g. "Do I know enough about my condition"; "Have I considered my individual circumstances") [OS]	Opposing positi	ve feedback on these questions
	Health professionals	jope	
	Could replace "Questions to consider when talking with your doctor" section with "Any further questions, ask your doctor" to save space [GP]	Opposing positi	ve feedback on this section
Modify the formatting	Change the heading of this section so it applies to GPs [PT]	Opposing feegb	ack to change the heading of this lies to any health professional
	Patients	cer	
	Remove this whole section to create space	Opposing postiti	ve feedback on this section
	Categorise questions based on which health professional should answer them	Too much over could answerve	ap between health professionals who ch question
ARE THERE OTHER TH	INGS I CAN DO?*	23 by g	
	Health professionals	ues	
Modify information to help people choose non- surgical options first	Move this section to the first page and make it clear surgery is a last resort [PT/CP]	We thought itw (and evidencoon to could ask a hotal	as important to present the options before patients reflect on questions they th professional
	Be specific about what exercises can be done [PT/CP]	Beyond the seo	be of this decision aid
		cop	

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1 2 3 4 5 6		Emphasise that there is often no need for early surgery and no harms in delaying surgery [OS/PT]	We suggested patients ask a health professional the following question: "Can I have surgery later? If so, how long should I wait before considering surgery?"
7 8 9	OVERALL FEEDBACK		ugust 20
9 10		Health professionals	21.
11		A 2-page decision aid is ideal [PT/CP/GP]	Opposing feedback that all information in the decision
12	Deduce emount of	The decision aid includes too much information [GP/OS/PT]	aid is important
13 14	information	Create a simplified version of the decision aid for patients [PT]	Positive feedback from patients that this decision aid is easy to understand
15 16 17		Remove some sections (e.g. questions to ask a health professional, references, rotator cuff repair surgery) [PT/OS]	Opposing positive feedback on these sections
18		Health professionals	p://
19		Include a section on diagnostic imaging (X-Ray, MRI,	Beyond the scope of this decision aid
20 21		Ultrasound) and the importance of not missing a serious disease [GP]	op enb
22 23 24	More detail needed	More detail is needed if the decision aid will be used without input from a health professional [PT]	Positive feedback from patients that this decision aid is easy to understand
25		Patients	on
26		Last page lacks a solution if a patient has tried everything else	There is no evaluate to address this complex issue
27		Encourage people to seek a second opinion or further	Positive feedeack that the decision aid covers all
28		information	important information
30		Health professionals	12
31 32		Create separate decision aids for each procedure [CP/OS/GP]	This would prevent patients using the decision aid before consulting with a surgeon as they would not
33	Formatting or		know which surgery they are most likely to receive
35 36 37	distribution suggestions	Create separate decision aids for surgical and non-surgical options [GP]	options, so it is important these options are listed in the same decision aid
38		Create a video summary of the decision aid [PT/CP]	This is a consideration for a future project
 39 40 41 42 43 44 45 		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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		5402
	Acknowledge that treatment decisions might be influenced by	We felt that this information would not add value to
	the health professional the decision aid is discussed with	this decision add
	[PT/OS]	A
	Patients	
	Include page numbers	st
	Create several decision aids (e.g. one for each surgery, one for	This would prevent patients using the decision aid
	patients and one for health professionals)	before consulting with a surgeon as they would not
		know which surgery they are most likely to receive
	Remove 'disclosure' section	Opposing postive feedback on the this section
	Emphasise the question asking section and de-emphasise	Opposing positive feedback on these sections
	others (e.g. harms, causes of shoulder pain, references)	fra
	Health professionals	
Suspects bias or	Thought the decision aid's underlying goal is to reduce the use	Opposing positive feedback suggesting the
questions relevance of	of surgery and thought it should be more balanced [OS]	presentation of options was balanced
the decision aid	Believes evidence is changing and the decision aid may	We plan to update the decision aid as new evidence
	become irrelevant overtime [OS]	emerges ⁹
CP: chiropractor; GP: generation	al practitioner; PT: physiotherapist; OP: osteopath; OS: orthopaed	c surgeon.
*: this section was removed	from the decision aid to save space so we could provide more deta	il about non-surgical options on the first page.
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Shoulder pain: should I have arthroscopic surgery?

Is this decision aid relevant for me?

• This decision aid can help if you have shoulder pain due to common causes like rotator cuff tears or bursitis and are considering arthroscopic surgery of the shoulder

Cause and symptoms of shoulder pain

- Shoulder pain is commonly caused by rotator cuff tears, swelling of fluid filled sacs call bursa ('bursitis') or impingement.
- Impingement occurs due to contact between a bony part of the shoulder (the 'acromion') and the rotator cuff tendons or bursa (see picture). Contact usually occurs as you move your arm out to the side.
- Shoulder pain often makes it difficult to do simple everyday tasks like reaching into a high cupboard and washing hair.
- Symptoms often take time to settle and one half of patients are better by around 6 months.



SHOULDER PAIN: SHOULD I HAVE SURGERY?

All information in this decision aid should be discussed with a health professional

Who should read this decision aid?

This decision aid is for people with persisting shoulder pain that is likely due to issues with rotator cuff tendons that move and support the shoulder (eg. inflammation, tears).

This type of pain often occurs around the shoulder. It makes it difficult to do simple tasks that involve lifting your arm above your head (eg. washing hair).

This decision aid does not apply to people who have other causes of shoulder pain like frozen shoulder (which causes pain and severe stiffness), osteoarthritis, or shoulder pain that begins after trauma immediately resulting in loss of movement or strength (eg. sudden rotator cuff tear, fracture, dislocation). If you're unsure of the cause of your pain, see a health professional.



What are the treatment options covered in this decision aid?

1. Surgery ('subacromial decompression' and/or 'rotator cuff repair')

Surgery requires admission to hospital and an anaesthetic. The surgeon will make a small skin cut in your shoulder to perform the procedure. Your surgeon may perform one or both of the following procedures:

 Subacromial decompression: Increase the space under the acromion by either shaving back some bone, trimming some ligament or removing a bursa

What are the treatment options covered in this decision aid?

Rotator cuff repair: Reconnecting torn rotator cuff tendons

The surgeon may only decide on which procedure to perform while in surgery.

2. No surgery

You can choose to not have surgery and instead have injections, physiotherapy, medication or wait to see if it improves by itself.

NON-SURGICAL OPTIONS

Trying the following non-surgical options is recommended before considering surgery:

- Wait to see if your symptoms improve by themselves (roughly half of all people with these symptoms will recover within 6 months) and/or change your activities until the pain settles (eg. avoid carrying heavy grocery bags or take a break from sport if these activities cause pain)
- Take simple pain medicine (eg. paracetamol, anti-inflammatories)
- See a health professional (eg. physiotherapist) for advice on changing some daily activities and/or some muscle strength and endurance exercises
- See a health professional (eg. doctor) for a steroid injection



SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION

You may consider surgery if the non-surgical options do not work and you can no longer put up with the pain. Typically surgery is not performed unless you have had symptoms for at least 3-6 months.

Surgery requires staying in hospital, having an anaesthetic and small skin cuts in your shoulder so the surgeon can perform one or both of the following:



Subacromial decompression surgery

Increase the space under the acromion by either shaving back some bone, trimming some ligament and/or removing a bursa

Rotator cuff repair surgery

Reconnecting torn rotator cuff tendons

You will need to have rehabilitation involving exercises for at least 3 months following surgery. Much of this rehabilitation can be done at home.



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Page 93 of 98 What are the likely <u>benefits</u> of arthroscopic surgery and non-surgical options?

Subacromial decompression vs. placebo

HIGH CERTAINTY EVIDENCE* that subacromial decompression is little-to-no better than placebo...

*We are very confident that the figures below represent the true benefits of surgery

Placebo = the patient goes under anaesthetic and the surgeon inserts the surgical tools BUT no further procedure is performed



KEY MESSAGE: On average, surgery leads to2.6% less pain and 2.8% better functioncompared to placebo surgery at 12 months.

Most patients would not consider these benefits important.

What % of people report treatment success?

🕈 treatment success rated by patients

treatment not a success

Each figure represents one person. We can't predict whether you will be one of the people who is helped.



Rotator cuff repair vs. no surgery

LOW-MODERATE CERTAINTY EVIDENCE* that rotator cuff repair is little-to-no better than no surgery...

*We have low-moderate confidence that the figures below represent the true benefits of surgery

No surgery = injections, physiotherapy, medication or no treatment



KEY MESSAGE: On average, surgery leads to **8.7% less pain** and **6% better function** compared to no surgery at 12 months.

Most patients would not consider these benefits important.

What % of people report treatment success?

treatment success rated by patients

treatment not a success

Each figure represents one person. We can't predict whether you will be one of the people who is helped.



With surgery, **8 more people out of 100** will report their treatment as successful at 12

What are the likely benefits of surgery compared to non-surgical options?

The figures on this page are based on the most up-to-date medical research as of 2020 (see references at the bottom of this page)

KEY MESSAGE

On average, patients report that surgery **improves pain and function by** <u>less than</u> **10%** (ie. an improvement in pain or function of less than a 1 point on a 0-10 pain scale) compared to non-surgical options in the short term (6 months after) and longer term (1-2 years after) ^c. Because most patients do not notice these improvements, research concludes:

- Subacromial decompression surgery is not better than placebo or non-surgical options (ie. injections, exercise, medication or no treatment) for people with shoulder pain and no full-thickness rotator cuff tears ^A
- Rotator cuff repair surgery is little-to-no better than than non-surgical options for people with full-thickness rotator cuff tears ^B

These results are averages. Surgery improves pain and function by more than 10% for some patients. But other patients have either **no improvements or worse** pain and function after surgery.

Further information:

^A For subacromial decompression surgery, we are very confident about this key message because research on this surgery is high-quality. This research was mostly conducted on people aged in their 40s, 50s and 60s, but is the best evidence we have for all ages.

⁸ For rotator cuff repair surgery, we are somewhat confident about this message because there is lack of high-quality research on this surgery. This research was mostly conducted on people aged in their 50s and 60s but is the best evidence we have for all ages. Research on rotator cuff repair surgery does not apply to people who tear a tendon following trauma, or people with a full-thickness tear of the subscapularis tendon.

^c Research suggests exercise or activities that you can do yourself at home may be just as helpful as a supervised exercise program.

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Q?

What practical issues should I consider?

The table shows key practical issues for those who have arthroscopic surgery and those who do not.

	ARTHROSCOPIC SURGERY	NO SURGERY
Procedure and follow-up	Performed by a surgeon in an operating theatre. Requires an anesthetic. Individualised follow-up with wound care and exercise	Advice from a professional about other treatments may be useful (eg. injections, exercise, activity modification, medication)
Recuperation	You may use a sling a few days after surgery. Recuperation typically takes between 2-6 weeks	No recuperation needed
Activity restrictions	Avoid heavy lifting for 7-21 days, overhead activities for 6 weeks and pushing through your hands for 3 months	No activity restrictions
Time off work	Depends on recovery and demands of job. Usually a few weeks after surgery	No time off work
Driving	You can start driving as soon as you feel able to steer. This is normally after one week	No driving limitations
Costs	Out-of-pocket costs for surgery are generally high. There may also be out-of-pocket costs for physiotherapy after surgery	No surgical costs BUT there may be out- of-pocket costs for physiotherapy or injections

• Summary of benefits, harms, and other practical issues

NON-SURGICAL OPTIONS

Potential benefits

- May improve by itself (within 6 months half of people will recover) or with non-surgical options (ie. injections, exercise, or medication)
- Avoid surgery

Potential harms

- May decide to have surgery later
- Cost of non-surgical options (eg. injection, physiotherapy)
- Time to attend health appointments (eg. for physiotherapy)
- Regardless of what treatment you have, your symptoms **may not improve**

SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION

Potential benefits

- May provide **slight improvement in pain and function** compared to non-surgical options
- Potential harms
- Possible surgical harms (eg. frozen shoulder, infection)
- Your symptoms may not improve with surgery
- Symptoms will temporarily be worse after surgery due to the operation (eg. pain when sleeping or moving your arm)
- Rehabilitation for 3-12 months after surgery and time to attend rehabilitation
- May take up to 6 weeks after subacromial decompression and 12 weeks after rotator cuff repair to perform daily activities (eg. reach above your head, lift heavy objects)
- May take **3-4 months** after subacromial decompression and **6-12 months** after rotator cuff repair to return to heavy manual work, exercise, or sport
- **Out-of-pocket costs** are generally higher for surgery than non-surgical options. There may be **costs for rehabilitation** after surgery and due to **time needed off work**

Are there other things I can do?

- Strength and endurance exercises for your shoulder might help reduce pain and improve function.
- Modifying your activities and using pain relieving medicines when needed might help reduce pain.
- Seek advice from a health professional about the options that best suit your needs.
- Consider surgery at a later point if the above points do not help

Questions to consider when talking with your doctor...

- Do I need arthroscopic surgery?
- What happens if I don't have arthroscopic surgery?
- Do I know enough about the benefits and harms of: » having arthroscopic surgery of the shoulder? » not having arthroscopic surgery?
- Am I clear about which benefits and harms matter most to me?
- Do I have enough information and support to decide?

Questions to consider when talking with a health professional...

- Q Do I need surgery? What happens if I don't have surgery? What happens if I do nothing?
- Is surgery suitable for me? Which surgery is suitable for my diagnosis?
- **Can I have surgery later? If so, how long should I wait before considering surgery?**
- Have I considered my situation before making any decisions (eg. age, pain severity, activity levels, job demands, insurance coverage, caring responsibilities, involvement in sport, etc)?
- Do I understand enough about my condition and the benefits and harms of having surgery and not having surgery?



Supplementary File 1. Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist

Items	Guide questions/description	Yes/No
Interviewer/facilitator	Which author/s conducted the interview or focus group?	Yes
Credentials	What were the researcher's credentials? e.g., PhD, MD	Yes
Occupation	What was their occupation at the time of the study?	Yes
Gender	Was the researcher male or female?	Yes
Experience and	What experience or training did the researcher have?	Yes
training		
Relationship	Was a relationship established prior to study commencement?	Yes
established		
Participant	What did the participants know about the researcher? e.g.,	No
knowledge of the	personal goals, reasons for doing the research	
interviewer		
Interviewer	What characteristics were reported about the	Yes
characteristics	interviewer/facilitator? e.g., Bias, assumptions, reasons and	
	interests in the research topic	
Methodological	What methodological orientation was stated to underpin the	Yes
orientation and theory	study? e.g., grounded theory, discourse analysis, ethnography,	
	phenomenology, content analysis	
Sampling	How were participants selected? e.g., purposive, convenience,	Yes
	consecutive, snowball	
Method of approach	How were participants approached? e.g., face-to-face, telephone,	Yes
	mail, email	
Sample size	How many participants were in the study?	Yes
Non-participation	How many people refused to participate or dropped out?	Yes
	Reasons?	
Setting of data	Where was the data collected? e.g., home, clinic, workplace	Yes
collection		
Presence of non-	Was anyone else present besides the participants and researchers?	Yes
participants		
Description of sample	What are the important characteristics of the sample? e.g.,	Yes
	demographic data, date	
Interview guide	Were questions, prompts, guides provided by the authors? Was it	Yes
	pilot tested?	
Repeat interviews	Were repeat interviews carried out? If yes, how many?	Yes
Audio/visual	Did the research use audio or visual recording to collect the data?	Yes
recording		
Field notes	Were field notes made during and/or after the interview or focus	Yes
	group?	
Duration	What was the duration of the interviews or focus group?	Yes
Data saturation	Was data saturation discussed?	Yes

Transcripts returned	Were transcripts returned to participants for comment and/or	Yes
	correction?	
Number of data	How many data coders coded the data?	Yes
coders		
Description of the	Did authors provide a description of the coding tree?	Yes
coding tree		
Derivation of themes	Were themes identified in advance or derived from the data?	Yes
Software	What software, if applicable, was used to manage the data?	Yes
Participants checking	Did participants provide feedback on the findings?	Yes
Quotations presented	Were participant quotations presented to illustrate the themes /	Yes
	findings? Was each quotation identified? e.g. participant number	
Data and findings	Was there consistency between the data presented and the	Yes
consistent	findings?	
Clarity of major	Were major themes clearly presented in the findings?	Yes
themes		
Clarity of minor	Is there a description of diverse cases or discussion of minor	Yes
themes	themes?	

autorse cases or discussion of

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Development of a patient decision aid on subacromial decompression surgery and rotator cuff repair surgery: an international mixed-methods study

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Development of a patient decision aid on subacromial decompression surgery and rotator cuff repair surgery: an international mixed-methods study Joshua R Zadro^{a*}, Caitlin Jones^a, Ian A Harris^{a,b}, Rachelle Buchbinder^{c,d}, Denise O'Connor^{c,d}, Kirsten McCaffery^e, Rachel Thompson^e, Sascha Karunaratne^f, Min Jiat Teng^a, Christopher Maher^a, Tammy Hoffmann^g. ^aInstitute for Musculoskeletal Health, School of Public Health, Faculty of Medicine and Health, The University of Sydney, New South Wales, Australia. ^bIngham Institute for Applied Medical Research, South Western Sydney Clinical School, UNSW Sydney, New South Wales, Australia. ^cDepartment of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Victoria, Australia. ^dMonash Department of Clinical Epidemiology, Cabrini Institute, Victoria, Australia. ^eSchool of Public Health, Faculty of Medicine and Health, The University of Sydney, New South Wales, Australia. ^fSurgical Outcomes Research Centre, Royal Prince Alfred Hospital, New South Wales, Australia. gInstitute for Evidence-Based Healthcare, Faculty of Health Sciences and Medicine, Bond University, Queensland, Australia. *Corresponding author: Dr Joshua R Zadro - Level 10 North, King George V Building, Royal Prince Alfred Hospital, PO Box M179, Missenden Road, Camperdown, NSW, 2050, Australia. Telephone: +61 2 8627 6782. Email: joshua.zadro@sydney.edu.au

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25 ABSTRACT

Objective: To develop and user test a patient decision aid for people with subacromial pain
 syndrome that presents evidence-based information on the benefits and harms of subacromial
 decompression surgery and rotator cuff repair surgery.

Design: Mixed-methods study outlining the development of a patient decision aid.

Setting: We assembled a multidisciplinary steering group, and used existing decision aids and
decision science to draft the decision aid. Participants were recruited through social media (not
restricted by country nor setting), local hospitals, and the authors' collaboration network.

33 Participants: People with shoulder pain and health professionals who manage people with
34 shoulder pain.

Primary and secondary outcomes: We interviewed participants to gather feedback on the decision aid, assessed useability and acceptability (using qualitative and quantitative methods), and performed iterative cycles of re-drafting the decision aid and re-interviewing participants as necessary. Interview data were analysed using thematic analysis. Quantitative data were summarised descriptively.

Results: We interviewed 26 health professionals (11 physiotherapists, 7 orthopaedic surgeons, 4 general practitioners, 3 chiropractors and 1 osteopath) and 14 people with shoulder pain. Most health professionals and people with shoulder pain rated all aspects of decision aid acceptability as adequate-to-excellent (e.g., length, presentation, comprehensibility). Interviews highlighted agreement among health professionals and people with shoulder pain on most aspects of the decision aid (e.g. treatment options, summary of benefits, harms and practical issues, questions to ask a health professional, graphics, formatting). However, some aspects of the decision aid elicited divergent views among health professionals (e.g. causes and evidence symptoms of shoulder pain, benefits and harms). on **Conclusion:** This decision aid could be an acceptable and valuable tool for helping people with

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 subacromial pain syndrome make informed treatment choices. A randomised controlled trial
evaluating whether this decision aid reduces people's intentions to undergo shoulder surgery

52 and facilitates informed treatment choices is underway.

53 Key words: shoulder surgery; subacromial decompression; rotator cuff repair; decision aid;

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54 shared decision making.

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56 Strengths and limitations of this study

- This is the first study to rigorously describe the development of a patient decision aid
 for people with subacromial pain syndrome that presents evidence-based information
 on the benefits and harms of subacromial decompression surgery and rotator cuff repair
 surgery, compared to non-surgical options
- We developed the patient decision aid with guidance from the International Patient
 Decision Aids Standards, used a mixed methods approach to evaluate useability and
 acceptability, interviewed a broad range of health professionals and patients, and
 conducted one-on-one interviews which allowed in-depth feedback on the decision aid
 Our decision aid includes several key features recommended to optimise risk
 communication (e.g. presenting numeric estimates, presenting uncertainty, using
 visuals, tailoring estimates)
 - Limitations include a small sample size for our quantitative acceptability data, being
 unable to recruit certain groups of health professionals (e.g. rheumatologists, sports
 doctors), and only interviewing people who speak English

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1. Introduction

Subacromial decompression surgery and rotator cuff repair surgery (with or without decompression) are frequently performed for people with subacromial pain syndrome [1-4] – an umbrella diagnosis that accounts for 85% of cases of shoulder pain (including rotator cuff tears) – but evidence suggests these procedures provide limited clinical benefit. Subacromial decompression surgery is not superior to placebo (high-certainty evidence) or non-surgical options, such as exercise and glucocorticoid injections (low- to moderate-certainty evidence), for improving pain and function in people with subacromial pain syndrome[5]. Rotator cuff repair surgery is not superior to non-surgical options for degenerative rotator cuff tears (lowto moderate-certainty evidence)[6]. Serious harms (e.g. infection) are experienced by 6/1000 people that have arthroscopic shoulder surgery[5].

Use of subacromial decompression surgery and rotator cuff repair surgery is increasing globally[1-4] despite the above evidence, suggesting people may not be making informed treatment choices. In Australia, the annual number of subacromial decompression surgeries performed increased from 3,536 to 7,455 between 2000 and 2019, while the number of rotator cuff repair surgeries performed increased from 6,212 to 12,436 during this period[1]. Increases have also been reported in the Unites States[4], England[2, 7] and Finland[3].

Patient decision aids present unbiased information on the benefits and harms of different healthcare options. A decision aid on options for treating subacromial pain syndrome could help patients make informed treatment choices and result in less use of unnecessary surgery. A Cochrane review of 105 studies (n=31,043) found that people exposed to decision aids made more informed choices about their healthcare and had a more active role in decision making, with no negative effects on outcomes or satisfaction[8]. For some conditions, patients were also more likely to choose less invasive treatment options[8].
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By eliciting views of key stakeholders using mixed-methods, our aim was to develop a patient decision aid for people with subacromial pain syndrome that presents evidence-based information on the benefits and harms of subacromial decompression surgery and rotator cuff repair surgery for subacromial pain syndrome (compared to non-surgical options).

2. Methods

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2.1. Initial decision aid design

We developed a patient decision aid with guidance from the International Patient Decision Aids 101 Standards (IPDAS) using mixed-methods [9, 10]. We began by assembling a multidisciplinary 102 steering group (study authors) including topic experts (IH: orthopaedic surgery; RB: shoulder 103 pain; KM, TH, RT and DO: patient decision aids and shared decision making) and health 104 professionals who manage people with shoulder pain (JZ and SK: physiotherapists; RB: 105 rheumatologist). The first draft of the decision aid was created in PowerPoint and based on 106 decision aids for antibiotics[11] and knee arthroscopy[12] which several study authors have 107 developed (TH, KM, RB, DO and IH) (Supplementary File 1). Key features adapted from these 108 decision aids included horizontal bar graphs displaying the effects of surgery compared to 109 placebo and non-surgical options (which included injections, physiotherapy, medication and 110 wait and see), icon arrays to help patients understand probabilities, a statement about the source 111 and quality of the evidence, questions for patients to ask their health professional, and practical 112 issues (e.g. time off work, driving restrictions). Decision science evidence suggests these 113 features improve patient decision making[13-17]. Data from the 2019 Cochrane reviews on 114 subacromial decompression surgery[5] and rotator cuff repair surgery[6] were used to inform 115 numeric estimates of benefits and harms used in the decision aid. Expert opinion and consensus 116 from the steering group was used to inform all information presented in the decision aid (e.g. 117 causes and symptoms of shoulder pain, practical issues). The steering group provided feedback 118

on the first draft before we conducted semi-structured interviews with people with shoulderpain and health professionals who manage people with shoulder pain.

2.2. Participants

Twenty-six health professionals involved in the management of shoulder pain were recruited through social media, Royal Prince Alfred and Concord Hospitals in Sydney (Australia), and the study authors' collaboration network. Health professionals had to manage/consult at least five people with suspected subacromial pain syndrome per year. There was no restriction on the type of health professional (e.g. orthopaedic surgeon, physiotherapist, general practitioner), work setting or country of practice, or years of experience. Fourteen people with self-reported shoulder pain (hereafter referred to as 'patients') were recruited through social media and referrals from health professionals who participated in the study. Patients had to be ≥ 18 years old and able to understand and communicate in English to participate. There was no restriction on their country of birth. Enrolled participants were asked if they had any contacts who met our inclusion criteria (snowballing). We purposively sampled participants to achieve diversity in age, gender and ethnicity. For health professionals, we also purposively sampled to achieve diversity in profession, years of experience and country of practice. All recruitment and data collection procedures were approved by the Sydney Local Health District Human Research Ethics Committee (Reference number: X20-0023). All participants provided consent by checking a box before proceeding to the pre-interview online questionnaire that confirmed they had read the Participants Information Sheet and Consent form and agree to participate in the study.

2.3. Data collection

We reported the qualitative aspect of this study according to the 32-item Consolidated Criteria
 for Reporting Qualitative Research (COREQ) checklist (Supplementary File 2)[18]. Box 1
 describes the data collection process including the pre-interview questionnaires (used to

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purposively sample participants; Supplementary Files 3 & 4), semi-structured interviews (topic guides in Supplementary Files 5 & 6) and acceptability questionnaires (Supplementary Files 7 & 8). In accordance with IPDAS guidance[9, 10], semi-structured interviews were used to assess patients' views on decisional needs and health professionals' views on patients' decisional needs, gather feedback on the draft decision aid, and assess useability and acceptability of the decision aid. Participants were provided the draft decision aid prior to the interview but some participants did not review it beforehand. At the end of each interview, participants were given the opportunity to provide any additional feedback or comments. Changes to the decision aid were made throughout the interview process. Modifications were compared to older versions of the decision aid to understand whether changes were useful.

Box 1. Data collection process

Pre-interview questionnaires used to purposively sample participants

For health professionals, we gathered data on demographics, profession, years of experience, clinical setting, and number of patients with subacromial pain syndrome seen per year (Supplementary File 3). For patients, we gathered data on demographics (e.g., age, gender), duration and severity of shoulder pain, and previous treatments, previous imaging, and previous sick leave for shoulder pain (Supplementary File 4).

Semi-structured interviews

Interviews were used to gather feedback on the best way to present different aspects of the decision aid, such as treatment options, numeric estimates of benefits and harms, practical issues, and questions to ask a health professional. Participants were then asked to 'think out loud' while they read through the decision aid. They were encouraged to say everything that came to mind (e.g. concepts that might be challenging to understand, what their eye was drawn to) and give feedback on how the decision aid could be improved. The researcher conducting the interview used additional questions to prompt participants who were unsure of what to say. For example, some participants were prompted to give feedback on the relevance, usefulness, formatting, and language of each section, and the use of images. Interview guides for health professionals and patients are in Supplementary File 5 and Supplementary File 6 respectively.

Acceptability questionnaires

After the first round of interviews (n=12 health professionals; n=7 patients) and several redrafts, we began assessing acceptability with a brief questionnaire at the end of each interview because we felt we were getting close to the final version of the decision aid. A separate questionnaire, adapted from The Ottawa Hospital Research Institute[19], was used for health professionals (Supplementary File 7) and patients (Supplementary File 8).

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All interviews were conducted one-on-one via videoconference due to COVID-19. All interviews lasted between 30-60 minutes and were conducted by a researcher with experience in conducting qualitative interviews (CJ). The interviewer was a female PhD candidate and occupational therapist. Two pilot interviews were conducted before recruitment to test the interview guides. During participant interviews, the interviewer took notes to highlight key concepts emerging from the interview and direct further questioning. The interviewer did not have an established relationship with participants prior to the study commencing. Participants were informed of the reason for the study prior to being interviewed. All interviews were audio-recorded (with verbal consent obtained from participants) and transcribed verbatim for analysis. All participants had the opportunity to review the transcript of their interview prior to data analysis if they wished. Health professionals and patients and who completed an interview were compensated for their time with a \$100 and \$50 supermarket gift card, respectively. Health professionals were compensated with more money to account for potentially sacrificing appointment slots to participate in this study.

2.4. Data analysis

Pre-interview and acceptability questionnaire responses were summarised using descriptive statistics (means and standard deviations [SD], counts and percentages). For the health professional acceptability questionnaire (Supplementary File 7), a 5-point Likert scale (strongly agree = 5; strongly disagree = 1) was used to assess agreement with various statements. We presented Likert scores as the percentage of responses for each category and as means (SD). We also calculated mean (SD) agreement scores for orthopaedic surgeons separately as we anticipated they might have different views on a decision aid for people considering surgery compared to other health professionals. For the patient acceptability questionnaire (Supplementary File 8), impressions of different sections of the decision aid were dichotomised as 'excellent/good' vs. 'fair/poor'.

All interview data were analysed using thematic analysis; a method for identifying, analysing and reporting patterns within data[20]. Grounded theory using an inductive approach underpinned how data was collected and analysed. Two researchers (CJ and JZ) independently familiarised themselves with the interviews (via audio-recordings or transcripts), recorded initial observations, and identified concepts relevant to the questions asked. The two researchers developed a framework to organise concepts into broader themes and sub-themes in Excel[21]. Any disagreements in categorising concepts into themes and sub-themes were discussed and resolved. The mapping of themes and sub-themes was iterative as new data emerged so that the decision aid was continually updated before new interviews were conducted. Over 10 iterative cycles of revisions were performed. However, in some cases these were very minor changes (e.g. correcting typos, re-wording a sentence). Patients' views on decisional needs and health professionals' views on patients' decisional needs were integrated with the feedback given on each section of the decision aid to streamline the presentation of the results. Interviews stopped once no new feedback was being provided (data saturation) and participants had an overall positive impression of the decision aid.

Patient or Public Involvement

196 Patients and members of the public were not involved in the design of this study.

3. Results

2.5.

3.1. Adherence to the IPDAS criteria and user-centredness

We determined that the decision aid (Supplementary File 9) met 6 out of 6 criteria to be considered a decision aid, 6 out of 6 criteria to reduce the risk of harmful bias, and 20 and 23 quality criteria according to the IPDASi checklist (v4.0)[22] (Supplementary File 10). Our decision aid also met 10 out of 11 criteria for user-centredness (Supplementary File 11), as assessed by the User-Centered Design 11-item measure (UCD-11)[23].

⁵⁰ 204 **3.2.** Participant characteristics and decision aid acceptability

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We interviewed 26 health professionals [11 (42%) physiotherapists, 7 (27%) orthopaedic surgeons, 4 (15%) general practitioners, 3 (12%) chiropractors and 1 (4%) osteopath] and 14 patients. Repeat interviews were conducted with one of these health professionals (physiotherapist) and four of these patients to explore whether initial feedback had been addressed through modifications to the decision aid. No participant who completed the pre-interview questionnaire refused an interview. However, a number of participants who completed the pre-interview questionnaire were not interviewed since participants were purposively sampled (n=130 health professional and n=19 patient respondents were not interviewed). Health professional and patient characteristics are in Table 1. There were 15 health professionals and 11 patients that completed the acceptability questionnaire. All aspects of decision aid acceptability were rated as adequate-to-excellent (e.g. length, amount of information, presentation, comprehensibility) by most health professionals (Table 2) and patients (Table 3). Figure 1 provides a summary of the development process.

3.3. Feedback on each section of the decision aid

Positive feedback for each section, and for the decision aid overall, largely included agreement with the content, graphics, formatting, amount of information, and presentation of information. Supplementary File 12 provides a summary of themes and sub-themes across sections of the decision aid. Suggestions for improvement (themes) and examples (sub-themes) are summarised below. Although most suggestions were implemented, some conflicted with others or were not possible to implement. Supplementary File 13 outlines feedback we did not incorporate in the decision aid and our justification for this. Feedback from three or more types of health professionals was classified as 'multidisciplinary feedback'.

3.3.1. Who should read this decision aid?

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2 3	228	This section covers the title of the decision aid, information about who should read the decision			
4 5 6 7	229	aid, and common causes and symptoms of shoulder pain. Suggestions for improvement			
7 8	230	(themes) with examples (sub-themes) included:			
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 9 20 21 22 23 24 25 26 27 28 29 30 31 32 33 4 35 36 37 38 20	231	• Improve clarity on the target population (e.g. some GPs wanted this section to be more			
11 12 13	232	concise, some patients thought softening the exclusion criteria would prevent people			
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	233	with overlapping symptoms disregarding the decision aid)			
	234	• Highlight that patients need to discuss this decision aid with a health professional			
	235	(multidisciplinary feedback)			
21 22	236	• Revise the causes and symptoms of shoulder pain (e.g. multidisciplinary feedback			
23 24	237	suggested this information had a pathoanatomical focus that was inaccurate and that			
25 26 27	238	this information could drive patients towards surgery)			
26 27 28 29 30 31	239	• Use positive messaging (e.g. some physiotherapists thought the language would cause			
	240	fear among patients)			
32 33 34	241	• Make this section more concise and relevant (e.g. multidisciplinary feedback suggested			
34 35 36 37 38 39 40 41	242	the explanation of shoulder symptoms might be irrelevant for patients, some			
	243	orthopaedic surgeons wanted to emphasise the importance of a proper diagnosis to			
	244	guide treatment decisions)			
42 43	245	Supplementary File 14 highlights changes between the first and final draft of this section.			
44 45	246				
46 47 48	240				
49 50	247	3.3.2. What are the treatment options covered in this decision aid?			
51 52	248	This section outlines non-surgical and surgical management options for subacromial pain			
53 54	249	syndrome. Suggestions for improvement included:			
56 57	250	• Include more detail on non-surgical options and how to progress management (e.g.			
58 59	251	multidisciplinary feedback suggested balancing the amount of information between the			
60					
		13			

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3 4	252	non-surgical and surgical options, some patients wanted more information on 'wait and
5 6	253	see' and how to modify activities)
7 8 0	254	• Change the non-surgical options presented (e.g. some physiotherapists thought it was
10 11	255	inappropriate to include medication and injections as options, some physiotherapists
12 13	256	and chiropractors thought the order of non-surgical options might be inappropriate)
14 15	257	• Include indications for surgery (e.g. multidisciplinary feedback suggested the inclusion
16 17 18	258	of indicators for each surgery like failed conservative management, severe pain, age
19 20	259	and massive cuff tears)
21 22	260	• Present evidence of benefits and harms in this section (e.g. multidisciplinary feedback
23 24 25	261	suggested mentioning the success rate of surgery and non-surgical options, and
26 27	262	emphasise the harms of surgery)
28 29	263	• Change the information on surgery (e.g. some patients wanted more detail on surgery
30 31 32	264	and rehabilitation, while others wanted less detail on the procedures)
33 34	265	• Modify the formatting and graphics (e.g. multidisciplinary feedback suggested listing
35 36	266	non-surgical options first, some patients wanted more space between the options and
37 38 39	267	thought the image of surgery was too graphic).
40 41 42	268	Supplementary File 15 highlights changes between the first and final draft of this section.
43 44	269	3.3.3. What are the likely benefits of surgery compared to non-surgical options?
45 46	270	This section summarises data on the effectiveness of subacromial decompression surgery and
47 48 40	271	rotator cuff repair surgery compared to non-surgical options from two Cochrane reviews [5, 6].
50 51	272	Suggestions for improvement included:
52 53	273	• Revise the description for the certainty of evidence (e.g. some physiotherapists and
54 55 56	274	chiropractors thought using a green font for high-certainty evidence would drive
57 58 59	275	patients towards surgery)
60		

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- 3 ⊿	276	• Evidence doesn't match experience, more clarification needed (e.g. some orthopaedic
5	277	surgeons thought the evidence from Cochrane reviews may not be generalizable,
7	270	
8 9	278	surgery may improve the speed of recovery and surgery may be useful for preventing
10 11	279	tears progressing even if there was no improvement in symptoms, some orthopaedic
12 13	280	surgeons and GPs thought it was important to acknowledge evidence represents
14 15	281	averages and careful selection of surgical candidates could yield positive results)
16 17 18	282	• Simplify the statistics (e.g. some physiotherapists and chiropractors thought 'key
19 20	283	messages' could be used instead of a bar graph, some orthopaedic surgeons thought
21 22	284	repetition of statistics was unnecessary and biased against surgery)
23 24	285	• Provide more detail or revise the description of the evidence (e.g. some patients wanted
25 26	206	information on the source of the evidence and more evaluation about the cortainty of
27 28	280	information on the source of the evidence and more explanation about the certainty of
29 30	287	evidence)
31 32	288	• Contextualise the evidence to reflect uncertainty on an individual level (e.g. some
33 34	289	patients wanted to highlight the numeric estimates were averages)
35 36	290	• Modify the formatting and language used (e.g. some GPs and patients wanted to
37 38 30	291	shorten the key messages box and include other information as footnotes, some patients
40 41	292	thought the icon array wasn't useful).
42 43	293	Supplementary File 16 highlights changes between the first and final draft of this section.
44 45		
46 47	294	3.3.4. What are the likely harms of surgery?
48 49	295	This section summarises data on the potential harms of subacromial decompression and rotator
50 51	296	cuff repair surgery from two Cochrane reviews[5, 6]. Data on the potential harms of non-
52 53	297	surgical options was not available. Suggestions for improvement included:
54 55	298	• Present both minor and serious harms (multidisciplinary feedback)
50 57 58	299	• Provide more context for harms (e.g. some physiotherapists and chiropractors
59 60	300	suggested comparing the harms of surgery and non-surgical options, some GPs and

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3 4	301	patients thought presenting harms in a different section to 'benefits' doesn't give an
5 6	302	understanding of harm versus benefit)
7 8 0	303	• Clarify the evidence as it does not match personal experience (e.g. some orthopaedic
10 11	304	surgeons thought harms were overestimated, some physiotherapists thought harms
12 13	305	were underestimated)
14 15	306	• Modify the formatting and language used (e.g. some orthopaedic surgeons and patients
16 17 18	307	thought 'harm' was too negative and suggested replacing it with 'risk').
19 20	308	Supplementary File 17 highlights changes between the first and final draft of this section.
21 22 22	309	3.3.5. Summary of benefits, harms, and other practical issues
23 24 25	310	This section provides a summary of the benefits, harms, and important practical issues of
26 27	311	surgery and non-surgical options. Suggestions for improvement included:
28 29 20	312	• Revise information on costs (e.g. some physiotherapists and GPs wanted specific cost
30 31 32	313	information on surgery, some orthopaedic surgeons wanted to soften the language
33 34	314	emphasising the costs of surgery, some chiropractors and patients wanted information
35 36 27	315	on the costs of non-surgical options)
38 39	316	• Revise information on activity restrictions and post-surgical management (e.g. some
40 41	317	physiotherapists and orthopaedic surgeons suggested alternative timeframes for post-
42 43 44	318	surgery activity restrictions, some GPs wanted to emphasise symptoms may improve
45 46	319	with or without surgery)
47 48	320	• Modify the formatting or language used (e.g. some GPs and patients wanted to separate
49 50 51	321	the practical issues by type of surgery, while some physiotherapists thought this would
52 53	322	result in too much information).
54 55	323	Supplementary File 18 highlights changes between the first and final draft of this section.
56 57 58 59 60	324	3.3.6. Questions to consider when talking with a health professional

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325 This section outlines questions patients should consider asking their health professional before326 deciding to have surgery. Suggestions for improvement included:

Adding questions (e.g. some physiotherapists suggested "How long should I wait before considering surgery?")

- Removing questions (e.g. some orthopaedic surgeons suggested removing "Do I know
 enough about my condition" and "Have I considered my individual circumstances?")
- Modifying the formatting (e.g. some physiotherapists wanted the heading to be inclusive of any health professional while others thought these questions were better suited to GPs).

An early version of the decision aid included a section on 'Are there other things I can do? Suggestions included activity modification, strength, and endurance exercises, seeking advice from a health professional, and considering surgery if these options don't help. We received positive feedback from patients on this section and helpful suggestions from health professionals to add information to help people try non-surgical options first. However, we decided to remove this section to save space so we could provide more detail about non-surgical options on the first page.

341 Supplementary File 19 highlights changes between the first and final draft of this section.

3.3.7. Overall feedback

343 Overall feedback included:

- Reduce the amount of information (e.g. multidisciplinary feedback suggested a 2-page decision aid was ideal, some physiotherapists and orthopaedic surgeons suggested removing the question-asking section and the references)
- More detail needed (e.g. some GPs wanted information on imaging and the importance of not missing a serious disease, some patients thought the last page lacked a solution if someone had tried everything)

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Formatting and distribution suggestions (e.g. multidisciplinary feedback and feedback from patients suggested separate decision aids for each surgery was needed, some GPs wanted separate decision aids for surgical and non-surgical options, some physiotherapists and chiropractors suggested making a video summary of the decision aid, some physiotherapists and orthopaedic surgeons suggested the decision aid should be provided in clinics, early during treatment, when patients are considering surgery and/or after a patient received a diagnosis, some patients suggested emphasising the question-asking section).

Some orthopaedic surgeons felt the decision aid was not balanced and biased against surgery. Most patients stated that the decision aid had swayed them away from surgery. One patient was initially sway towards surgery after reading the decision aid – to have surgery before the risk of complications increased or pain got worse – but changed their mind after reviewing the decision aid in a repeat interview due to lack of evidence of benefit.

4. Discussion

4.1. **Summary of findings**

Most health professionals and people with shoulder pain rated all aspects of decision aid acceptability as adequate-to-excellent (e.g., length, amount of information, presentation, comprehensibility). Interviews highlighted agreement with most aspects of the decision aid (e.g. treatment options, summary of benefits, harms and practical issues, questions to ask a health professional, graphics, formatting, amount of information, and presentation of information) and some divergent views among health professionals on parts of the decision aid (e.g. causes and symptoms of shoulder pain, evidence on benefits and harms). To understand whether this tool adds value to clinical practice, a randomised controlled trial evaluating whether this decision aid reduces people's intentions to undergo shoulder surgery and facilitates informed treatment choices is underway.

375 4.2. Strengths and limitations of this study

We developed a decision aid according to the IPDAS criteria, used a mixed methods approach to evaluate useability and acceptability, interviewed a broad range of health professionals and patients, and conducted one-on-one interviews which allowed in-depth feedback on the decision aid. Our decision aid includes several key features recommended to optimise risk communication (e.g. presenting numeric estimates, presenting uncertainty, using visuals, tailoring estimates)[17]. Limitations include a small sample size for our quantitative acceptability data, being unable to recruit certain groups of health professionals (e.g. rheumatologists, sports doctors), and the decision aid only being developed in English (the Steering group will consider cross-cultural adaptation of this tool following its evaluation in a clinical trial). We also acknowledge that individual circumstances may limit the applicability of the evidence presented in the decision aid (e.g. age, pain severity, activity levels, job demands, insurance coverage, caring responsibilities, involvement in sport).

4.3. Meaning of the study

Interviews highlighted high levels of agreement with most aspects of the decision aid among health professionals and patients, although we did find some divergent views among health professionals on parts of the decision aid. Highly consistent feedback included praise for including practical issues for surgery and non-surgical options and a global summary of the benefits and harms of each, praise for including questions to ask a health professional, and a comment that a 2-page decision aid would be ideal if it included all information from the 3-page version. We attempted to create a 2-page version of the decision aid but were not able to do so without comprising useability and acceptability or removing important information.

Health professionals and patients largely agreed with the presentation of non-surgical and
surgical options, with some patients pleased to have 'wait and see' included as this aligned
with their experience of pain that has resolved without treatment. Most health professionals

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and patients wanted non-surgical options listed before surgery to mimic treatment
recommendations in real-life. However, evidence suggests people are more likely to think a
decision aid is balanced if options are listed side-by-side[13]. We listed the options side-byside, with non-surgical options on the left ('first'), as a compromise.

A few physiotherapists thought it was inappropriate to include medication and injections as options and wanted physiotherapy-delivered treatments listed earlier. Cochrane reviews on treatments for subacromial pain syndrome show glucocorticoid injections are superior to placebo and provide similar effects to non-steroidal anti-inflammatory drugs[24] and physiotherapy-delivered treatments (e.g. exercise, manual therapy, electrotherapy)[25, 26]. There is no evidence physiotherapy-delivered treatments are superior to placebo[25, 26]. For these reasons, we did not action their suggestions.

We found quite varied feedback on the causes and symptoms of shoulder pain and presentation of benefits. Most health professionals and patients thought the causes and symptoms of shoulder pain were accurate and easy to understand. However, some health professionals (mostly physiotherapists) thought the pathoanatomical description of shoulder pain was inappropriate and used language that could cause fear and drive patients towards surgery. Some health professionals and patients thought the icon array and bar graphs were helpful, which is consistent with evidence suggesting these graphics help people make value-aligned decisions[14]. However, we replaced some icon arrays and bar graphs with a 'key messages' box to address feedback that the statistics needed to be simplified and less repetitive, and because 'fact boxes' are useful risk-communicating tools[27]. We kept numeric estimates in the key messages box due to evidence suggesting patients prefer numeric estimates over narrative descriptions of effect sizes (e.g. 'small' effects)[28].

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Some orthopaedic surgeons disagreed with evidence from Cochrane systematic reviews and thought the decision aid was biased against surgery. Some believed that, if surgeons selected surgical candidates carefully, surgery could improve the speed of recovery and prevent tears progressing (outcomes not assessed in Cochrane reviews), while minimising the risk of harm. On the other extreme were some physiotherapists, who suggested that Cochrane systematic reviews have underestimated the true harms of surgery. We did not change the evidence presented because it is vital numeric estimates of benefits and harms in decision aids are based on the highest quality available evidence[15, 29].

Nearly 3 in 4 patients thought the decision aid was biased against surgery (Table 3), likely
because the evidence we presented shows subacromial decompression surgery and rotator cuff
repair surgery are not superior to non-surgical management[5, 6]. This suggests tools for
assessing perceived balance of decision aids may not be suitable when a decision aid presents
information that counters prevailing norms.

We included health professionals practising in various counties to maximise the acceptability
of this tool globally. As such, some information had to be made more general to accommodate
the characteristics of different health systems. For example, we could not be specific about the
costs of surgery or non-surgical options as this varies between countries due to factors like
health system and insurance coverage. We also received feedback to mention physiotherapists
as providers of injections as this is within the scope of some advanced practice physiotherapists
in the UK.

4.4. Implications for future research

We are currently evaluating a print/online version of the decision aid in a randomised
controlled trial including people with shoulder pain considering shoulder surgery. However,
feedback from health professionals raised the possibility of future trials evaluating different

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formats of the decision aid (e.g. video summary, decision aid specific to one shoulder surgery) in different populations (e.g. patients who have consulted with a surgeon and know what surgery they are likely to receive).

5. Conclusion

By eliciting views of key stakeholders, we developed a patient decision aid that presents evidence-based information on the benefits and harms of subacromial decompression surgery, rotator cuff repair surgery and non-operative treatments for subacromial pain syndrome. Acceptability testing and interviews with health professionals and people with shoulder pain highlights this decision aid could be an acceptable and valuable tool for helping people with shoulder pain make informed treatment choices. A randomised controlled trial evaluating whether this decision aid reduces people's intentions to undergo shoulder surgery and facilitates informed treatment choices is underway. idei .

3 4	460	ithors' contributions			
⁵ 461 All authors critically revised the manuscript for important intellectual content and					
7 8 9	462	the final manuscript. Please find below a detailed description of the role of each author:			
10 11	463	- Joshua R Zadro: conception and design, analysis and interpretation of data, drafting and			
12 13	464	revision of the manuscript, and final approval of the version to be published			
14 15 16	465	- Caitlin Jones: conception and design, analysis and interpretation of data, drafting and			
17 18	466	revision of the manuscript, and final approval of the version to be published			
19 20	467	- Ian A Harris: conception and design, interpretation of data, drafting and revision of the			
21 22 23	468	manuscript and final approval of the version to be published			
24 25	469	- Rachelle Buchbinder: conception and design, interpretation of data, drafting and			
26 27	470	revision of the manuscript and final approval of the version to be published			
28 29 30	471	- Denise O'Connor: conception and design, interpretation of data, drafting and revision			
30 31 32	472	of the manuscript and final approval of the version to be published			
33 34	473	- Kirsten McCaffery: conception and design, interpretation of data, drafting and revision			
35 36	474	of the manuscript and final approval of the version to be published			
37 38 39	475	- Rachel Thompson: conception and design, interpretation of data, drafting and revision			
40 41	476	of the manuscript and final approval of the version to be published			
42 43	477	- Sascha Karunaratne: conception and design, interpretation of data, drafting and revision			
44 45	478	of the manuscript and final approval of the version to be published			
40 47 48	479	- Min Jiat Teng: conception and design, interpretation of data, drafting and revision of			
49 50	480	the manuscript and final approval of the version to be published			
51 52	481	- Christopher G Maher: conception and design, interpretation of data, drafting and			
53 54 55	482	revision of the manuscript and final approval of the version to be published			
56 57	483	- Tammy Hoffmann: conception and design, interpretation of data, drafting and revision			
58 59 60	484	of the manuscript and final approval of the version to be published			

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The Corresponding Author (JZ) attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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Ethics statement: All recruitment and data collection procedures were approved by the Sydney Local Health District Human Research Ethics Committee (Reference number: X20-0023).

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Table 1. Characteristics of health professionals who manage people with shoulder pain (n=26) and people with shoulder pain (n=14)

Health professionals	(unless specified otherwise)
Profession	(unless specified other wise)
Physiotherapist	11 (42%)
Orthopaedic surgeon	7 (27%)
General practitioner	4 (15%)
Chiropractor	3 (12%)
Osteopath	1 (4%)
Age (years)	40 (11)
Female Country of superior	8 (31%)
Country of practice	10 (600/)
Australia	18 (69%)
United States	4 (15%)
Canada	2 (8%)
England	2 (8%)
Years of experience	12 (9)
Works in private practice	19 (73%)
Number of nationts with shoulder pain seen per year	164 (167)
Trumber of patients with shoulder pair seen per year	Median (IQR): 100 (40-250)
People with shoulder pain	Mean (SD) or N (%)
r copie with shoulder pain	(unless specified otherwise)
Age (years)	46 (18)
Female	6 (43%)
Highest level of education	6 (420/)
	0 (43%) 9 (570/)
High school or IAFE/Irade	8 (57%)
Country of birth	
Australia	10 (71%)
Philippines	1 (7%)
United States	1 (7%)
United Kingdom	1 (7%)
Egypt	1 (7%)
Employment status	
Working	9 (64%)
Not working	3 (21%)
Retired/unable to work	2 (14%)
Health insurance	8 (57%)
	96 (117)
Duration of shoulder pain (months)	Median (IOR): 18 (6-180)
Activity interference in the past week	
Not at all	3 (21%)
A little hit	3 (21%)
Moderately	6 (43%)
moucrately	0 (1570)

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2 3		<i>Ouite a bit</i>	1 (7%)
4 5		Extremely	1 (7%)
6		Management strategies trialled	
7		Exercise	9 (64%)
o 9		Medication	8 (57%)
10		Rest	7 (50%)
11 12		Massage	6 (43%)
13		Manual therapy	5 (36%)
14 15		Injections	2 (14%)
15 16		Surgery	2 (14%)
17		Other	3 (21%)
18 19		Previously had a scan (X-Ray, MRI, Ultrasound)	8 (57%)
20		Previously had sick leave due to shoulder pain	2 (14%)
21	586	IQR: interquartile range; MRI: magnetic resonance im	aging; N: number of participants; SD:
22 23	587	standard deviation.	
24	588		
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Table 2. Acceptability questionnaire for health professionals who manage patients with shoulder pain (n=15; nine physiotherapists, five orthopaedic surgeons and one osteopath)

Acceptability statements	Strongly agree, N (%)	Somewhat agree, N (%)	Neither agree nor disagree, N (%)	Somewhat disagree, N (%)	Strongly disagree, N (%)	Mean (SD)*	Mean (SD) for orthopaedic surgeons*
It will be easy for me to use	10 (67%)	4 (27%)	0 (0%)	0 (0%)	1 (7%)	4.5 (1.1)	3.6 (1.5)
It is easy for me to understand	12 (80%)	3 (20%)	0 (0%)	0 (0%)	0 (0%)	4.8 (0.4)	4.8 (0.4)
It will be easy for me to experiment with using it before making a final decision to adopt it	12 (80%)	3 (20%)	0 (0%)	0 (0%)	0 (0%)	4.8 (0.4)	4.6 (0.5)
The results of using the decision aid will be easy to see	2 (13%)	4 (27%)	7 (47%)	2 (13%)	0 (0%)	3.4 (0.9)	2.6 (0.5)
This decision aid is better than how I usually go about helping patients decide about shoulder surgery	3 (20%)	4 (27%)	4 (27%)	4 (27%)	0 (0%)	3.4 (1.1)	2.8 (0.8)
This decision aid is compatible with the way I think subacromial shoulder pain should be managed	8 (53%)	5 (33%)	2 (13%)	0 (0%)	0 (0%)	4.4 (0.7)	4.2 (0.4)
Compared with my usual approach, this decision aid will result in my patients making more informed decisions	4 (27%)	5 (33%)	4 (27%)	2 (13%)	0 (0%)	3.7 (1.0)	3.6 (0.5)

2									
3		Using this	2 (13%)	7 (47%)	4 (27%)	1 (7%)	1 (7%)	3.5	34(15)
4		decision aid	_ (/ -)	. ((_,,,,)	- (.,.)	- ((/))	(1 1)	
5		will save me						(111)	
6		time							
/		This decision	7 (470/)	4 (270/)	1 (70/)	2 (200/)	0 (00/)	4.0	24(12)
ð			/ (4/%)	4 (27%)	1 (7%)	5 (20%)	0 (0%)	(1, 2)	3.4 (1.3)
9 10								(1.2)	
11		method of							
12		helping							
13		patients make							
14		decisions							
15		about shoulder							
16		surgery							
17		Pieces or	7 (47%)	7 (47%)	0 (0%)	1 (7%)	0 (0%)	4.3	4.2 (1.3)
18		components of						(0.8)	
19		the decision						(0.0)	
20		aid can be							
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23		themselves	0.(600.()		2 (120 ()	0 (00()	0.(00())		
24 25		This type of	9 (60%)	4 (27%)	2 (13%)	0 (0%)	0 (0%)	4.5	4.2 (0.8)
25		decision aid is						(0.7)	
20		suitable for							
28		helping							
29		patients make							
30		value laden							
31		choices							
32		This decision	8 (53%)	4 (27%)	2 (13%)	1 (7%)	0 (0%)	4.3	3.8 (1.1)
33		aid					()	(1.0)	()
34		complements						()	
35		my usual							
36		approach							
3/ 20		Using this	10 (67%)	2 (120/)	2 (129/)	1 (70/.)	0 (0%)	4.4	4.6 (0.5)
20		Using uns	10 (0776)	2 (1370)	2 (1370)	1 (770)	0(070)	(1.0)	4.0 (0.3)
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41		does not							
42		involve							
43		making major							
44		changes to the							
45		way I usually							
46		do things							
47		There is a high	4 (27%)	8 (53%)	2 (13%)	1 (7%)	0 (0%)	4.0	3.6 (0.9)
48		probability						(0.8)	
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58	591	*Likert Scale from	m strongly a	gree (5) to st	rongly disagi	ree (1).			
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Acceptability items		Ν
Information presented was 'excellent or	r good'*	
Subacromial shoulder	pain: should I have surgery?	9 (8
Causes and symptoms	of subacromial shoulder pain	8 (7
What are the treatment options cover	ed in this decision aid? (Non-	10 (9
	surgical options)	-
What are the treatment options	covered in this decision aid?	9 (8
	(Surgery)	
What are the likely benefits of surge	ery and non-surgical options?	9 (8
What a	re the likely risks of surgery?	8 (7
What pract	ical issues should I consider?	10 (9
Questions to consider when talking	with your health professional	10 (9
Length of the decision aid		
	Just right	8 (7
	Too short	1 (
	Too long	2 (1
Amount of information		
	Just right	10 (9
	Too little information	0 (
	Too much information	1 (
Presentation		
	Balanced	2(1
	Slanted towards surgery	1 (
Slanted	towards non-surgical options	8(7
Useful when deciding about surgery	· ·	
Makes decision to have surgery easier		8(1
Enough information provided		9 (8
N: number of participants.		
*compared to 'fair/poor'		

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2 3 4	597	Figure legends
5	598	Figure 1. Flowchart of the development process
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600 Supplementary files

- 601 Supplementary File 1. Draft patient decision aid.
- 602 Supplementary File 2. Consolidated Criteria for Reporting Qualitative Research (COREQ)

603 checklist.

- 604 Supplementary File 3. Health professional questionnaire.
- 5 605 Supplementary File 4. Patient questionnaire.
- ⁶⁰⁶ Supplementary File 5. Topic guide for interviews with health professionals.
- 607 Supplementary File 6. Topic guide for interviews with patients.
- 608 Supplementary File 7. Acceptability questionnaire for health professionals.
- 4 609 Supplementary File 8. Acceptability questionnaire for patients.
- ⁶ 610 Supplementary File 9. Patient decision aid.
- 611 Supplementary File 10. International Patient Decision Aid Standards (IPDAS) checklist.
- 612 Supplementary File 11. User-Centered Design 11-item measure (UCD-11)
- 613 Supplementary File 12. Themes, sub-themes and example quotes for each section of the 614 decision aid.
- 615 Supplementary File 13. Reasons for not implementing feedback for each section of the decision 616 aid.
- 617 Supplementary File 14. Changes between the first and final draft of 'Who should read this 618 decision aid?'
- 619 Supplementary File 15. Changes between the first and final draft of 'What are the treatment
 620 options covered in this decision aid?'
- 621 Supplementary File 16. Changes between the first and final draft of 'What are the likely 53 54 622 benefits of surgery compared to non-surgical options?'
- 66 623 Supplementary File 17. Changes between the first and final draft of 'What are the likely harms 67 624 of surgery?'

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5 Supplementary File 18. Changes between the first and final draft of 'Summary of benefits,

626 harms, and other practical issues.'

627 Supplementary File 19. Changes between the first and final draft of 'Questions to consider

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628 when talking with a health professional.'







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Shoulder pain: should I have arthroscopic surgery?

Is this decision aid relevant for me?

• This decision aid can help if you have shoulder pain due to common causes like rotator cuff tears or bursitis and are considering arthroscopic surgery of the shoulder

Cause and symptoms of shoulder pain

- Shoulder pain is commonly caused by rotator cuff tears, swelling of fluid filled sacs call bursa ('bursitis') or impingement.
- Impingement occurs due to contact between a bony part of the shoulder (the 'acromion') and the rotator cuff tendons or bursa (see picture). Contact usually occurs as you move your arm out to the side.
- Shoulder pain often makes it difficult to do simple everyday tasks like reaching into a high cupboard and washing hair.
- Symptoms often take time to settle and one half of patients are better by around 6 months.



What are the treatment options covered in this decision aid?

1. Surgery ('subacromial decompression' and/or 'rotator cuff repair')

Surgery requires admission to hospital and an anaesthetic. The surgeon will make a small skin cut in your shoulder to perform the procedure. Your surgeon may perform one or both of the following procedures:

• Subacromial decompression: Increase the space under the acromion by either shaving back some bone, trimming some ligament or removing a bursa



• **Rotator cuff repair:** Reconnecting torn rotator cuff tendons The surgeon may only decide on which procedure to perform while in surgery.

2. No surgery

You can choose to not have surgery and instead have injections, physiotherapy, medication or wait to see if it improves by itself.



Discloser: Arthritis Australia provedencing indexelop this top//bornagine in knowing memorifs the /debelop/reprinted basss The table lopers of this decision aid include orthopaedic surgeons, rheumatologists, physiotherapists, psychologists and occupational therapists. 8/11 developers have a PhD. None of these people will gain or lose anything based on the choices that people make.

What are the likely benefits of arthroscopic surgery and non-surgical options?

Subacromial decompression vs. placebo

HIGH CERTAINTY EVIDENCE* that subacromial decompression is little-to-no better than placebo...

*We are very confident that the figures below represent the true benefits of surgery

Placebo = the patient goes under anaesthetic and the surgeon inserts the surgical tools BUT no further procedure is performed



KEY MESSAGE: On average, surgery leads to **2.6% less pain** and **2.8% better function** compared to placebo surgery at 12 months.

Most patients would not consider these benefits important.

What % of people report treatment success?

🕈 treatment success rated by patients

treatment not a success

Each figure represents one person. We can't predict whether you will be one of the people who is helped.



Rotator cuff repair vs. no surgery

LOW-MODERATE CERTAINTY EVIDENCE* that rotator cuff repair is little-to-no better than no surgery...

*We have low-moderate confidence that the figures below represent the true benefits of surgery

No surgery = injections, physiotherapy, medication or no treatment



KEY MESSAGE: On average, surgery leads to **8.7% less pain** and **6% better function** compared to no surgery at 12 months.

Most patients would not consider these benefits important.

What % of people report treatment success?

treatment success rated by patients

treatment not a success

Each figure represents one person. We can't predict whether you will be one of the people who is helped.



With surgery, **8 more people out of 100** will report their treatment as successful at 12

What are the likely <u>harms</u> of arthroscopic surgery?

Each figure represents one person. We can't predict whether you will be one of the people who is harmed.

100 people who **do** have surgery

has serious problems

no serious problems

blems blems Based on moderate-certainty evidence, **less than 1 person per 100** that receives arthroscopic surgery will have serious (and potentially life-threatening) problems like infection, nerve injury, deep vein thrombosis, pulmonary embolism, heart attack, stroke and pneumonia.

Q?

Where do these estimates of <u>benefits</u> and <u>harms</u> come from?

Estimates of benefits and harms are based on the most up-to-date medical evidence from two reviews of 17 studies and over 2000 people that looked at arthroscopic surgery in people with subacromial pain syndrome.

What practical issues should I consider?

The table shows key practical issues for those who have arthroscopic surgery and those who do not.

	ARTHROSCOPIC	SURGERY	NO SURGERY A.
Procedure and follow-up With wound care and exercise		operating theatre. dualised follow-up	Advice from a professional about other treatments may be useful (eg. injections, exercise, activity modification, medication)
Recuperation	You may use a sling a few day Recuperation typically takes	ys after surgery. between 2-6 weeks	No recuperation needed
Activity restrictions	Avoid heavy lifting for 7-21 days, overhead activities for 6 weeks and pushing through your hands for 3 months		No activity restrictions
Time off work	Depends on recovery and de Usually a few weeks after su	mands of job. rgery	No time off work
Driving	You can start driving as soon steer. This is normally after o	as you feel able to ne week	No driving limitations
Costs	Out-of-pocket costs for surge high. There may also be out-o physiotherapy after surgery	ery are generally of-pocket costs for	No surgical costs BUT there may be out- of-pocket costs for physiotherapy or injections
Are there of	her things I can do?	Questions to c	consider when talking with your
 Strength and e shoulder might function. 	ndurance exercises for your : help reduce pain and improve	doctor Do I need arth	roscopic surgery?
 Modifying your relieving medic reduce pain. 	r activities and using pain ines when needed might help	Do I know eno » having arthro » not having ar	ugh about the benefits and harms of: oscopic surgery of the shoulder? rthroscopic surgery?
 Seek advice fro the options that 	om a health professional about at best suit your needs.	Am I clear about to me?	ut which benefits and harms matter most
 Consider surgery at a later point if the above points do not help 		Do I have enou	ugh information and support to decide?
.es			

2. Karjalainen TV, et al. Surgery for rotato F@) tpeee Coencientation only. It is not intended as medical advice and should not be relied upon as a substitute for consultations with a qualified health professional who can determine your medical needs.

Last reviewed: ... 2019. Update due ... 2020. Developed by Dr Joshua Zadro, [Institute for Musculoskeletal Health, School of Public Health, The University of Sydney, NSW, Australia.

1. Karjalainen TV, et al. Subacromial decompression surgery for rotator cuff disease. Cochrane Database of Systematic Reviews 2019, Issue 1. Art. No.: CD005619.

Supplementary File 2. Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist

Items	Guide questions/description	Yes/No
Interviewer/facilitator	Which author/s conducted the interview or focus group?	Yes
Credentials	What were the researcher's credentials? e.g., PhD, MD	Yes
Occupation	What was their occupation at the time of the study?	Yes
Gender	Was the researcher male or female?	Yes
Experience and	What experience or training did the researcher have?	Yes
training		
Relationship	Was a relationship established prior to study commencement?	Yes
established		
Participant	What did the participants know about the researcher? e.g.,	Yes
knowledge of the	personal goals, reasons for doing the research	
interviewer		
Interviewer	What characteristics were reported about the	Yes
characteristics	interviewer/facilitator? e.g., Bias, assumptions, reasons and	
	interests in the research topic	
Methodological	What methodological orientation was stated to underpin the	Yes
orientation and theory	study? e.g., grounded theory, discourse analysis, ethnography,	
	phenomenology, content analysis	
Sampling	How were participants selected? e.g., purposive, convenience,	Yes
	consecutive, snowball	
Method of approach	How were participants approached? e.g., face-to-face, telephone,	Yes
	mail, email	
Sample size	How many participants were in the study?	Yes
Non-participation	How many people refused to participate or dropped out?	Yes
	Reasons?	
Setting of data	Where was the data collected? e.g., home, clinic, workplace	Yes
collection		
Presence of non-	Was anyone else present besides the participants and researchers?	Yes
participants		
Description of sample	What are the important characteristics of the sample? e.g.,	Yes
	demographic data, date	
Interview guide	Were questions, prompts, guides provided by the authors? Was it	Yes
	pilot tested?	
Repeat interviews	Were repeat interviews carried out? If yes, how many?	Yes
Audio/visual	Did the research use audio or visual recording to collect the data?	Yes
recording		
Field notes	Were field notes made during and/or after the interview or focus	Yes
	group?	
Duration	What was the duration of the interviews or focus group?	Yes
Data saturation	Was data saturation discussed?	Yes
Transcripts returned	Were transcripts returned to participants for comment and/or	Yes
-----------------------	--	-----
	correction?	
Number of data	How many data coders coded the data?	Yes
coders		
Description of the	Did authors provide a description of the coding tree?	Yes
coding tree		
Derivation of themes	Were themes identified in advance or derived from the data?	Yes
Software	What software, if applicable, was used to manage the data?	Yes
Participants checking	Did participants provide feedback on the findings?	Yes
Quotations presented	Were participant quotations presented to illustrate the themes /	Yes
	findings? Was each quotation identified? e.g. participant number	
Data and findings	Was there consistency between the data presented and the	Yes
consistent	findings?	
Clarity of major	Were major themes clearly presented in the findings?	Yes
themes		
Clarity of minor	Is there a description of diverse cases or discussion of minor	Yes
themes	themes?	

Supplementary File 3. Health professional questionnaire

Thank you for your participation in this study, which is investigating what information health professionals feel patients need to know when considering shoulder surgery.

We would like you to answer a few questions before the interview. This should not take more than 5-10 minutes.

First some quick questions about you...

1. Please indicate your gender:

- □ Female
- □ Male
- Prefer not to say
- 2. Please indicate your age: [free text response]
- 3. In which country do you currently practice? [free text response]
- 4. What health profession are you?
 - □ Orthopaedic surgeon
 - □ General practitioner
 - □ Rheumatologist
 - □ Sports medicine doctor
 - □ Physiotherapist
 - □ Other (please specify)
- 5. How many years have you been practicing? [free text response]
- 6. Which clinical setting have you spent the most time practicing in?
 - □ Private practice
 - □ Public hospital
 - □ Private hospital
 - □ Sports teams
 - □ Other (please specify)
- 7. On average, how many patients with subacromial pain syndrome do you manage/review per year? [free text response]

Thank you for completing the questionnaire.

Supplementary File 4. Patient questionnaire

Thank you for your participation in this study, which is investigating what information patients feel is important to know when considering shoulder surgery.

We would like you to answer a few questions before the interview. This should not take more than 5-10 minutes.

First some quick questions about you...

- 1. Please indicate your gender:
 - Female
 - 🗖 Male
 - □ Prefer not to say
- 2. Please indicate your age: [free text response]
- 3. In which country were you born? [free text response]
- 4. What option best describes your highest level of education?
 - □ Primary school or less
 - □ High school (not completed)
 - □ High school (completed)
 - □ TAFE/Trade
 - □ University- undergraduate degree/s (completed)
 - □ University- postgraduate degree/s e.g. Masters, PhD (completed)
 - \Box Other (please specify)
- 5. What is your employment status?
 - □ Employed part-time
 - □ Employed full-time
 - □ Casual work
 - □ Retired
 - □ Unemployed
 - □ Student
 - □ Sick/disability leave
 - □ Other (please specify) _
- 6. Do you have private health insurance?
 - □ Yes
 - 🛛 No
- 7. How long have you had your shoulder pain (in weeks, months or years)?

^{8.} During the past week, how much did shoulder pain interfere with your normal work (including both work outside the home and housework)?

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□ Not at all

□ A little bit

□ Moderately

□ Quite a bit

□ Extremely

9. What treatment options have you tried for you shoulder pain?

🛛 Rest

 \square Medication

□ Exercise

□ Massage

□ Manual therapy (usually provided by a physiotherapist)

Injections

□ Surgery

□ Other (please specify) _

10. Have you previously had a scan on your affected shoulder (e.g Xray, ultrasound, MRI)?

□ Yes

□ No

11. Have you previously taken sick leave due to shoulder pain?

□ Yes

□ No

12. If you have had shoulder surgery, please specify the procedure (i.e. rotator cuff repair, shaving back a bone spur, removal of bursa) [free text response]

Thank you for completing the questionnaire.

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Supplementary File 5. Topic guide for interviews with health professionals.

Example structure of interviews with health professionals

Note: The topics below will serve as an outline to guide the interview

Introductions

- Group introductions
- Brief explanation of the interview

Opening questions

- What is your understanding of subacromial pain syndrome? What causes it? How can it be treated?
- What information is important to know about different treatments?
- What do you think of surgery (specifically subacromial decompression and rotator cuff repair surgery) as a treatment?

Brief explanation of subacromial decompression and rotator cuff repair surgery to health professionals (depending on their current level of understanding e.g. do not explain this to an orthopedic surgeon)

- Nature of the procedure
- Theoretical indications
- Benefits and harms

Core questions

If we were designing an education leaflet to help patients decide whether to have subacromial decompression surgery or not....

- What information is most important for them to know? (prompt for views on presenting different treatment options, benefits and harms, recovery time, likelihood of need for revision surgery, details of the procedure, etc.)
- How would you like information to be presented in terms of visual aids, text, tables, pictures, etc.? (example below, but exact topics will depend on what arose from the previous question)
 - Different treatment options
 - Benefits and harms
 - Recovery time
 - $\circ \quad \text{Likelihood of need for revision surgery} \\$
 - Details of the procedure
- How would your response to the above options differ if the information was intended to be used during a consultation with a health professional?

When reviewing patient decision aid

<u>Instructions to health professionals (as an example)</u>: The material we want you to review has been developed for patients to improve their knowledge and confidence in making the decision to have shoulder surgery or not. We would like for you to help us refine this material – for example, how you find the visual appeal, readability, content, and what are your overall thoughts on patients using this material?

To do this, I am going to ask you to think out loud while you read through the material. Just say everything that goes through your mind- if you are finding anything confusing, what your eye is drawn to. If a page is easy, and you understand what to do – just say that. Providing examples is very helpful (e.g. "look at a table", "look at a page with just text vs with an image").

Prompt questions as health professionals are reading through the material:

- How do you think patients would find this section?
- Did you feel like patients will know where to look, and what to do next?

- Did you feel like patients knew the relevance of this section in their decision?
- How do you think patients will find the content of this section?
- Were the instructions clear/helpful?
- How easy was it to understand the section? (readability)
- Was there anything that was unclear or confusing?
- How were the visual aids?
- How was the functionality?
- Is there anything that you would improve in this section?
- What did you like most about this material?
- What did you like least about this material?

General feedback at the end

- Are there any topics that you would like to see in future versions of this tool?
- Do you have any other general feedback, thoughts or comments?

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Supplementary File 6. Topic guide for interviews with patients.

Example structure of interviews with patients

Note: The topics below will serve as an outline to guide the interview

Introductions

- Group introductions
- Brief explanation of the interview

Opening questions

- What is your understanding of your shoulder pain (i.e. subacromial pain syndrome)?
- How and why do you think this affects people?
- How can it be treated?
- What treatments have you heard of or been suggested to try?
- What information is important to know about different treatments?
- What would you like to know about the benefits?
- What would you like to know about harms?
- What do you think of surgery as a treatment?

Explain subacromial decompression surgery to patients

- Nature of the procedure
- Theoretical indications
- Benefits and harms

Core questions

If we were designing an education leaflet to help you decide whether to have subacromial decompression surgery or not....

- What information is most important to know? (prompt for views on presenting different treatment options, benefits and harms, recovery time, likelihood of need for revision surgery, details of the procedure, etc.)
- How would you like information to be presented in terms of visual aids, text, tables, pictures, etc.? (example below, but exact topics will depend on what arose from the previous question)
 - Different treatment options
 - Benefits and harms
 - Recovery time
 - Likelihood of need for revision surgery
 - Details of the procedure

When reviewing patient decision aid

<u>Instructions to patients (as an example)</u>: The material we want you to review has been developed for patients to improve their knowledge and confidence in making the decision to have shoulder surgery or not. We would like for you to help us better understand your experience of this material – for example, how you find the visual appeal, readability, content, and what are your overall experiences using this material.

To do this, I am going to ask you to think out loud while you read through the material. Just say everything that goes through your mind- if you are finding anything challenging, what your eye is drawn to. If a page is easy, and you understand what to do – just say that. Providing examples is very helpful (e.g. "look at a table", "look at a page with just text vs with an image").

Prompt questions as patients are reading through the material:

- How are you finding reading through this section?
- Did you feel like you knew where to look, and what to do next? For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

- Did you feel like you knew the relevance of this section in your decision?
- How did you find the content of this section?
- Were the instructions clear/helpful?
- How easy was it to understand the section? (readability)
- Was there anything that was unclear or confusing?
- How were the visual aids?

- How was the functionality?
- Is there anything that you would improve in this section?
- What did you like most about this material?
- What did you like least about this material?

General feedback at the end

- Are there any topics that you would like to see in future versions of this tool?
- Do you have any other general feedback, thoughts or comments?

Supplementary File 7. Acceptability questionnaire for health professionals

The following set of questions asks about your perceptions of the decision aid you just read. We are interested in your reactions to the decision aid. Please indicate how strongly you agree or disagree with each statement by *circling* the appropriate number.

In general:	Strongly agree		\rightarrow		Strongly disagree
It will be easy for me to use	1	2	3	4	5
It is easy for me to understand	1	2	3	4	5
It will be easy for me to experiment with using it before making a final decision to adopt it	1	2	3	4	5
The results of using the decision aid will be easy to see	1	2	3	4	5
This decision aid is better than how I usually go about helping patients decide about shoulder surgery	1	2	3	4	5
This decision aid is compatible with the way I think subacromial shoulder pain should be managed	1	2	3	4	5
Compared with my usual approach, this decision aid will result in my patients making more informed decisions		2	3	4	5
Using this decision aid will save me time	1	2	3	4	5
This decision aid is a reliable method of helping patients make decisions about shoulder surgery	1	2	3	4	5
Pieces or components of the decision aid can be used by themselves	1	2	3	4	5
This type of decision aid is suitable for helping patients make value laden choices	1	2	3	4	5
This decision aid complements my usual approach	1	2	3	4	5
Using this decision aid does not involve making major changes to the way I usually do things	1	2	3	4	5
There is a high probability that using this decision aid may cause/result in more benefit than harm	1	2	3	4	5
			1		1

Supplementary File 8. Acceptability questionnaire for patients

We would like to know what you think about the patient decision aid you have just read.

1. Please rate each section by circling 'poor', 'fair', 'good', or 'excellent' to show what you think about the way the information was presented on:

Subacromial shoulder pain: should I	Poor	Fair	Good	Excellent	
have surgery?					
Causes and symptoms of	Poor	Fair	Good	Excellent	
subacromial shoulder pain					
What are the treatment options	Poor	Fair	Good	Excellent	
covered in this decision aid? (Non-					
surgical options)					
What are the treatment options	Poor	Fair	Good	Excellent	
covered in this decision aid?					
(Surgery)					
What are the likely benefits of	Poor	Fair	Good	Excellent	
surgery and non-surgical options?					
(Key message)					
What are the likely benefits of	Poor	Fair	Good	Excellent	
surgery and non-surgical options?					
(What % of people report treatment					
success?)					
What are the likely risks of surgery?	Poor	Fair	Good	Excellent	
What practical issues should I	Poor	Fair	Good	Excellent	
consider?					
Questions to consider when talking	Poor	Fair	Good	Excellent	
with your health professional					
The length of the decision aid was (che	ck one):				
a. Too long					
b. Too short					
c. Just right					
The amount of information was (check	one).				

- 2. The length of the decision aid was (check one):
 - a. Too long
 - b. Too short
 - c. Just right
- 3. The amount of information was (check one):
 - a. Too much information
 - b. Too little information
 - c. Just right
- 4. I found the presentation (check one):
 - a. Slanted towards non-surgical options
 - b. Slanted towards surgery
 - c. Balanced
- 5. Would you find (or would you have found) this decision aid useful when /if you were making your decision about surgery for subacromial shoulder pain?
 - a. Yes
 - b. No
 - c. Comments:
- 6. Did this decision aid/would this decision aid make your decision to have surgery:
 - a. Easy

b. More difficult

c. Comments:

c. Comments:

a. Yes

b. No

tor per terien ont

shoulder pain decide on whether to have surgery or not?

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SHOULDER PAIN: SHOULD HAVE SURGERY?

All information in this decision aid should be discussed with a health professional

Who should read this decision aid?

This decision aid is for people with persisting shoulder pain that is likely due to issues with rotator cuff tendons that move and support the shoulder (eg. inflammation, tears).

Acromion

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BMJ Oper

This type of pain often occurs around the shoulder. It makes it difficult to do simple tasks that involve lifting your arm above your head (eg. washing hair).

This decision aid does not apply to people who have other causes of shoulder pain like frozen shoulder (which causes pain and severe stiffness), osteoarthritis, or shoulder pain that begins after trauma immediately resulting in loss of movement or strength (eg. sudden rotator cuff tear, fracture, dislocation). If you're unsure of the cause of your pain, see a health professional.



What are the treatment options covered in this decision aid?

NON-SURGICAL OPTIONS

Trying the following non-surgical options is

SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION

Bursa

recommended before considering surgery:

- Wait to see if your symptoms improve by themselves (roughly half of all people with these symptoms will recover within 6 months) and/or change your activities until the pain settles (eg. avoid carrying heavy grocery bags or take a break from sport if these activities cause pain)
- Take simple pain medicine (eg. paracetamol, anti-inflammatories)
- See a health professional (eg. physiotherapist) for advice on changing some daily activities and/or some muscle strength and endurance exercises
- See a health professional (eg. doctor) for a corticosteroid injection



You may consider surgery if the non-surgical options do not work and you can no longer put up with the pain. Typically surgery is not performed unless you have had symptoms for at least 3-6 months.

Surgery requires staying in hospital, having an anaesthetic and small skin cuts in your shoulder so the surgeon can perform one or both of the following:



Subacromial decompression surgery

Increase the space under the acromion by either shaving back some bone, trimming some ligament and/or removing a bursa



Reconnecting torn rotator cuff tendons

You will need to have rehabilitation involving exercises for at least 3 months following surgery. Much of this rehabilitation can be done at home.



What are the likely benefits of surgery compared to non-surgical options?

The figures on this page are based on the most up-to-date medical research as of 2020 (see references at the bottom of this page)

KEY MESSAGE

On average, patients report that surgery **improves pain and function by** <u>less than</u> **10%** (ie. an improvement in pain or function of less than a 1 point on a 0-10 pain scale) compared to non-surgical options in the short term (6 months after) and longer term (1-2 years after) ^c. Because most patients do not notice these improvements, research concludes:

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- Subacromial decompression surgery is not better than placebo or non-surgical options (ie. injections, exercise, medication or no treatment) for people with shoulder pain and no full-thickness rotator cuff tears ^A
- Rotator cuff repair surgery is little-to-no better than than non-surgical options for people with full-thickness rotator cuff tears ^B

These results are averages. Surgery improves pain and function by more than 10% for some patients. But other patients have either **no improvements or worse** pain and function after surgery.

Further information:

^A For subacromial decompression surgery, we are very confident about this key message because research on this surgery is high-quality. This research was mostly conducted on people aged in their 40s, 50s and 60s, but is the best evidence we have for all ages.

^B For rotator cuff repair surgery, we are somewhat confident about this message because there is lack of high-quality research on this surgery. This research was mostly conducted on people aged in their 50s and 60s but is the best evidence we have for all ages. Research on rotator cuff repair surgery does not apply to people who tear a tendon following trauma, or people with a full-thickness tear of the subscapularis tendon.

^c Research suggests exercise or activities that you can do yourself at home may be just as helpful as a supervised exercise program.



Think of each figure as 1 person. We can't predict if you will be one of the people who is harmed. Harms are more common among people with other health conditions (e.g. diabetes, heart disease).

has frozen shoulder or		
minor harms		
has serious problems	<pre></pre>	<pre>i i i i i i i i i i i i i i i i i i i</pre>
problems	<pre>i i i i i i i i i i i i i i i i i i i</pre>	<pre>i i i i i i i i i i i i i i i i i i i</pre>
	i i i i i i i i i i i i i i i i i i i	<pre>i i i i i i i i i i i i i i i i i i i</pre>

About 3 people per 100

that have surgery will develop frozen shoulder (which may cause shoulder pain and stiffness for up to 2 years) or minor harms with surgery.

About 1 person per 100

that has surgery will have serious (and potentially life-threatening) problems like infection, nerve injury, heartattack, stroke and pneumonia.

Important information: The information in this decision aid is not intended as medical advice and should not be used as a substitute to seeing a qualified health professional who can determine your medical needs.

References: 1) Karjalainen TV, et al. Cochrane Database Syst Rev. 2019, Issue 1. Art. No.: CD005619;
2) Karjalainen TV, et al. Cochrane Database Syst Rev. 2019, Issue 12. Art. No.: CD013502;
3) Page MJ, et al. Cochrane Database Syst Rev. 2016, Issue 6. Art. No.: CD012224.

+ Summary of benefits, harms, and other practical issues

NON-SURGICAL OPTIONS

Potential benefits

May **improve by itself** (within 6 months half of people will recover) or with non-surgical

SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION



BMJ Oper

May provide slight improvement in pain and function

options (ie. injections, exercise, or medication)

Avoid surgery

Potential harms

- May decide to have surgery later
- **Cost of non-surgical options** (eg. injection, physiotherapy)
- Time to attend health appointments (eg. for physiotherapy)
- Regardless of what treatment you have, your symptoms may not improve

compared to non-surgical options

Potential harms

- Possible surgical harms (eg. frozen shoulder, infection)
- Your symptoms may not improve with surgery
- Symptoms will temporarily be worse after surgery due to the operation (eg. pain when sleeping or moving your arm)
- **Rehabilitation for 3-12 months** after surgery and time to attend rehabilitation
- May take up to 6 weeks after subacromial decompression and **12 weeks** after rotator cuff repair to perform daily activities (eg. reach above your head, lift heavy objects)
- May take **3-4 months** after subacromial decompression and 6-12 months after rotator cuff repair to return to heavy

manual work, exercise, or sport

Out-of-pocket costs are generally higher for surgery than non-surgical options. There may be **costs for rehabilitation** after surgery and due to **time needed off work**

Questions to consider when talking with a health professional...

- Do I need surgery? What happens if I don't have surgery? What happens if I do nothing?
- Is surgery suitable for me? Which surgery is suitable for my diagnosis?
- Can I have surgery later? If so, how long should I wait before considering surgery?
- Have I considered my situation before making any decisions (eg. age, pain severity, activity levels, job demands, insurance coverage, caring responsibilities, involvement in sport, etc)?



Do I understand engugh about my condition and the benefits and harms of having Ê surgery and not having surgery?



Discloser: Arthritis Australia provided funding to develop this tool but had no involvement in the development process. The developers of this decision aid include orthopaedic surgeons, rheumatologists, physiotherapists, psychologists and occupational therapists, who have a range of views on the information in this decision aid. 8/11 developers have a PhD. None of the developers will gain or lose anything based on the choices that people make. Feedback from people with shoulder pain and health professionals practicing in various countries was used to refine the information presented in this decision aid

Last reviewed: 27/05/21. Ugdate due 27/05/23.

Lead developer: Dr Joshua Zådro, Institute for Musculoskeletal Health, University of Sydney, Australia.

3 4 5	Supplementary File 10. International Patient Decision Aid Standards checklist (IPDASi v4.0)	t
6	Qualifying criteria	Answer
7	1. The patient decision aid describes the health condition or problem	Yes
8	(treatment, procedure, or investigation) for which the index decision is	
9	required.	
10	2 The patient decision aid explicitly states the decision that needs to be	Ves
11	considered (index decision)	105
12	3 The national decision aid describes the options available for the index	Vac
13	designer	105
14	$\frac{1}{4} = \frac{1}{2} = \frac{1}$	V
15	4. The patient decision and describes the positive features (benefits or	Yes
10	advantages) of each option.	
17	5. The patient decision aid describes the negative features (harms, side	Yes
19	effects, or disadvantages) of each option.	
20	6. The patient decision aid describes what it is like to experience the	Yes
21	consequences of the options (e.g., physical, psychological, social).	
22	Certification criteria	Answer
23	1. The patient decision aid shows the negative and positive features of	Yes
24	ontions with equal detail (e.g. using similar fonts sequence presentation of	105
25	statistical information)	
26	2. The notions decision aid (on acceptional decommentation) provides situations	Vac
27	2. The patient decision and (or associated documentation) provides citations	res
28	to the evidence selected.	
29	3. The patient decision aid (or associated documentation) provides a	Yes
3U 21	production or publication date.	
37	4. The patient decision aid (or associated documentation) provides	Yes
33	information about the update policy.	
34	5. The patient decision aid provides information about the levels of	Yes
35	uncertainty around event or outcome probabilities (e.g., by giving	
36	a range or by using phases such as "our best estimate is").	
37	6. The patient decision aid (or associated documentation) provides	Yes
38	information about the funding source used for development.	
39	7 The patient decision aid describes what the test is designed to measure	N/A
40	8. If the test detects the condition or problem, the patient decision aid	
41	describes the next stone trained by taken	1N/PA
42	O The net int had in a it has the next stars if the and it is a list of the second stars in the second stars if the second stars is the second stars in the second sta	
43 44	9. The patient decision and describes the next steps if the condition of	N/A
45	problem is not detected.	
46	10. The patient decision aid has information about the consequences of	N/A
47	detecting the condition or disease that would never have caused	
48	problems if screening had not been done (lead time bias).	
49	Quality criteria	Answer
50	1. The patient decision aid describes the natural course of the health	Yes
51	condition or problem, if no action is taken (when appropriate).	
52	2 The patient decision aid makes it possible to compare the positive and	Ves
53	2. The patient decision and makes it possible to compare the positive and negative features of the available options	105
54	2 The notions decision aid provides information shout outcome probabilities	Vac
55	5. The patient decision are provides information about outcome probabilities	105
56 57	associated with the options (i.e., the likely consequences of decisions).	
57 58	4. The patient decision and specifies the defined group (reference class) of	Yes
59	patients for whom the outcome probabilities apply.	

3 4	5. The patient decision aid specifies the event rates for the outcome	Yes
5	probabilities	
6	6. The patient decision aid allows the user to compare outcome probabilities	Yes
7	across options using the same time period (when feasible).	
8	7. The patient decision aid allows the user to compare outcome probabilities	Yes
9	across options using the same denominator (when feasible).	
10	8. The patient decision aid provides more than 1 way of viewing the	Yes
11	probabilities (e.g., words, numbers, and diagrams).	
12	9. The patient decision aid asks patients to think about which positive and	Yes
13	negative features of the options matter most to them (implicitly or	
15	explicitly)	
16	10. The patient decision aid provides a step-by step way to make a decision	Ves
17	10. The patient decision aid includes tools like workshoets on lists of	Vac
18	11. The patient decision and includes tools like worksheets of lists of	res
19	questions to use when discussing options with a practitioner.	
20	12. The development process included a needs assessment with clients or	Yes
21	patients.	
22	13. The development process included a needs assessment with health	Yes
23	professionals.	
24	14. The development process included review by clients/patients not	Yes
25	involved in producing the decision support intervention.	
20	15. The development process included review by professionals not involved	Yes
27	in producing the decision support intervention.	
29	16 The patient decision aid was field tested with patients who were facing	Ves
30	the decision	103
31	17. The notions decision aid was field tested with prestitioners who seemaal	Vac
32	17. The patient decision and was held tested with practitioners who counsel	res
33	patients who face the decision.	X 7
34	18. The patient decision aid (or associated documentation) describes how	Yes
35	research evidence was selected or synthesized.	
36	19. The patient decision aid (or associated documentation) describes the	Yes
3/	quality of the research evidence used.	
30	20. The patient decision aid includes authors'/developers' credentials or	Yes
40	_qualifications.	
41	21. The patient decision aid (or associated documentation) reports	No
42	readability levels (using 1 or more of the available scales).	
43	22. There is evidence that the patient decision aid improves the match	No*
44	between the preferences of the informed patient and the option that is	
45	chosen	
46	23 There is evidence that the national decision aid helps nationals improve	No*
47	their knowledge shout entions' features	INU
48	24. The notice the initial state in formation about the above of	NT/A
49	24. The patient decision and includes information about the chances of	IN/A
50	having a true-positive test result.	
52	25. The patient decision aid includes information about the chances of	N/A
53	having a true-negative test result.	_
54	26. The patient decision aid includes information about the chances of	N/A
55	having a false-positive test result.	
56	27. The patient decision aid includes information about the chances of	N/A
57	having a false-negative test result.	
58	28. The patient decision aid describes the chances the disease is detected	N/A
59	with and without the use of the test	
60	mini and without the use of the test.	

N/A: not applicable. *we are in the process of evaluating the decision aid in a randomised controlled trial.

for oper texies only

Supplementary File 11. User-	Centered Design 11-item measure (UCD-11)	
Items	Explanations and examples	Yes/No
1. Were potential end users	Such steps could include various forms of user	Yes
(eg, patients, caregivers,	research, including formal or informal needs	
family and friends,	assessment, focus groups, surveys, contextual	
surrogates) involved in any	inquiry, ethnographic observation of existing	
steps to help understand	practices, literature review in which users were	
users (eg, who they are, in	involved in appraising and interpreting existing	
what context might they use	literature, development of user groups,	
the tool) and their needs?	personas, user profiles, tasks, or scenarios, or	
<u> </u>	other activities	
2. Were potential end users	Such steps could include storyboarding,	Yes
involved in any steps of	reviewing the draft design or content before	
designing, developing,	starting to develop the tool, and designing,	
and/or refining a prototype?	developing, or retining a prototype	
3. Were potential end users	Such steps could include feasibility testing,	Yes
involved in any steps	usability testing with iterative prototypes, pilot	
intended to evaluate	testing, a randomized controlled trial of a final	
prototypes or a final version	version of the tool, or other activities	
of the tool?		
4. Were potential end users	For example, they might be asked to voice	Yes
asked their opinions of the	their opinions in a focus group, interview,	
tool in any way?	survey, or through other methods	
5. Were potential end users	For example, they might be observed in a	Yes
observed using the tool in	think-aloud study, cognitive interviews,	
any way?	through passive observation, logfiles, or other methods	
6. Did the development	The definition of a cycle is that the team	Yes
process have 3 or more	developed something and showed it to at least	
iterative cycles?	one person outside the team before making	
-	changes; each new cycle leads to a version of	
	the tool that has been revised in some small or	
	large way	
7. Were changes between	For example, the team might have explicitly	No
iterative cycles explicitly	reported them in a peer-reviewed paper or in a	
reported in any way?	technical report. In the case of rapid	
	prototyping, such reporting could be, for	
	example, a list of design decisions made and	
	the rationale for the decisions	
8. Were health professionals	Health professionals could be any relevant	Yes
asked their opinion of the	professionals, including physicians, nurses,	
tool at any point?	allied health providers, etc. These professionals	
	are not members of the research team. They	
	provide care to people who are likely users of	
	the tool. Asking for their opinion means simply	
	asking for feedback, in contrast to, for	
	example, observing their interaction with the	
	tool or assessing the impact of the tool on	
	health professionals' behavior	

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9. Were health professionals consulted before the first prototype was developed?	Consulting before the first prototype means consulting prior to developing anything. This may include a variety of consultation methods	Yes
10. Were health professionals consulted between initial and final prototypes?	Consulting between initial and final prototypes means some initial design of the tool was already created when consulting with health professionals	Yes
11. Was an expert panel involved?	An expert panel is typically an advisory panel composed of experts in areas relevant to the tool if such experts are not already present on the research team (eg, plain language experts, accessibility experts, designers, engineers, industrial designers, digital security experts, etc). These experts may be health professionals but not health professionals who would provide direct care to end users	Yes

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Supplementary File 12. The	emes, sub-themes and example quotes for each section of the deci	ision aid.
Themes	Sub-themes	Example quotes (abbreviation for type of health professional comes first, where applicable)
WHO SHOULD READ T	THIS DECISION AID?	ugust 2
	Health professionals	02
	Causes of shoulder pain and graphics were appropriate [PT/OS/OP]	OP, Female 49-49 yrs old – "I think the description really quite good and that's the sort of language that would usually use to describe what's happening as well."
Positive feedback	Patients	
	Clear explanation of the target population	Female 40-49 yrs old – "I like the way it breaks dow the different types of shoulder pain within the broad subsection of subacromial shoulder pain "
	Helpful graphic of shoulder joint anatomy image	Male 30-39 yes old – "I can understand it clearly, it helps having the picture there to be able to visualise it."
	Health professionals	S S S S S S S S S S S S S S S S S S S
	Make the information more specific to a diagnosis [OS/PT]	OS, Male 40-99 yrs old – "We haven't even reached the stage where a diagnosis is madeshoulder pain not a diagnos."
Improve clarity on the target population	Differentiate between degeneration and traumatic rotator cuff tears [OS/OP]	OS, Male 40-99 yrs old – "Sometimes someone ma develop inflammationfrom an acute pinching of t bursa or the tendon. Or someone can have a trauma event and actually tear their rotator cuff and it may resemble an impingement problem or they may be older patients and have chronic impingement pain, developing degenerative changes in the tendons in t region."
	Make the section more concise [GP]	GP, Female 39-39 yrs old – "There's a lot to look a and sometimes that can be overwhelming for some
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		patients, I think they'll receive it but then maybe put it
		aside."
	Provide more detail on alternative diagnoses for shoulder pain	OS. Male $50-39$ vrs old – "You certainly have covered
	[PT/OP/OS]	some of the key things it can cause shoulder pain but
		the other thin that's missing is that shoulder pain may
		come from elewhere, for example cervicogenic pain "
	Detionto	
	Make it clear the decision and is for people with subacromial	Male 30-39 ys old – "Rotator cuff tears or
	impingement syndrome (e.g. include the diagnosis in the title)	impingement or bursitis should be the title, because
		that's really the patient demographic that you're
		looking atJust 'shoulder pain' in general is a little bit
		vague at this point."
	Simplify 'subacromial shoulder pain' (e.g. 'shoulder pain')	Male 20-29 yes old – "How necessary is it that you
		have subacromial in there? My first reaction was
		"oh wow, these are words that I don't understand,
		maybe this is 't for me.""
	Soften the exclusion criteria to avoid people with overlapping	Female 40-4 Evrs old – "One of the problems that I
	symptoms disregarding the decision aid	had is that frozen shoulder is not a very clear diagnosis
		and there could be overlap with subacromial shoulder
		pain. It [decision aid] might be still relevant to some
		pani. It [decision and] might be sum relevant to some
		shoulder."
	Re-word or re-format this information	Female 40-49 yrs old – "'Do not read this form' is
		very clear but possibly being in red sounds quite
		alarmist " N
	Health professionals	
	Emphasise that patients should discuss the decision aid with a	OS, Female 50-59 yrs old – "The more information a
Hignlight that patients	health professional [OS/PT/GP]	patient has the better, I would love it if a patient came
need to discuss this	1 L J	with something like this and said what do you reckon
decision aid with a health		and then we could talk about their individual issue."
professional	Title needs to be revised [PT]	PT Male $40-\frac{2}{8}9$ vrs old – "When you say at the top
		'Shoulder name should I have arthroscopic surgery?'
		oy rig
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	For peer review only - http://bmjopen.bmj.com/site/about/gui	ueimes.xnumi

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		Why is that e^{\bigotimes}_{e} a question? Why can't it	be
		'Shoulder pain, should I have a profession	nal
		consultation? $\overset{1}{\sim}$	
	Health professionals		
	Information has a pathoanatomical focus that is inaccurate	CP, Male $20-\frac{2}{2}9$ yrs old – "It does make it	sound very
	[PT/OS/CP]	pathoanatomisal which it can definitely be	e in a lot of
		cases but in that first description it almost	seems like
		it's a couple of options that it could be, eit	ther rotator
		cuff tear or borsitis and there's definitely s	some other
		things to constder there."	
	Information could drive patients towards surgery [CP/PT/OS]	PT, Male 20-39 yrs old – "So this first pag	ge if I were t
		be a patient looking at this I'd be like ok v	vell this is
		clearly pointing me towards having surger	ry."
	Clarify that shoulder pain can be caused by overuse and work	GP, Female 🗿 - 39 yrs old – "I find that me	ost of the
	(e.g. heavy lifting) [GP/PT]	patients that see that have it tend to be a	middle aged
Poviso the course and		group having used a lot of overhead repeti	itive
symptoms of shoulder		activities."	
noin	Re-format or re-word this information [PT/OS]	OS, Male $60\frac{1}{6}9$ yrs old – "I know it's a la	y term, the
pam		'inflamed tendons' but 'degenerative rotat	tor cuff tears
		is often what we're dealing with."	
	Patients	0ece	
	Describe what causes the structural issues associated with	Female 60-69 yrs old – "I suppose when s	omebody
	shoulder pain (e.g. explain why a tendon tears or a bursa gets	gets a sore shoulder you want to know, wh	nether it's a
	inflamed)	swollen bursa, whether it's a tear, what's a	actually
		causing it?"	
	Provide more information about potential aggravating	Male 20-29 yes old – "Or even just 'your l	hands above
	activates (e.g. lifting overhead)	your head' or something like that."	
	Avoid jargon	Male 20-29 yas old – "Non-medical folks	are the
		people who haven't been seeing a doctor of	or
		You lubing of Googling shoulder pain, are	e not going
Uso positivo mossoging	Health professionals		
Use positive messaging		<u> </u>	
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		righ	
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		Language will cause fear among patients [CP/PT]	CP, Male 20-29 yrs old – "There's a lot of very scary language in here too which is very nocebic; inflamed tendons, impligement, tears, swelling, fluid filled. Which for someonesee those things and think
		Include positive messaging about prognosis and what pain	there really very well might not be." CP. Male $20-\overline{2}9$ vrs old – "Having a line like that in
_		means (e.g. pain doesn't equal damage, pain may get better with time, imaging findings are common in people without symptoms) [CP/PT/OP]	there that most people with shoulder pain get better on their own with time - stay positive."
		Health professionals Too much information [PT/CP/OS]	CP, Male 20-29 yrs old – "For the sake of just having a printout to give to somebody definitely the more visual and less wordy is probably good. I'm just thinking of it from a patient perspective where they want simplicity with direct answers."
	Make this section more concise and relevant	Explanation of shoulder symptoms might be irrelevant for patients [GP/OS/PT]	PT, Female 39-39 yrs old – "I'm just wondering if the line of 'shoulder pain often makes it difficult to do simple everyday tasks' really needs to be there, these people will $k = 0$ w that."
		Graphic of pain distribution might be more useful than a graphic of the shoulder anatomy [OS/PT]	OS, Male 40-49 yrs old – "I think a surface-based picture showing a highlighted area of pain going down the lateral part of their arm may be more useful than an anatomical pieture."
		Remove the word 'arthroscopic' from decision aid [OS]	OS, Male 40-39 yrs old – "There's still debate on what's the best surgery for certain things, like open or arthroscopic.
,	WHAT ARE THE TREA	TMENT OPTIONS COVERED IN THIS DECISION AID?	uest. Pro
_	Positive feedback	Health professionals	atea
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	Graphic of surgery, details about surgery, non-surgical options are appropriate [PT/CP/OS]	PT, Male 40-49 yrs old – "The thing is with arthroscopic repair you'd never do it justice with any type of picture anyway, so any general picture there would be fine It doesn't scare me away, it looks gentle, plus I we been in the OR anyway."	ıy
	Important that rehabilitation following surgery is highlighted [PT/OP/OS]	OP, Female 49-49 yrs old – "To talk about rehabilitation] think it is really responsible and important."	
	Patients	nlos	
	Order of options, description of options, formatting of information on surgery, including 'wait and see' as an option are appropriate	Male 20-29 yes old – "I do think those non-surgical options are important, that first one 'wait to see if yo pain goes away'. I read that and go yeah, every sing time my pain has eventually gone away."	our gle
	Important to emphasise the downsides of surgery (e.g. long rehabilitation, anaesthetic)	Male 20-29 yes old – "That's definitely also pretty clear. I think the 3 to 12 months rehabilitation brack that would kind of freak me out a bit to see that upper band there."	cet,)er
	Graphic of surgery was helpful to understand it is an invasive procedure	Male 30-39 yes old – "I think that does a good job or showing what they're planning on doing and that it' not something simple."	of 's
	Health professionals	ec	
Include more detail on non-surgical options and how to progress	Balance the amount of information between non-surgical and surgical options [CP/PT/OS/GP/OP]	PT, Female 39-39 yrs old – "I would look at those two options and get there's all this information about surgery and under no surgery there's just a few word surgery must get the more involved better option for because it looks bigger."	wo ds, me
management	More detail needed on rehabilitation after surgery [PT]	PT, Male 40 $\frac{3}{49}$ yrs old – "It may be the same commitment for greater than conservative rehab, so y just have to be aware that it's not just fixednow y have to follow this rehabilitation protocol."	you ′ou
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	Need a flowchart of non-surgical options [PT]	PT, Female 39-39 yrs old – "Yeah maybe even a flow chart of some kindIs it a new event? Yes. Was it a full rupture? Yes. so you have surgery "
	Highlight how long patients should try different non-surgical options before surgery [GP/PT]	GP, Male 50 29 yrs old – "If they are younger, I won't let them wait for six months, if they're not better within 4 to 6 weeks I'm probably sending them off to a surgeon if they have a torn tendon."
	More detail is needed on muscle strengthening programs [PT]	PT, Male 20-29 yrs old – "Maybe a greater emphasis on what the carrent evidence showsthat strengthening can make a difference and even time with doing the right things could improve it."
	Include evidence for non-surgical options [PT/OS]	OS, Female 59-59 yrs old – "I think it's important for them to know that if they wait long enough it will probably settle on its own, and we know the studies support that."
	Emphasise the need for shared decision making [CP]	CP, Male 20-29 yrs old – "It's always going to be a shared decision making process, it's always going to take into account the patients values and what their lifestyle is like, how much this is impairing them."
	Patients	
	Provide more non-surgical options	Female 50-5% yrs old – "There's not a lot of optionsI think it's telling me in my particular case that it's inevitable that I would have to have surgery eventually." \vec{N}
	Provide evidence for various non-surgical options (e.g. options listed in the decision aid, lifestyle change, TENS, ultrasound, hydrotherapy, massage, diet, acupuncture, Chinese herbs)	Female 60-6 Syrs old – "This has taught me a lot about surgery, whether to get surgery or not, but it hasn't told me a lot about whether cortisone injections are better than not having cortisone injections or whether physio is better than having no physio. "
	Provide more information on activity restrictions and how to modify activities while in pain	Female 60-6% yrs old – "I would like to know if I need to do anything or if it's just going to take time regardless of what you doOr whether you should
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<u>-</u>			2021-05403
5 4 5			and things like that even though it's a little bit painful."
; ; ;		Highlight whether delaying surgery or non-surgical treatment is harmful or not	Female 60-6 Eyrs old – "I'd read a lot about that, where they said if you wait too long its irreparable sort of thing, Dr Google again."
0 1 2 3		Provide more information on 'wait and see' (e.g. highlight that you can trial non-surgical options while you 'wait and see') Present information in a way that helps patients understand	Male 30-39 yrs old – "I think 6 months is a long time to wait and deal with an issue without seeking advice." Male 30-39 yrs old – "Is there a recommendation from
14 15		the importance of non-surgical options	the health board or something where it says 'non- surgical option is recommended?"
16 17 18 19 20 21		Health professionals Inappropriate to mention medication and injections as options [PT/CP]	PT, Male 40-69 yrs old – "Personally I balk at the steroid injection option because the evidence for that is so poor. There's reasonably strong emerging evidence that its adverse effects are pretty high."
22 23 24 25		Re-format or re-word information on non-surgical options [OS/PT]	PT, Female 39-39 yrs old – "Rather than saying 'see a doctor for a corticosteroid injection' I would say 'discuss the options of a corticosteroid injection with the doctor."
26 27 28 29 30	Change the non-surgical options presented	Label 'no surgery' as something more positive (e.g. conservative, exercise-based) [PT]	PT, Male 40-89 yrs old – "I wouldn't call it 'no surgery', I would call it either 'conservative', 'exercise' "physio exercise therapy', 'strengthening therapy'"
31 32 33 34 35 36		Do not mention specific exercises in the decision aid [GP]	GP, Female 39-39 yrs old – "Generally [patients] won't do [exercise] if they didn't pay money [to see a physiotherapiet], if they didn't invest time into it they're not going to take on board the advice as much."
37 38 39		Mention the benefits of ultrasound for diagnosis and guiding injections [GP]	GP, Female & -69 yrs old – "The other thing would be usefulness of altrasound for the diagnosisespecially if you do ultrasound guided steroid injections."
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1 2 3			
4 5 6		[PT/OP]	months, which is really the implication of that first one, would be a long time for people in pain."
7 8 9		Order of non-surgical options might be inappropriate [CP/PT]	CP, Male 20 29 yrs old – "The order of the bullet points, I mean hopefully they're not in any sort of order of priority, to go straight to anti-inflammatories,
11 -		Health professionals	I'm biased towards non-pharmacological first."
12		Include indications for each surgery (a.g. failed concernative	GP. Formula 20 yrs ald "Mayba in the desigion
13		menagement source pain and rotation sufficient immingement	malying tool in the decision
14 15		elite sports participation, massive cuff tears) [GP/OS/CP/PT]	you'd then become a surgical candidate."
16		Highlight that imaging findings in isolation aren't indications	OS, Female 5 -59 yrs old – "It's not relevant to me
17		for surgery [PT/OS]	what the imaging says, it's relevant what the patient's
18			symptoms and signs are."
19		Important for patients to know which procedure they are most	OS, Male $40\frac{3}{4}9$ yrs old – "That's what I say to a lot of
20		likely to receive as this could influence recovery and	my patients, by by by it's very much dependent on
22		rehabilitation needs [OS]	the diagnosis and the anatomy of what's going on."
23		Re-format or re-word indications for surgery [PT]	PT. Male 30-39 vrs old – "I guess putting option one
24	Include indications for		and two there kind of implies that they have to have
25	surgerv		surgery afterwards."
26	~~~g~-y	Highlight that surgery may improve symptoms or anatomy but	OS Female $59-59$ vrs old – "I say to them their rotator
27		not address the cause [PT/OS]	cuff has got a headache the surgery can take the
28		not address the eduse [1 1/08]	hammer awa \mathfrak{P} but you will still have the headache and
30			that headaches will take time to improve Unless you do
31			the anti inflammatories and the rehabilitation therapy
32			thet hand a have a super over if you have
33			unat neadache won't go away even n'you nave
34		Detionta	Surgery.
35		Presidences leteiler the indications for some one (a.e.	Male 20 20 size al.1. Ill serve also also statis that first
36		Provide more detail on the indications for surgery (e.g.	Male $20-29$ yrs old -1 wonder about in that first
3/		worsening pain)	underlined sentenceIf the above options don't work,
39 -			if you can't live with the pain, or something like the
40			Бу
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42			vrig
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		above options are not feasible, you can't rest becaus
	Health professionals	
	Make the uncertainty of options clear [PT/OS]	OS. Female 59 -59 vrs old – "By 6 months 75% are
		much better than they were before surgery. But woul
		they have been there without surgery as well? Don't
		know I think it's a hard question and we all think as
		surgeons that our surgery does wonderful things that
		one of the downsides of talking to surgeons we'll say
Present evidence of		we're fantastic and everything works really well "
benefits or harms in this	Mention the success rate of surgery and non-surgical options	OS Male 60-49 vrs old – "When I'm talking about t
section	[GP/PT/OS]	things that will help them and then get onto surgery
		but also talk them about things a lot of people spe
		a lot of money on, there's no evidence that they wor
		as well."
	Emphasise the harms of surgery [PT/CP/GP]	CP. Male 20- $\frac{29}{29}$ vrs old – "A 1% chance of you
	Emphanist and marine of sangery [1 1, 01, 01]	notentially dying from the surgery when it's no bette
		than anythingelse that's a big risk but it doesn't sour
		like a lot."
	Health professionals	
	Provide more detail on rehabilitation (e.g. time frames, will	GP , Female 39 -39 yrs old – "Surgery by itself is
	determine success, can be performed at home) [PT/OS/GP]	useless, if your regoing to go through surgery expect
		lot of rehab and if you can't commit to the rehab
		you're better off not going through surgery."
Change Information on	Include more details about the procedures [PT/OP/OS]	PT, Male 40-99 yrs old – "You could even explain a
surgery		little more about the surgery, I think it's even ok to s
		a little more.
	Re-format or re-word information on surgery [PT/OS]	OS, Male 40뵭9 yrs old – "I think again there's too
		much writing having lines like 'pain you can't deal
		with' is pushing the patientagain it's too wordy, so
		you would just say 'surgery is an option.'"
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2 3 4		Include details on recovery, comparing surgery to non- surgical options [PT/CP/OS]	PT, Male 20-29 yrs old – "One example recently I had a shoulder patient and they got surgery and regretted it.
5 6 7			They were saying they didn't know how much they would go backwards and how long it would take and the restriction?
8 9		Patients	
10		Provide less information on surgery	Male 20-29 vis old – "The two different procedures I
11 12 13		Trovide less information on surgery	haven't been to a doctor or physio about this, these are big words. Age I one? Am I the other? I don't really
14			know. Do I care? Is it important?"
15 16 17		Provide more information on surgery and rehabilitation	Female 40-49 yrs old – "Perhaps an explanation of what rehabilitation means, I'm not sure I would really know what that means "
18 -		Health professionals	
19 20		Modify the presentation of the two surgical options [GP]	GP, Female 39-39 yrs old – "I wonder in the surgery
21 22			part, the box that has subacromial decompression and rotator cuff repair, if it would be easier to just have it
23 24 25			listed as two got points instead of two separate
26 27		List non-surgical options first [PT/CP/OS]	OS, Male 40-49 yrs old – "Usually when we're talking about treatmentwe're mentioning no surgery first. I
28 29 30	Modify the formatting or graphics		think therefore that should be put first instead of having surgery first because it doesn't make sense to talk about surgery first when I'm seeing a patient "
31		Patients	N
32 33 34		Improve the graphics (e.g. current image makes it appear surgery is less invasive than it is, current image of surgery too	Female 50-5 Byrs old – "You might want to fine tune that one pictureis there another one you can put
35 36		graphic, remove clock image, put image of person doing exercise on the left so it stands out more)	that's not so karsh?"
37 38 39		Improve the formatting of surgical options (e.g. list procedures side by side, highlight procedures in a different colour, put a clear dividing line or increase space between the	Male 20-29 y_{RS}^2 sold – "Potentially on the first page you could have subacromial on the left and rotator cuff on the right to have continuity in that sense."
40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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	procedures, list surgical options before non-surgical options due to previous positive experience with surgery, replace '12 weeks' rehabilitation with '3 months' rehabilitation)	54032 on 30 A	
	Re-word or re-format this section	Female 40-4 underlining pro- stop."	yrs old – "Again a small thing, the obably needs to finish next to the full
WHAT ARE THE LIKEI	Y BENEFITS OF SURGERY COMPARED TO NON-SURG	GICAL OPTIO	NS?
	Health professionals	load	
Positive feedback	Icon array, statistics, footnotes and colour scheme are clear and appropriate [PT/CP/GP/OP]	OP, Female 4 really quite gg would usually well."	-49 yrs old – " I think the description is od and that's the sort of language that I use to describe what's happening as
	Patients	ma	
	Key messages box, bar graphs, icon array, description for certainty of evidence, explanation of placebo and formatting is appropriate	Female 60-69 when I read the	yrs old – "I think the layout is good, is it seemed simpler too."
	Health professionals	con	
	Remove the description of the certainty of evidence [PT/OS]	OS, Male 40-g patients how g hard thing to g	9 yrs old – "So we're trying to teach b interpret correct evidence and that is a o."
Revise description for the certainty of evidence	Using green font for high-certainty evidence will drive patients towards surgery [PT/CP]	CP, Male 20-2 interpret the hi but when you decompression	9 yrs old – "Some people might gh certainty evidence as a better thing, actually read it, subacromial is little to no better than placebo."
	Describe certainty of evidence as 'strong' instead of 'high- certainty' [PT]	PT, Male 40-4 and figure out evidence, some that's one work confusing."	9 yrs old – "I would drop the certainty another adjective or just 'strong' ething like that, maybe a stronger word d or two words. Low moderate is
	Health professionals		
		by copyrigh	

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1 2 3 4 5		Evidence doesn't match experience (e.g. careful patient selection will yield better outcomes) [OS/GP]	GP, Male 50-99 yrs old – "If you select the patient well enough often the result is not as bad as 3 percent, probably significantly higher."
6 7 8 9 10 11		Evidence from Cochrane reviews may not be generalizable to patients [OS]	OS, Male 40 9 yrs old – "We don't really want to generalise the patient's condition because some patients may have pain that's caused by a specific problem that doesn't fit in with what these studies were looking at."
12 13 14 15 16 17 18 19		Highlight that surgery may increase the speed of recovery or yield better long-term outcomes [OS]	OS, Female 59-59 yrs old – "I agree that at 12 months you're probably the same as if you didn't have surgery, but what's the patient journey in that 12 months between the two groups? That doesn't come out in this. So if the surgical group are sleeping and are back at work and are comfortable sooner then that's relevant."
20 21 22 23 24	Evidence doesn't match experience, more clarification needed	Acknowledge that statistics represent averages and individual results may vary [GP/OP]	OP, Female 49-49 yrs old – "[Suggested to write] 'Some patients report a better result than these statistics would show but plenty don't'or something like that."
25 26 27 28 29		Add outcomes or provide further explanation for existing outcomes (e.g. include quality of life, define treatment success, emphasise pain results) [GP/PT/OP]	PT, Female 39-39 yrs old – "They fix what's inside and they might get range, but their pain is still ongoing and that was the reason they wanted the surgery in the first place." $\frac{1}{2}$
30 31 32 33 34 35 36 37		Mention the population and time points of the evidence [PT/CP/OS]	PT, Male 30-59 yrs old – "I know a lot of people would, especially in layman's terms, read this and say "well that doesn't apply to me, I could heal better than that or it wouldn't affect me." It might be nice to put the patient population in these two studies just so people can say oh cool, it was mostly older people or mostly younger people. "
38 39 40 -		Appears negative towards surgery but agrees the statistics are supported by evidence [PT/OS]	OS, Female 5 -59 yrs old – "If they're cut and paste from a Cochrene review then that's the best evidence
41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

1		BMJ Open	njopen-2021-0	Page 74 o
2 3 4 5			that we've gopso we	can't dispute it, I just don't like
6 7 8 9 10 11		Highlight that surgery may be useful for preventing tears progressing even if there was no improvement in symptoms [OS]	OS, Male 40 a 9 yrs o tendon tear has becor tendon tear, so the ac has extended to invol don't think that's cov	III - "In that group, a single ne a one and a half to a two ute component which is just a tear ve the next adjacent tendons. I ered well by any study."
12 13 14 15 16		Emphasise the uncertainty of the statistics [OS]	OS, Male 50-₹9 yrs c confident' is an overs many unknovensthe better studies?	Id – "I think using 'somewhat stretchthe literature presents at's why there's a strong need for
17 18 19 20 21 22		Health professionals Avoid numeric estimates (e.g. 3% could be framed as 'small') [PT]	PT, Female 39-39 yrs numbers and oust hav pain and better function something."	s old – "I'd even take out the e "on average surgery has less on but not by much" or
23 24 25		Replace bar graphs with a 'key messages' box [PT/CP]	CP, Male 20-29 yrs o think that's probably the bar graphs themse	ld – "I do like those boxes, I even a little bit more helpful than elves."
26 27 28 29 30 31	Simplify the statistics	Choose one way to summarise the data (e.g. bar graph or key messages box but not both) [PT/OS]	PT, Male 40-89 yrs o might lose somebody together and graphs, a busy section, and th information on both s	Id – "I think as a patient you a lot of numbers and words that's a lot, it's a busy slide or it's ley're both together so it's a lot of dides."
32 33 34 35 36		Repetition of evidence is biased against surgery [OS]	OS, Female 59-59 yr the chart or the box o is just repetition sayin have surgery ", "don't	s old – "I think you need either r one of them, but all three to me ng "don't have surgery", "don't t have surgery.""
37 38		Statistics might be hard for patients to understand [PT/GP/OS]	GP, Female 39-39 yr that it's a yestor no at	s old – "I think they would expect nswer, we know it or we don't."
 39 40 41 42 43 44 45 46 		For peer review only - http://bmjopen.bmj.com/site/about/gui	d by copyright. delines.xhtml	

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1 2 3 4 5		Difference between surgeries might be hard for patients to understand [PT/CP]	PT, Male 20-29 yrs old – "Again it's like do they really know the difference between rotator cuff repair, subacromial decompression?"
6 7 8 9 10 11 12 13 14		Include the same comparison group when describing the evidence for both surgeries (e.g. remove placebo comparison) [PT/CP/OS]	CP, Male 20-29 yrs old – "I don't think people really understand the concept of placebo surgeries, that seems super veird to some people when I've told them about thatmaybe just [say] "subacromial decompression doesn't seem to be better than some of the other options in terms of changes in pain and function.""
15 16 17 18 19 20 21		Re-word the certainty of evidence statement [PT]	PT, Male 30-39 yrs old – "I'm wondering if there's a different way to phrase that, we are very certain, that almost seems like it's an ad on a TV or something. I think that maybe "we are confident in these results as these were high quality studies" or something like that."
22 23 24		Patients Provide information on the source of the evidence	Female 50-59 yrs old – "Then you get this percentage, I don't know bow you got this percentage "
25 26 27 28		Provide more explanation about the certainty of evidence	Female 60-69 yrs old – "When you say this research on surgery is high quality, I wouldn't know what low quality is."
29 30 31 32 33 34	Provide more detail or revise the description of the evidence	Including both the 'key messages' box and icon array is confusing	Interviewer — "What about the percentage of people reporting treatment success in the four with the green and grey people?" [icon array for benefits that was removed]
36 37 38 39 40 -		Adding the age range of research participants is not necessary unless being outside this range would influence the benefits of surgery	different set of research?" Male 20-29 yes old – "I'm 20. I'm not sure if there would be anything different on younger people. Even
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		the ages of the participation changes it."	nts, I'm not sure if that really
	Provide more detail on the non-surgical comparison groups	Female 40-49 yrs old – decompression surgery alternatives to surgery, v repair you've given alter injections, physiotherap	"I guess under subacromial you haven't given any whereas under the rotator cuff rnatives to surgery, so the y etc. Would those alternatives
	Clarify whether the evidence applies to those with severe pain	Apply to both ap	know it's very difficult to do, ble about scales of pain and o whether you should be going ery therapies."
	Patients		1)
	Clarify that numeric estimates are averages and that some people will experience better or worse outcomes	Male 30-39 yes old – "I I need to know what the can then speak to my GI find out if my particular	think that's important because average outcome is and then I P or surgeon or someone to case is likely to be better than
Contextualise the evidence to reflect uncertainty on an individual level	Emphasise that surgery may help but it will not be a cure	Male 40-49 yrs old – "It guess that would probab about success?"	will help but it's not perfect. I bly be more relevant than stats
	Statistics shouldn't influence treatment decisions as they are averages and patients should trust their health professional's advice	Male 40-49 yes old – "T for me at all. The stats a selection of the populati doesn't necessarily apply it was determined by a h professional that I neede stats would not be a con	he stats would not come into it re obviously for a large on, that's an average, it y to my specific situation. So if health professional or medical ed surgery I'd just take it, the sideration whatsoever."
Modify the formatting or language used	Health professionals		
	Mention the findings before the certainty of evidence [CP]	CP, Male 20-29 yrs old 'subacromial decompres	– "So starting off with ssion is little to no better than
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		placebo' and then following it up with there's high				
		certainty evidence for this."				
	Shorten the 'key messages' box and include other information	GP, Female 30-39 vrs old – "I like the version two				
	as footnotes [GP]	where it's a staller box there and it's cut out some of				
		the text and put it below as well."				
	Make the bar graphs vertical [PT/CP]	CP, Male 20-29 yrs old – "I think that would make				
		sense to a lot $\vec{\Theta}$ people. Maybe even just going in a				
		vertical sense might also help some folks but I don't				
		think there's $\vec{\mathbf{p}}$ o much trouble with that."				
	Modify the colour scheme and presentation [PT]	PT, Female 48-49 yrs old – "I was just wondering if				
		you could change the colour of different procedures so				
		that they can gee more difference."				
	Reduce the amount of text [PT/OS]	OS) Male $40\frac{3}{2}9$ yrs old – "I think the second page, the				
		likely benefite, is just a bit wordy. I think a patient will				
		get to that ang just think, ugh, they will probably just				
		be captured by the green men [icon array which was				
		later remove				
	Patients	Patients				
	Shorten 'key messages' box and include other information as	Male 30-39 yrs old – "I think having a smaller box and				
	footnotes	just having those couple of pointsmakes it quicker to				
		read to get the basic information and the important				
		information."				
	Limit footnotes as they slow the reading pace	Male 30-39 y s old – "Almost every single line you're				
		going back down and then you're going back up. It's				
		really not easis, it doesn't flow well and it's not easy to				
		read that."				
	Suggested strategies to reduce text (e.g. not repeating	Male 20-29 yas old – "A lot of text, I'm wondering if				
	information in each column, move some information to a	you could make it more infographicI mean the				
	further reading section, replace words with graphics)	boxes are good if you read it, but again I m wondering				
		ni you can make it more easily digestible from a				
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3		Icon array is not useful (e.g. confusing prefers har graph icon	Male 30-39 was old - "I'd prob	ably just neg all this and	
4		array takes focus off key messages)	go straight to a bar thingcon	idense it all down, crack	
5			on, it's just too much words ar	nd too much extra stuff."	
0 7		Address inconsistency between headings, figures and text	Male 20-29 ves old – "Are tho	se first two really	
8			benefits?" [highlighting that th	here are actually no	
9			benefits of suggery]	5	
10		Mention benefits before harms as benefits are the crux of the	Female 40-49 yrs old Williams	s – "I was just thinking	
11		decision aid	about the order starting with co	omplications and then	
12			going to benetits, you normall	y would see it the other	
14			way around."		
15		Numeric estimates, surgical options and footnotes are	Male 60-69 yes old – "Subacro	omial decompression	
16		confusing	surgery, what does that mean?	"	
17			ttp:/		
18	WHAT ARE THE LIKE	LY HARMS OF SURGERY?	/bm		
20		Health professionals			
21		Presentation of harms is appropriate [PT/OS/OP]	PT, Male 30-39 yrs old – "Aga	ain, they're simple,	
22			graphic and wisual, easy to rea	d and certainly makes	
25 24			you reconsider surgery, so yea	h that looks good."	
25		Patients	/ or		
26		Clear figures and text which would make patients think hard	Female 40-49 yrs old - "I thin	k the image is useful	
27	Positive feedback	before having surgery	there actually g		
28	I OSITIVE IEEUDACK	Statement about the risk of harms being higher in people with	Male 30-39 ys old – "The series	ious problem one, it's	
29 30		other health conditions is valuable	possible it might deter me, but	not that much. It would	
31			depend obviously on my perso	onal condition and my	
32			personal scenariothen I can	tell if I'm one of those	
33			average people, or if I'm bette	r or worse than the	
34			average personI think that's	nice and clear, I can get	
35			a lot of information out of that	quite quickly."	
37		Health professionals			
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1 2 3 4 5		Distinguish between surgical complications, complications specific to the procedure (e.g. frozen shoulder) and poor	OP, Female 49-49 yrs old – "Harm is different to unsuccessful outcomes so again, they have to be		
6 7 8 9 10		Mention revision surgery as a possible adverse event [OS]	OS, Male 40 9 yrs old – "So discussion about the need for re-do surgery is usually about poor healingWhat I'm talking about there is failure of repair. There are other needs to do revision surgery		
11 12 13 14 15	Present minor and serious harms	Patients	when the repair has healed well but, for example, the patient may have a recalcitrant adhesive capsulitis or frozen shoulder."		
16 17 18 19 20 21		Important to know both minor (e.g. loss of movement and strength) and serious harms	Male 30-39 yzs old – "Recovery time would be very important to be in a trade. Probably if there's other side effects as possible loss of range of motion or strength because that would severely impact my work and day to day life."		
22 23 24 25 26		Definition of minor and serious adverse event is problematic because severity is subjective	Male 30-39 yrs old – "Saying a serious problem versus a non-serious problem, I think that's very relative to the patient begause that becomes a material assessment."		
27		Health professionals	e e		
28 29 30 31 32	Provide more context for	Presenting harms in a different section to 'benefits' doesn't give an understanding of harm vs. benefit [GP]	GP, Female (2)-69 yrs old – "When you compare them [harms] to the benefits being very minimal, then the harms outweigh the benefitsthe graphics don't really show that aspect."		
33 34 35 36 37	narms	Compare the harms of surgery and non-surgical options [PT/CP]	CP, Male 20-29 yrs old – "One in one hundred people who are going through something like this, that's big. We look at rates of adverse reactions in manual therapies, your re looking at like 1 in 3 million."		
38 -		Patients	ect		
39 40 41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gu	idelines.xhtml		

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	Presenting harms in a different section to 'benefits' doesn't give an understanding of harm vs. benefit	Interviewer: If it did get to a po to consider that [surgery], what	oint where you needed t would you most want
		to know while you're weighing	g up that choice.
		Male 30-39 yrs old – Probably the chance of Success in compa	the risks involved and arison to that risk.
	Emphasise surgery involves a general anaesthetic	Female 60-69 yrs old – "Again into that anaesthetic, do I really anaesthetic for it as well?"	you've got to count y want to go under
	Health professionals	adee	
	Harms might be overestimated [OS]	OS, Male 40-49 yrs old – "I we in my practice, and having don for more than 10 years, it migh	buld say deep infection e arthroscopic surgery t be 1 in 10,000. That
	Cr r	doesn't relate to me in my prac my patients those statistics."	tice, so I wouldn't give
Evidence doesn't match experience, more clarification needed	Harms might be underestimated [PT]	PT, Female 39-39 yrs old – "M about the harms of arthroscopic at that and thinkit's not like having any problems 1 in 10 not that likely but actually 1 in	ly only other feedback is c surgery. I would look ly I'm going to be 0 makes it look like it's 100 is quite high."
	Highlight populations who are at the greatest risk of harms (e.g. diabetes, other co-morbidities) [CP]	CP, Male 20-29 yrs old – "I knowspace to add more information know or saying predisposing ri problems or for frozen shoulde conditions, if any."	ow it takes up more always, but letting ther sk factors for serious r, comorbidity
	Health professionals	23 8 8	
Modify the formatting or	Format the harms section so it is consistent with the benefits section [PT]	OS, Male 40겊9 yrs old – "Yea the same way Whatever forma	h, and present them in it you choose."
language used	Move harms to practical issues section [CP]	CP, Male 20-29 yrs old – "So g were saying, what do we use for probably really good. This [pre practical issues section] is just	yoing back to what you or visuals, tables are esenting harms in another way of showin
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	the differences, this might even be another way when
	we're compariing the harms of arthroscopic surgery
	versus conservative care that might even be another
	way to compare the two so people can see."
Include in-text citations or state 'figures are from the most up	CP, Male 20-29 yrs old – "To say that it's based on the
to date medical research' [PT/CP]	most up to date medical evidence is probably really
	important."
Replace 'harm' with a less emotive word (e.g. 'risk',	OS, Female $59-59$ yrs old – "So this one I found ever
'complication') [OS]	more emotives harm is in red and underlinedI
	wonder if there might be a different word, I know
	you're avoiding risks, you're using the word harms
	rather than risks, I don't know what other word migh
	be better. "
Re-format to emphasise the harms (e.g. place minor harms on	PT, Male 20-29 yrs old – "Maybe with this graphic
the left side of the page as they are most important, icon array	because the percentage is so small, it takes up a lot of
downplays the true risk of narms)[P1]	space to do that. I guess it can be a good graphic to
	show now if you look at this you d think I d be pretty
	that The gravitation does its ish but if you take away from
	unal. The graphic does its job but if you think there's
	only han a person getting a serious problem that s
Patients	
Change the terminology used (e.g. 'harms' too pegative	Male 40-49 ves old – "'Harms' seems dangerous. I
change 'harms' to 'risk' change 'person' to 'people' define	suppose I think risk is inferred with those kinds of
'frozen shoulder')	procedures I'm just thinking there's maybe a better
	word than harm."
Change the formatting of numeric estimates (e.g. keep the	Male 20-29 vas old – "I don't know how much the
same denominator for minor and serious adverse events, use 6	picture does $\overline{3}$ me, if you just had a big 4% there that
in 1000 rather than <1 in 100, use 4% instead of 4 in 100,	might get the same message across."
remove icon array to save space, avoid text touching the	, , , , , , , , , , , , , , , , , , ,
boxes, seek help from a graphic designer)	9Cte
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SUMMARY OF BENEFI	TS, HARMS, AND OTHER PRACTICAL ISSUES	54032 on 30	
	Health professionals	A	
	The whole section is appropriate [GP/PT/OS/OP]	PT, Female $3\frac{19}{2}$ -39 yrs old – "I like the idea of the at the end about the practical issues that they should consider."	e tab ould
	Being vague about costs is appropriate because as patients in the public system may not have any out-of-pocket costs [PT]	PT, Female 39-39 yrs old – "I feel like that's wh many people so surgically as opposed to going conservative hysiotherapy driven pathway, bec they've got to pay privately for physiotherapy a injections but they get their surgery done for fre	ny so along cause nd re at i
Positive feedback	<u> </u>	hospital and then will often go into the public sy for their rehat as well."	/ster
	Patients Content, layout, and discussion about costs and recuperation after surgery is appropriate	Male 40-49 yes old – "I'm looking at them throu different lenst his time and I think they're pretty spot on."	ugh a 7 mu
	Global summary would be helpful for people without time to read the entire decision aid	Female 70-79 yrs old – "I think that it's very go Some people who won't read through things. The neat and tidy and it takes you a minute or so to p	od. nis is read.
	Health professionals	če	
Revise information on costs	Include the cost of non-surgical options (e.g. time, effort, cost without insurance coverage) [CP]	CP, Male 20-29 yrs old – "If this is just somebo paying out of pocket because they have shoulde it might actually be more expensive for them to care from a physio or a chiro than it would be to go get a surgery because that's going to be cove through their msurance."	dy r pai seel jus red
	Be specific about costs to emphasis the true cost of surgery [PT/GP]	GP, Female 30-39 yrs old – "I think [include] th actual cost its If, which is very hard for you to p decision aid. Eknow depending on which area, y	ie out ii whic
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1 2 3 4			surgeon, it could be very different, but just giving an
5 6 7 8 9		Include costs related to time off work [OS/PT]	OS, Male 40-49 yrs old – "Out of pocket costs, correct, there's the other costs are not working, so if someone has used up their sick leave, whether it's surgery or no surgery, then they're on leave without pay so that's
10 11 12 13 14 15 16 17		Soften the language emphasising the costs of surgery [OS]	another cost to consider as well." OS, Male 50-\$9 yrs old – "When you say the out of pocket costs for surgery are generally high, I think that's a value statement. I would say they are generally higher than non-operative treatment. Some surgeons don't charge anything, there's no out of pocket paying cost for some patients."
18 19 20 21 22 23 24 25		PatientsBe more specific about costs (e.g. time off work, add "speak to your GP and insurance provider to understand exact costs", costs of non-surgical options, non-surgical options might equally expensive in some countries)Highlight that waiting times are long and costs are higher without private insurance	Male 70-79 yes old – "How much is going to cost in the hospital? Am I covered by medical benefits? How much am I covered for my medical benefits? How long am I going to be in hospital? What are the charges?" Male 30-39 yrs old – "What I want to do and other factors, financial factors as well and how long I have
26 27 <u></u>		Health professionals	to wait for this sort of stuff, all these things."
20 29 30 31 H 32 a 33	Revise information on ctivity restrictions and post-surgical	Revise timeframes for post-surgical activity restrictions [OS/PT]	OS, Male 50-59 yrs old – "Practical issues after decompression, I would suggest avoiding heavy lifting usually for sign for twice that long, that's a bit short. They may elegate above their head at 1-3 weeks but we would not let them heavy lift for 6-8 weeks."
34 35 36 37 38	management	Include timeframes for returning to normal function (e.g. sports, activities of daily living, pre-injury function) but also acknowledge the possibility patients won't return to normal [PT/CP]	PT, Male 30-99 yrs old – "I guess that's what people want to know will I be able to play, pick up ball again."
 39 40 41 42 43 44 45 46 		For peer review only - http://bmjopen.bmj.com/site/about/gu	idelines.xhtml

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	Highlight that symptoms may improve, with or without surgery [GP]	GP, Female 39-39 yrs old – "No recuperation time frame, it makes it sound like with surgery you will just always have symptoms whereas without surgery you won't have symptoms. I understand that is correct, I'm trying to say, symptoms may come and go until rehabilitation is completed? I don't know how to word that."
	Mention that people who do not have surgery will still have their usual symptoms and their improvement will depend on the success of the non-surgical options they try [OS]	OS, Female 59-59 yrs old – "If you don't have surgery there's no surgery to recuperate from, but you still have your prishary symptoms, so you're not pain free."
	Emphasise that symptoms will get worse following surgery due to the procedure [PT/OS]	PT, Male 30-39 yrs old – "It seems a lot of people don't fully conceptualise that, you can't even use the muscles in your shoulder for 6 weeks. That's a pretty big consideration."
-	Add a row for 'social support' (e.g. getting dressed, dishes, transport to appointments) [PT]	PT, Female 39-39 yrs old – "The other thing I would put in there is people getting to rehab if they don't have someone, social support. Who's going to help them get dressed or do their dishes, take them to appointments?"
	Highlight that people must do exercises following surgery [PT/OS/CP]	OS, Male 40–49 yrs old – "I tell them that their shoulders will be stiff and will have deconditioned because they been waiting for their tendons to heal and the structures to heal. It usually takes that extra 3 months of work to rehabilitate them enough that they can get back boto manual labour type activities."
	Define 'heavy lifting' [PT]	PT, Female 39-39 yrs old – "I think I'd try to be a little more specific with that, because heavy lifting is so specific to different people."
	Include activity restriction timeframes for non-surgical options [PT]	PT, Male 30-39 yrs old – "Do you have anything in there for 'no surgery' as well, like most people do well in 6 weeks or expect 12 weeks?"
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1 2 3 4 5 6 7		Highlight that recovery is influenced by the severity of a patients' pre-intervention symptoms [OS]	OS, Male 50-99 yrs old – "I think just recognising that there is a spectrum of severity of symptoms, that they're not all the same. Therefore, people with lower symptoms are generally more likely to improve."
8		Patients	St
9 10		Emphasise driving restrictions	Male 70-79 yes old – "I would rather see 'you can't drive for 6 weeks' rather than 'you can.'"
11 12 13 14		Emphasise that patients may need treatment after surgery (e.g. physiotherapy, injections, exercise, etc.)	Male 40-49 yes old – "I guess my experience is even after surgery there's still lots of injections, lots of medication
15 16 17 18 19 20 21 22 23 24		Highlight the need for patients to consider their individual circumstances before making any decisions (e.g. pain levels, social aspects, insurance, job demands, caring responsibilities, age, activity levels, sports participation, etc)	Male 40-49 yzs old – "I think that's probably a lot more important to consider with stats; where would you be without this if you can't go back to doing the things you want to do again? In another non-sporty point, if it affects a tradesman ability to earn income it affects their entire family's quality of life. So I think that's probably the more responsible point to make in it, rather than you'll get 9 or 6% less pain and that sort of stuff."
25 26		Add a column for 'no treatment'	Female 60-69 yrs old – "Are you allowed to have a column that says 'no treatment?'"
27		Health professionals	
29 30 31 32 33	Modify the formatting or	Separating practical issues by type of surgery results in too much information [PT]	PT, Male 20-29 yrs old – "Do they really know the difference between rotator cuff repair, subacromial decompression? I guess it's really only if they've been told that's what appropriate for them that they then go, which one and I?
34 35 36 37	language used	Split the practical issues section by type of surgery [GP]	GP, Female $3\overline{2}$ -39 yrs old – "Then the third page I guess the text looks like instead of lines we split something in two columns."
38 39		Discuss 'Follow-up with surgeon' in 'Recuperation' section [GP]	GP, Female 30-39 yrs old – "Maybe talk about the follow up in gecuperation. I think that suits
40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

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	recuperation more than it does procedure, in my the of thought anyway."
Could use a checkbox to reduce the number of words in the 'Activity restrictions' section (e g. sling (tick); 3-4 weeks off work (tick), etc.) [CP]	CP, Male 20-29 yrs old – "If we were to reduce he many words are present, the row with all the activ restrictions and time off, it seems like that could be either a check box yes or no 'do you require a sling
Include a summary of whole decision aid in the practical issues table in case people don't want to read the whole decision aid [CP]	CP, Male 20- $\overline{2}$ 9 yrs old – "That might be helpful is someone doesn't want to read three pages and the just got one toging to glance at, we could direct the just the one togile."
Change title of this section to "What will my recovery look like after surgery and non-surgical options" to reduce bias against surgery [PT]	PT, Male 30-39 yrs old – "It's very heavily biased towards don'Phave surgeryMaybe instead of 'w practical issues should I consider' it might be bett have something along the lines of 'what would my recovery look like' or something like that, or 'what these processes look like?'"
Remove this page entirely as patients will be losing interest by this point [OS]	OS, Male 40-99 yrs old – "I thought there shouldr a third page as all to be honest, by then the averag punter is losing interest."
Patients	
Present practical considerations for the two types of surgery in separate columns to match the second page	Female 20-29 yrs old – [Shown two surgeries in separate columns as option #2] "I feel like I'm be super biased But I'm going to say the second one well because that breaks down each surgery[an seems a little git clearer."
Make the headings and sub-headings clearer	Male 20-29 yes old – "So just in terms of the layo thought that was the subheading and the next char table was related to the what are the likely harms. maybe a thicker bit in between might separate tho ideas, just a begger space or something like that."
Do not mention insurance as this is not relevant for people treated in the public system	Male 30-39 yas old – "Just the first part where you 'and insurance provider' I get a little bit offended
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-			n-20
			21
			05 40
			anyway because it automatically presumes that I have
			private health insurance or that this is a work cover
			thing. It makes an assumption of the reader."
		Acknowledge that timeframes are averages so patients don't	Female 50-5 Eyrs old – "If you just say an average and
		get disheartened when they don't reach a milestone on time	you don't hit that 21-day average- unfortunately whatever affects your body affects your mind."
		Change the colour of table to match other sections of the	Female 40-4 Eyrs old – "This table is quite clearly laid
		decision aid	outgood use of shading and colour, although the
_			blue is a different shade to what's used in the whole rest of the leaguet."
	QUESTIONS TO CONSI	IDER WHEN TALKING WITH A HEALTH PROFESSION	AL AL
-		Health professionals	p://
		All questions are important [GP/PT/OS/OP]	OP, Female 49-49 yrs old – "I think that's really good
			because you can tick through that and make sure that they've understood the really important points."
		Patients	<u>.</u>
	Positive feedback	All questions are important	Male 20-29 yes old – "Especially the last one [about]
			I've seen some of my friends sometimes don't [ask].
			So I think that's an amazing one to have in there."
		Agrees that patients should be directed to ask questions	Female 20-29 gyrs old – "I think they're good because
			when you're in an appointment setting for me I get
-			really nervous and I don't always think."
		Health professionals	
	Adding and removing	Add questions (e.g. "Do I understand what's wrong with my	PT, Male 20-29 yrs old $-$ "If I wait with my tear, is
	questions	shoulder?"; "What level of activity can I get to if I have	that going to mean it keeps tearing and then I need
_	_	should I try before considering surgery?") [OP/PT/OS]	surgery later on and it gets worse? that sort of thing.
			ecte
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1 2 3 4 5 6 7 8 9		Remove questions (e.g. "Do I know enough about my condition"; "Have I considered my individual circumstances") [OS]	OS, Male 40-49 yrs question to ask beca practitioner to read to considered my spect something a lealth p format."	old – "I don't think that's a good use you're asking the health the patient's mind. 'Have I ific situation?' Again, that's not professional can answer in that
10		Patients		
11 12 13 14 15 16 17		Add questions (e.g. "Can I have surgery later?"; "What is my diagnosis? Are there any other surgeries performed for this type of shoulder pain?"; "What other treatment options do I have/who else can I see?"; "How will my individual circumstances impact me?"; "What happens if I don't do anything?")	Male 20-29 yes old diagnosis.'"	– "Maybe add in there 'what is my
18		Health professionals	d//b	
19 20 21 22 23		Increase the size of this section [PT/CP]	PT, Female 39-39 y things that I can do that box 'other thing that first page under	rs old – "Can we make the 'other 17 times bigger?' I almost think gs I can do' needs to be up there on on surgery."
24 25 26 27		Could replace "Questions to consider when talking with your doctor" section with "Any further questions, ask your doctor" to save space [GP]	GP, Female 30-39 y out, I would eut out to your doctog?"	rs old – "If you needed to cut that and say any 'further questions talk
28 29 30	Modify the formatting	Change the heading of this section so it applies to any health professional [PT]	PT, Male 20-29 yrs talking to your doct for your doctor or pl	old – "Then the 'questions when or' are what we were saying before hysio."
31 32 33 34 35 36 37 38 39 40		Change the heading of this section so it applies to GPs [PT]	Interviewer – Sin wi direct people who to keeping it open like professional, knowi people. Do you thin your physio of even depending on who t	hich case do you think we need to o ask these questions to, rather than that? We've just said health ng that could be a whole number of k we should say 'ask your GP', ask just subcategories the questions hey're asking."
40 41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gu	delines.xhtml	

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		PT, Male 40-49 yrs old – "Put great faith in GPs, they
	Detionts	o
	Remove this whole section to create space	Male 20-29 yes old – "I don't think it adds a lot for n just because Ethink they're kind of obvious in a sens I think questions would naturally arise from this."
	Modify the formatting for the bullet points (e.g. words don't line up with the bullet points, too cramped, put questions in speech bubbles)	Female 40-49 yrs old – "In the third one, the spacing of the lettering is quite different to the spacing in the fourth one." $\frac{1}{6}$
	Change to "Questions to consider when talking with <u>a</u> health professional" (instead of "your health professional")	Male 40-49 yes old – "So when I just see the way that heading looksI'm wondering if that's pointing then too specifically just to one person."
	Combine the first two questions	Male 40-49 yes old – "Am I clear about the benefits and the harms? That's the same as "Do I know enoug about the benefits and harms?"
	Categorise questions based on which health professional should answer them	Male 40-49 ys old – "I'm wondering if there should just be more specifics around health professionals. I mean they're all health professionals, but some I've found to be more valuable than others."
ARE THERE OTHER TH	HINGS I CAN DO?*	ר Decem
	Patients	ber
Positive feedback	"Other things I can do" box is great (1) [PT/CP]	PT, Male 40-49 yrs old – "So you make up for it by highlighting that which is cool, for saying the ongoin commitments." I like that you're putting that there."
	Health professionals	
Modify information to help people choose non- surgical options first	Move this section to the first page and make it clear surgery is a last resort [PT/CP]	CP, Male 20-299 yrs old – "Obviously really good advice, I think that should almost be at the forefront. These are pretty good options that they're probably going to have to try even before considering surgery becausesuggery is often a last resort."
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	Be specific about what exercises can be done [PT/CP]	PT, Male 20-29 yrs old – "I think in general yo broad spectrum of things, from a physical thera standpoint obviously I might include beyond ju strength and endurance exercises, strength, flex endurance exercises."	u hit the py ist cibility,
	Emphasise that there is often no need for early surgery and no harms in delaying surgery [OS/PT]	PT, Male 20-29 yrs old – "It was more a fear of don't do it now then what happens in the future	f 'if I ?'"
OVERALL FEEDBACK		ownload	
	Health professionals		
	The graphics will assist non-English speaking people [PT/OS]	PT, Female 39-39 yrs old – "A lot of my client speak Englisher so I'll always go with pictures a graphics and ceally easy to understand things."	s don't nd
Positive feedback	The decision aid will be an important tool for busy clinicians [PT/OS]	OS, Male 40 39 yrs old – "Assuming that the C have some musculoskeletal background and kn little bit about this problemthen having that information sheet [decision aid] certainly is hel and I can assess the patient, they already know that information and I don't have to rehash everything."	Ps ow a pful some of
I USITIVE ICCUDACK	There is no information that is not important in this decision (aid [PT/OS/GP]	PT, Male 30-39 yrs old – "Maybe you could tal that's the proglem it's all pretty useful."	ke-
	Patients		
	Language, flow. explanations, content, length, and disclosure statement are appropriate	Male 30-39 yrs old – "That seems fairly straight forward as wall, there doesn't seem to be anyth there that I don't either understand or isn't visu represented." 을	nt ning in ally
	References are important but should be provided on request	Male 30-39 yrs old – "You could maybe just sa 'references can be provided via emailing this ad I don't know f you need to put all those referent there."	ddress.' nces in
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- 3 4 5		The decision aid will be an important tool for patients who do not receive enough information in a consultation	Male 40-49 yes old – "My surgeon, wonderful guy, really nice guy and he's done a great job, he never really explained a lot to me."
0 <u> </u>		Health professionals	
9 10 11		A 2-page decision aid is ideal [PT/CP/GP]	GP, Female 39-39 yrs old – "I don't know if this is possible, but Ethink two pages. So being able to print it double sided and have just one piece of paper given to the patient it feels in my head less overwhelming than a bunch of paper being stapled
13			together and saving here, read it all."
14 15 16 17 18	Reduce amount of information	The decision aid includes too much information [GP/OS/PT]	OS, Male 40–49 yrs old – "I thought it was a bit too busythere's so much writing now I can't tell. If you're going to give that to the general public you've got to be like it's pretty straight forward."
20 21 22		Create a simplified version of the decision aid for patients [PT]	PT, Male 20-29 yrs old – "Maybe you give this one to the health practitioner and you do a separate for patients to take with them."
23 24 25 —		Remove some sections (e.g. questions to ask a health professional, references, rotator cuff repair surgery) [PT/OS]	PT, Male 30-39 yrs old – "Do the patients care specifically about references?"
25 26 27 28 29 30		Health professionals Include a section on diagnostic imaging (X-Ray, MRI, Ultrasound) and the importance of not missing a serious disease [GP]	GP, Female 69-69 yrs old – "You don't want to miss arthritis or tumours or things like that. I think that would be useful tounderstand the roles of each, of the x-ray ultrasound and MRL"
31 32 33	More detail needed	More detail is needed if the decision aid will be used without input from a health professional [PT]	PT, Male 20-29 yrs old – "I think the one that would be sent home you would want a little bit more detailed versus one that you are with a patient going over it."
34 35 36		Acknowledge who made this decision aid so patients can evaluate the quality of the information [OS]	OS, Male 50-59 yrs old – "Acknowledge what the background of the people constructing it is"
37 38 39		Patients Last page lacks a solution if a patient has tried everything	Male 20-29 yes old – "I don't know if that exists or not but to give people a new solution."
41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gu	idelines.xhtml

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	Encourage people to seek a second opinion or further	Male 70-80 yys old – "Do I have enough information
	information	and if not what do I do? I guess, if I answer that as no,
		I don't have enough information, then what do I do
		next, I've already spoken to the doctor."
		Interviewan Prat's a good naint maybe some links to
		further recovering might be helpful
		further resources might be helpful.
		Participant: Yaah."
	Health professionals	ade
	Improve the colour scheme or layout (e.g. improve	PT, Male 40-49 yrs old – "I feel so critical, it's a bit
	consistency, space out information) [GP/PT/OS]	gloomy." 🖇
	Create separate decision aids for each procedure [CP/OS/GP]	OS, Female 59 yrs old – "It's too much covering
		decompression and rotator cuff repair on the one
		handout because they are two separate conditions and
		they're offered for different reasons and they should be
		separated."
	Create separate decision aids for surgical and non-surgical	GP, Female 60-69 yrs old – "Having surgery as a
Formatting on	options [GP]	separate one frecision and, because you wouldn't tell
rormatting or distribution suggestions		much inform gion at the beginning most people would
uisti ibution suggestions		get a bit alarred if you talked about surgery at the
		beginning."
	Create a video summary of the decision aid [PT/CP]	CP. Male 20- $\frac{29}{29}$ vrs old – "I feel like people nowadays
		don't have a great attention spanI almost wonder if
		somehow like a video, they could access it on Youtube
		or something free like that."
	Include citations in the decision aid [CP]	CP, Male 20-29 yrs old – "I don't see a citation."
	Acknowledge that treatment decisions might be influenced by	OS, Female $50/2$ -59 yrs old – "In my experience, those
	the health professional the decision aid is discussed with	who fail non-aurgical do really well with surgery and
	[PT/OS]	so most of my patients do better, but I haven't got a
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	group to compare them to so I've got a very biased view of surgery because that's all I see."
Distribution suggestions for the decision aid (e.g. in a clinic, early in treatment, when a patient is considering surgery, after a diagnosis is made) [PT/OS]	OS, Male 40 9 yrs old – "The most useful thing that we're talking about surgery vs. no surgery, is at the junction where surgery is being considered and that is in the specialist's office, to me that would make the most sense."
Improve readability of the decision aid [PT/OS]	PT, Male 40- $\frac{2}{8}$ 9 yrs old – "I think the challenge with language is, let's say your aim is to get the FKMG score of a reading literacy score down to year 8 or year 6. A message that details enough to be satisfactory for a consumer, but without getting there's a lot of words on this page."
Patients	njop
Include page numbers	Male 70-79 ys old – "I kept looking for more pages, only because thought it would have been a longer thing for no reason other than why won't it go page down anymore. So maybe 'page 1 of 3' or something like that on the top."
Create several decision aids (e.g. one for each surgery, one for patients and one for health professionals)	Male 30-39 yes old – "It's like half of that is not relevant to me if I have subacromial decompression surgery and the other half is not relevant to me if I have a rotator cuff injury. It's like well give me the one that's relevant for me."
Improve readability (e.g. increase the font size, space out the text even if it means the decision aid is 3 pages, use a consistent design across pages, use a darker grey background)	Male 30-39 yrs old – "I think a lot of the text is too smallI know it's a draft, I just think it's a bit- it doesn't easily flow well."
Patients should read the decision aid before or after a consultation with a health professional so they don't waste a health professional's time and can ask questions	Male 30-39 yrs old – "You have to be able to ask questions to somebody, so a health professional it could be an OFT, a physio, a nurse or a doctor…but probably not as a one-on–one, face-toface thing. It
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		would be sit in the waiting room have any questions jot a little n come in ask the questions to cla	n, "read this, if you ote, then when you arify""
	Remove 'disclosure' section	Male 30-39 yes old – "That wo whole funding thing as well" no conflict of interest or say no nothing to declare."	uld then take out the You declare that there's othing to disclose or
	Emphasise the question asking section and de-emphasise others (e.g. harms, causes of shoulder pain, references)	Male 40-49 ys old – "Yeah, ar beginning one"who should r think maybe that's too much. I wordyThe yery last one [que probably too Httle[we need]	id maybe the very ead this decision aid", I think it's very doctor-y estions section] I think is a little bit of balance
	Move 'Important information' to above the references so patients are more likely to read it	Male 30-39 yas old – "It blends down the page, if I saw it I wou gets lost in references straight a	in. As I'm coming ald read that. Whereas it away."
	Health professionals		•
	Thought the decision aid's underlying goal is to reduce the use of surgery and thought it should be more balanced [OS]	OS, Male 40 49 yrs old – "Rea to do is get them to not have th	lly what you're trying e surgery."
	Believes evidence is changing and the decision aid may become irrelevant overtime [OS]	OS, Male 40-49 yrs old – "I me view, and in gyear's time that	an that's the current might change."
Suspects bias or questions relevance of the decision aid	Unsure of the applicability of the decision and when patients don't have a diagnosis or when they have tried all the non- surgical options listed [OS]	OS, Male 40- $\frac{3}{2}$ 9 yrs old – "The we're talking about, surgery vs junction where surgery is being in the special st's office. To me most sense. Before that no one no one's really talking about su	most useful thing that no surgery, is at the g considered and that is e, that would make the knows what's going on, argery, there might be
		hearsay and things like that, the but at that time you may not ev imaging etc. Offen when I see already done few of those con which have not worked, which	ere might be guesses, en have a diagnosis or the patients they've nservative measures is why they're in my
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1 2 3 4 5 6 7 8			officeI guess if the decision aid is hitting them at the point where surgery vs no surgery, because there's not so much difference in the short to medium term, then it has to be done after the diagnosis is made I think, or surgery is being considered."
9		Patients	
10 11 12 13 14 15 16	Decision aid swayed patients away from surgery	Swayed towards surgery because it might be beneficial (e.g. pain might get worse, small improvements in pain and function might be important for work, the risk of complications gets higher as you age, subacromial decompression might work if someone has tried all other options)	Female 50-59 yrs old – "It's not too bad for me to consider a shoulder surgery yet, but it's also making me think, may be it's something I should have before it gets too bad."
17		Swayed away from surgery (e.g. would only have surgery if it	Female 40-49 yrs old – "To me you read that and
18 19		was a guaranteed solution as time off work and cost is a major inconvenience)	think, I'm probably not going to go down that route."
22 * 23 24 25 26 27 28 29 30 31 32 33	: this section was removed	from the decision aid to save space so we could provide more deta	uil about non-surgical options on the first page.
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upplementary File 13 Rea	sons for not implementing feedback for each section of the decis	$\overset{\text{O}}{\overset{\text{O}}{\overset{\text{N}}{\overset{\text{N}}{\overset{\text{N}}{\overset{\text{N}}{\overset{\text{O}}{\overset{\text{N}}{\overset{N}{N$	
hemes	Sub-themes	Reason for matimplementing feedback	
HO SHOULD READ T	HIS DECISION AID?	0 Augus	
	Health professionals	20	
	Make the information more specific to a diagnosis [OS/PT]	Identifying a structural nociceptive cause of	
		subacromial impingement syndrome is not possib	le,
Improve clarity on the		we decided to keep the diagnosis broad (i.e.	
target population		subacromial impingement syndrome)	
	Patients	ed f	
	Make it clear the decision aid is for people with subacromial	Opposing feegback to remove the term 'subacron	nial
	impingement syndrome (e.g. include the diagnosis in the title)	impingement yndrome'	
	Health professionals	p:///	
	Clarify that shoulder pain can be caused by overuse and work	Potential causes of shoulder pain were removed a	S
Revise the causes and	(e.g. heavy lifting) [GP/PT]	they were too speculative	
symptoms of shoulder	Patients		
pain	Describe what causes the structural issues associated with	This information would have been too speculative	e dı
	shoulder pain (e.g. explain why a tendon tears or a bursa gets	to a lack of evidence on this issue	
	inflamed)	<u> </u>	
	Health professionals		
	Language will cause fear among patients [CP/PT]	Opposing positive feedback from patients on our	
		explanation of shoulder pain	
Use positive messaging	Include positive messaging about prognosis and what pain	Beyond the scope of this decision aid	
	means (e.g. pain doesn't equal damage, pain may get better	20	
	with time, imaging findings are common in people without	23	
	symptoms) [CP/PT/OP]	 د	
	Health professionals	ues	
Make this section more concise and relevant	Explanation of shoulder symptoms might be irrelevant for	Opposing positive feedback on our explanation o	f
	patients [GP/OS/PT]	shoulder symptoms	
	Graphic of pain distribution might be more useful than a	Opposing positive feedback on our graphic of sho	oulc
	graphic of the shoulder anatomy [OS/PT]	anatomy g	
		сор	
		oyriq	
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WHAT ARE THE TREA	TMENT OPTIONS COVERED IN THIS DECISION AID?	2 on 30
	Health professionals	Aug
	Need a flowchart of non-surgical options [PT]	Opposing positive feedback on the layout of non- surgical options
	Highlight how long patients should try different non-surgical options before surgery [GP/PT]	There is no evidence to guide timeframes on trying various non-sorgical options. This could depend on treatment success and patient preferences
	More detail is needed on muscle strengthening programs [PT]	Beyond the scope of this decision aid
	Include evidence for non-surgical options [PT/OS]	This decision aid was developed for people considering surgery. We only included one treatmen decision (i.e. surgery vs. non-surgical options) and
		hence, the evidence for surgery compared to non-
Include more detail on		surgical options
non-surgical options and	Patients	
how to progress management	Provide more non-surgical options	Opposing positive feedback that our decision aid covers all potentially valuable options
	Provide evidence for various non-surgical options (e.g. options listed in the decision aid, lifestyle change, TENS,	This decision aid was developed for people considering sgrgery. We only included one treatment
	ultrasound, hydrotherapy, massage, diet, acupuncture, Chinese herbs)	decision (i.e. Surgery vs. non-surgical options) and hence, the evidence for surgery compared to non- surgical options
	Highlight whether delaying surgery or non-surgical treatment is harmful or not	There is not epough evidence to address this issue. suggested patients ask a health professional the following question: "Can I have surgery later? If so
	Provide more information on 'wait and see' (e.g. highlight that you can trial non-surgical options while you 'wait and see')	Opposing positive feedback on the description of no surgical options
Change the new survey	Health professionals	
options presented	Inappropriate to mention medication and injections as options [PT/CP]	Cochrane reverse on treatments for subacromial pa syndrome show glucocorticoid injections are superi
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		to placebo and provide similar effects to non-stero anti-inflammatory drugs (22) and physiotherapy- delivered treatments (e.g. exercise, manual therapy
	Mention the benefits of ultrasound for diagnosis and guiding injections [GP]	electrotherap@) (23, 24) Beyond the seope of this decision aid
	Waiting 6 months might be too long for patients to do nothing [PT/OP]	Opposing positive feedback on the description of surgical options
	Order of non-surgical options might be inappropriate [CP/PT]	Opposing positive feedback on the order of non- surgical options
	Health professionals Highlight that imaging findings in isolation aren't indications for surgery [PT/OS]	Peripheral to the main purpose of this decision aid
Include indications for surgery	Important for patients to know which procedure they are most likely to receive as this could influence recovery and rehabilitation needs [OS]	Too dependent on an individual's symptoms
	Highlight that surgery may improve symptoms or anatomy but not address the cause [PT/OS]	Adding this information might be considered bias against surgery as non-surgical options might also address the cause of symptoms
	Health professionals	
Present evidence of benefits or harms in this section	Mention the success rate of surgery and non-surgical options [GP/PT/OS]	We only included data on pain and function from two Cochrane reviews of shoulder surgery. Include findings from responder analyses would have conflicted with feedback to avoid repetition of statistics
	Emphasise the harms of surgery [PT/CP/GP]	Adding this information would be biased against surgery. The presentation of benefits and harms ir decision aids beed to be balanced
Change information on	Patients	Pr
surgery	Provide less information on surgery	Opposing positive feedback on the level of detail surgery
		by copyrig

3 4

24

2		BMJ Open	njopen-20
WHAT AF	RE THE LIKEI	Provide more information on surgery and rehabilitation	Opposing positive feedback on the level of detail about surgery and rehabilitation
		Health professionals	ust 20
Revise de the certair	escription for ity of evidence	Remove the description of the certainty of evidence [PT/OS]	Opposing positive feedback for acknowledging the certainty of evidence
		Health professionals	
		Evidence doesn't match experience (e.g. careful patient selection will yield better outcomes) [OS/GP] Evidence from Cochrane reviews may not be generalizable to patients [OS]	We did not change the evidence presented because it is vital numeric estimates of benefits and harms in decision aids are based on the highest quality available evidence (15, 27)
Evidence doesn't match experience, more	Highlight that surgery may increase the speed of recovery or yield better long-term outcomes [OS]	- ```tp://bmj	
clarifica	clarification needed	Add outcomes or provide further explanation for existing outcomes (e.g. include quality of life, define treatment success, emphasise pain results) [GP/PT/OP]	We limited outcomes to pain and function from the two Cochrane reviews of shoulder surgery to avoid repetition
	Highlight that surgery may be useful for preventing tears progressing even if there was no improvement in symptoms [OS]	We limited the potential benefits of surgery to data presented in the two Cochrane reviews of shoulder surgery	
		Health professionals	Cert
Simplify	the statistics	Avoid numeric estimates (e.g. 3% could be framed as 'small') [PT]	Opposing post tive feedback on the presentation of numeric estimates
		Patients	. 20
Provide m clarify t	ore detail and he evidence	Adding the age range of research participants is not necessary unless being outside this range would influence the benefits of surgery	Opposing feedback to mention the population of the evidence
Contex	tualise the	Patients	Š.
evideno uncerta indivi	ce to reflect ainty on an dual level	Statistics shouldn't influence treatment decisions as they are averages and patients should trust their health professional's advice	We did not change the evidence presented because it is vital numeric estimates of benefits and harms in
		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

	BMJ Open	op e Pag
		-2021-05
		decision aids are based on the highest quality availal evidence $(15, 27)$
Modify the formatting or	Health professionals	> >
language used	Make the bar graphs vertical [PT/CP]	We removed the bar graphs due to negative feedback
WHAT ARE THE LIKEL	Y HARMS OF SURGERY?	st 2021.
	Health professionals	Dov
Present minor and	Mention revision surgery as a possible adverse event [OS]	Not a direct harm of surgery
serious harms	Patients	
serious narms	Definition of minor and serious adverse event is problematic	Opposing feet back to separate minor and serious
	because severity is subjective	harms g
Provide more context for	Health professionals	}
harms	Compare the harms of surgery and non-surgical options	Data on the petential harms of non-surgical options
		was not available
	Health professionals	<u> </u>
Evidence doesn't match	Harms might be overestimated [OS]	_ We did not change the evidence presented because r
experience, more	Harms might be underestimated [PT]	vital numeric estimates of benefits and harms in
clarification needed		decision aids are based on the highest quality available $\frac{15}{97}$
	Health professionals	
	Move harms to prostical issues section [CP]	Opposing for the same format when
	Nove harms to practical issues section [CF]	presenting begefits and harm
	Replace 'harm' with a less emotive word (e.g. 'risk'	'Harm' is a more accurate term than 'risk' and is use
Modify the formatting or	'complication') [OS]	more frequently in the decision aid literature
language used	Patients	
	Change the terminology used (e.g. 'harms' too negative,	'Harm' is a more accurate term than 'risk' and is use
	change 'harms' to 'risk', change 'person' to 'people', define	more frequentary in the decision aid literature
	'frozen shoulder')	
SUMMARY OF BENEFIT	FS, HARMS, AND OTHER PRACTICAL ISSUES	rotected
	Health professionals	ьу
		copyrigh
	For peer review only - http://bmjopen.bmj.com/site/about/gi	uidelines.xhtml ^류

Page 101 of 112		BMJ Open	-) open-
1 2 3 4 5 6		Include the cost of non-surgical options (e.g. time, effort, cost without insurance coverage) [CP] Be specific about costs to emphasis the true cost of surgery	Costs vary to g_{g}^{N} much to include an accurate figure
/ 8		Patients	
9 10 11 12	Revise information on costs	Be more specific about costs (e.g. time off work, add "speak to your GP and insurance provider to understand exact costs", costs of non-surgical options, non-surgical options might equally expensive in some countries)	Costs vary to a much to include an accurate figure
13 14 15		Highlight that waiting times are long and costs are higher without private insurance	This might not apply to all health systems
16 17 18		Health professionals Add a row for 'social support' (e.g. getting dressed, dishes, transport to appointments) [PT]	Information not covered already
19 20 21	Revise information on activity restrictions and post-surgical	Include activity restriction timeframes for non-surgical options [PT]	Activity restriction timeframes varied by health professional to much
22 23		Highlight that recovery is influenced by the severity of a patients' pre-intervention symptoms [OS]	Suggestion was not relevant to this section
24 25	management	Patients	ν. • • • • • • • • • • • • • • • • • • •
26 27		Emphasise driving restrictions	Driving restriction timeframes varied by health professionals doo much
28 29		Add a column for 'no treatment'	'No treatmened is covered in the 'non-surgical options' column
30		Health professionals	N N
32 33	Modify the formatting or	Separating practical issues by type of surgery resulted in too much information [PT]	Opposing feedback to separate practical issues by type of surgery g
34	language used	Split the practical issues section by type of surgery [GP]	<u> </u>
35 36 37	iniguage used	Could use a checkbox to reduce the number of words in the 'Activity restrictions' section (e g. sling (tick); 3-4 weeks off work (tick), etc.) [CP]	Opposing po辩tive feedback on the layout of this section
30 39 40 41 42 43 44 45 46		For peer review only - http://bmjopen.bmj.com/site/about/gui	ted by copyright. delines.xhtml

	BMJ Open	Page 10.
	Change title of this section to "What will my recovery look	We removed the headings to save space
	like after surgery and non-surgical options" to reduce bias against surgery [PT]	n 30 At 1
	Remove this page entirely as patients will be losing interest by this point [OS]	Opposing pogitive feedback on this section
	Patients Acknowledge that timeframes are averages so patients don't get disheartened when they don't reach a milestone on time	We included timeframe ranges to address this comment
QUESTIONS TO CONSI	DER WHEN TALKING WITH A HEALTH PROFESSIONA	AL ed
	Health professionals	from
Adding and removing questions	Remove questions (e.g. "Do I know enough about my condition"; "Have I considered my individual circumstances")	Opposing positive feedback on these questions
	Health professionals	
	Could replace "Questions to consider when talking with your doctor" section with "Any further questions, ask your doctor" to save space [GP]	Opposing positive feedback on this section
Modify the formatting	Change the heading of this section so it applies to GPs [PT]	Opposing feegback to change the heading of this section so it applies to any health professional
	Patients	cerr
	Remove this whole section to create space	Opposing postive feedback on this section
	Categorise questions based on which health professional	Too much overlap between health professionals who
	should answer them	could answergach question
ARE THERE OTHER TH	IINGS I CAN DO?*	23 by gu
	Health professionals	lest
Modify information to help people choose non- surgical options first	Move this section to the first page and make it clear surgery is a last resort [PT/CP]	We thought it was important to present the options (and evidence) before patients reflect on questions they could ask a health professional
	Be specific about what exercises can be done [PT/CP]	Beyond the seope of this decision aid
		copyright

 $\begin{array}{c} 11\\ 12\\ 13\\ 14\\ 15\\ 16\\ 17\\ 18\\ 19\\ 20\\ 21\\ 22\\ 23\\ 24\\ 25\\ 26\\ 27\\ 28\\ 29\\ 30\\ 31\\ 32\\ 33\\ 34\\ 35\\ 36\\ 37\\ 38\\ 39\\ 40 \end{array}$

Page 103 of 112		BMJ Open	njopen.
1 2 3 4 5 6 –		Emphasise that there is often no need for early surgery and no harms in delaying surgery [OS/PT]	We suggested patients ask a health professional the following question: "Can I have surgery later? If so, how long should I wait before considering surgery?"
7 8 9	OVERALL FEEDBACK		ugust 20
10		Health professionals	21.
11		A 2-page decision aid is ideal [PT/CP/GP]	Opposing fee back that all information in the decision
12		The decision aid includes too much information [GP/OS/PT]	aid is important
13 14	information	Create a simplified version of the decision aid for patients [PT]	Positive feedback from patients that this decision aid is easy to understand
15 16 17		Remove some sections (e.g. questions to ask a health professional, references, rotator cuff repair surgery) [PT/OS]	Opposing $positive$ feedback on these sections
18		Health professionals	p://
19		Include a section on diagnostic imaging (X-Ray, MRI,	Beyond the scope of this decision aid
20 21	More detail needed	Ultrasound) and the importance of not missing a serious disease [GP]	openb
22 23 24		More detail is needed if the decision aid will be used without input from a health professional [PT]	Positive feedback from patients that this decision aid is easy to understand
25		Patients	on
26		Last page lacks a solution if a patient has tried everything else	There is no endence to address this complex issue
27		Encourage people to seek a second opinion or further	Positive feedback that the decision aid covers all
28		information	important information
29 - 30		Health professionals	
31		Create separate decision aids for each procedure [CP/OS/GP]	This would prevent patients using the decision aid
32			before consulting with a surgeon as they would not
33	Formatting or		know which surgery they are most likely to receive
34 35 36 37	distribution suggestions	Create separate decision aids for surgical and non-surgical options [GP]	The evidence compares surgery to non-surgical options, so it is important these options are listed in the same decision and
38		Create a video summary of the decision aid [PT/CP]	This is a consideration for a future project
39 40 41 42 43 44 45		For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml

		BMJ Open	njopen-20	Page 104 of
1 2			021-0540	
3 4 5		Acknowledge that treatment decisions might be influenced by the health professional the decision aid is discussed with [PT/OS]	We felt that this information would not add va this decision add	ilue to
7		Patients	Ğ	
8		Include page numbers	ust 2	
9		Create several decision aids (e.g. one for each surgery, one for	This would prevent patients using the decision	n aid
10		patients and one for health professionals)	before consulting with a surgeon as they woul	d not
11			know which surgery they are most likely to re	ceive
12		Remove 'disclosure' section	Opposing postitive feedback on the this section	n
14		Emphasise the question asking section and de-emphasise	Opposing positive feedback on these sections	
15		others (e.g. harms, causes of shoulder pain, references)	1 fro	
16		Health professionals	3	
1/ 10	Suspects bias or	Thought the decision aid's underlying goal is to reduce the use	Opposing positive feedback suggesting the	
10	questions relevance of	of surgery and thought it should be more balanced [OS]	presentation of options was balanced	
20	the decision aid	Believes evidence is changing and the decision aid may become irrelevant overtime [OS]	We plan to update the decision aid as new evi	dence
21	CP: chiropractor: GP: genera	al practitioner: PT: physiotherapist: OP: osteonath: OS: orthopaed	ic surgeon	
23	* this section was removed	from the decision aid to save space so we could provide more det	hi shout non surgical options on the first page	
24	: this section was removed	from the decision and to save space so we could provide more deta		
25			on	
26			Dec	
27				
20			ber	
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31			20	
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39			d by	
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Shoulder pain: should I have arthroscopic surgery?

Is this decision aid relevant for me?

• This decision aid can help if you have shoulder pain due to common causes like rotator cuff tears or bursitis and are considering arthroscopic surgery of the shoulder

Cause and symptoms of shoulder pain

- Shoulder pain is commonly caused by rotator cuff tears, swelling of fluid filled sacs call bursa ('bursitis') or impingement.
- Impingement occurs due to contact between a bony part of the shoulder (the 'acromion') and the rotator cuff tendons or bursa (see picture). Contact usually occurs as you move your arm out to the side.
- Shoulder pain often makes it difficult to do simple everyday tasks like reaching into a high cupboard and washing hair.
- Symptoms often take time to settle and one half of patients are better by around 6 months.



SHOULDER PAIN: SHOULD I HAVE SURGERY?

All information in this decision aid should be discussed with a health professional

• Who should read this decision aid?

This decision aid is for people with persisting shoulder pain that is likely due to issues with rotator cuff tendons that move and support the shoulder (eg. inflammation, tears).

This type of pain often occurs around the shoulder. It makes it difficult to do simple tasks that involve lifting your arm above your head (eg. washing hair).

This decision aid does not apply to people who have other causes of shoulder pain like frozen shoulder (which causes pain and severe stiffness), osteoarthritis, or shoulder pain that begins after trauma immediately resulting in loss of movement or strength (eg. sudden rotator cuff tear, fracture, dislocation). If you're unsure of the cause of your pain, see a health professional.



What are the treatment options covered in this decision aid?

1. Surgery ('subacromial decompression' and/or 'rotator cuff repair')

Surgery requires admission to hospital and an anaesthetic. The surgeon will make a small skin cut in your shoulder to perform the procedure. Your surgeon may perform one or both of the following procedures:

 Subacromial decompression: Increase the space under the acromion by either shaving back some bone, trimming some ligament or removing a bursa

What are the treatment options covered in this decision aid?

Rotator cuff repair: Reconnecting torn rotator cuff tendons

The surgeon may only decide on which procedure to perform while in surgery.

2. No surgery

You can choose to not have surgery and instead have injections, physiotherapy, medication or wait to see if it improves by itself.

NON-SURGICAL OPTIONS

Trying the following non-surgical options is recommended before considering surgery:

- Wait to see if your symptoms improve by themselves (roughly half of all people with these symptoms will recover within 6 months) and/or change your activities until the pain settles (eg. avoid carrying heavy grocery bags or take a break from sport if these activities cause pain)
- Take simple pain medicine (eg. paracetamol, anti-inflammatories)
- See a health professional (eg. physiotherapist) for advice on changing some daily activities and/or some muscle strength and endurance exercises
- See a health professional (eg. doctor) for a steroid injection



SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION

You may consider surgery if the non-surgical options do not work and you can no longer put up with the pain. Typically surgery is not performed unless you have had symptoms for at least 3-6 months.

Surgery requires staying in hospital, having an anaesthetic and small skin cuts in your shoulder so the surgeon can perform one or both of the following:



Subacromial decompression surgery

Increase the space under the acromion by either shaving back some bone, trimming some ligament and/or removing a bursa

Rotator cuff repair surgery

Reconnecting torn rotator cuff tendons

You will need to have rehabilitation involving exercises for at least 3 months following surgery. Much of this rehabilitation can be done at home.



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1 2

3 4

Page 107 of 112 What are the likely <u>benefits</u> of arthroscopic surgery and non-surgical options?

Subacromial decompression vs. placebo

HIGH CERTAINTY EVIDENCE* that subacromial decompression is little-to-no better than placebo...

*We are very confident that the figures below represent the true benefits of surgery

Placebo = the patient goes under anaesthetic and the surgeon inserts the surgical tools BUT no further procedure is performed



KEY MESSAGE: On average, surgery leads to2.6% less pain and 2.8% better functioncompared to placebo surgery at 12 months.

Most patients would not consider these benefits important.

What % of people report treatment success?

🕈 treatment success rated by patients

treatment not a success

Each figure represents one person. We can't predict whether you will be one of the people who is helped.



Rotator cuff repair vs. no surgery

LOW-MODERATE CERTAINTY EVIDENCE* that rotator cuff repair is little-to-no better than no surgery...

*We have low-moderate confidence that the figures below represent the true benefits of surgery

No surgery = injections, physiotherapy, medication or no treatment



KEY MESSAGE: On average, surgery leads to **8.7% less pain** and **6% better function** compared to no surgery at 12 months.

Most patients would not consider these benefits important.

What % of people report treatment success?

treatment success rated by patients

treatment not a success

Each figure represents one person. We can't predict whether you will be one of the people who is helped.



With surgery, **8 more people out of 100** will report their treatment as successful at 12

What are the likely benefits of surgery compared to non-surgical options?

The figures on this page are based on the most up-to-date medical research as of 2020 (see references at the bottom of this page)

KEY MESSAGE

On average, patients report that surgery **improves pain and function by** <u>less than</u> **10%** (ie. an improvement in pain or function of less than a 1 point on a 0-10 pain scale) compared to non-surgical options in the short term (6 months after) and longer term (1-2 years after) ^c. Because most patients do not notice these improvements, research concludes:

- Subacromial decompression surgery is not better than placebo or non-surgical options (ie. injections, exercise, medication or no treatment) for people with shoulder pain and no full-thickness rotator cuff tears ^A
- Rotator cuff repair surgery is little-to-no better than than non-surgical options for people with full-thickness rotator cuff tears ^B

These results are averages. Surgery improves pain and function by more than 10% for some patients. But other patients have either **no improvements or worse** pain and function after surgery.

Further information:

^A For subacromial decompression surgery, we are very confident about this key message because research on this surgery is high-quality. This research was mostly conducted on people aged in their 40s, 50s and 60s, but is the best evidence we have for all ages.

⁸ For rotator cuff repair surgery, we are somewhat confident about this message because there is lack of high-quality research on this surgery. This research was mostly conducted on people aged in their 50s and 60s but is the best evidence we have for all ages. Research on rotator cuff repair surgery does not apply to people who tear a tendon following trauma, or people with a full-thickness tear of the subscapularis tendon.

^c Research suggests exercise or activities that you can do yourself at home may be just as helpful as a supervised exercise program.

Z.ezoni





shoulder or minor harms	•
has serious problems	•

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About 3 people per 100

that have surgery will develop frozen shoulder (which may cause shoulder pain and stiffness for up to 2 years) or minor harms with surgery.

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L																			

About 1 person per 100

that has surgery will have serious (and potentially life-threatening) problems like infection, nerve injury, heartattack, stroke and pneumonia.

What practical issues should I consider?

The table shows key practical issues for those who have arthroscopic surgery and those who do not.

	ARTHROSCOPIC SURGERY	NO SURGERY
Procedure and follow-up	Performed by a surgeon in an operating theatre. Requires an anesthetic. Individualised follow-up with wound care and exercise	Advice from a professional about other treatments may be useful (eg. injections, exercise, activity modification, medication)
Recuperation	You may use a sling a few days after surgery. Recuperation typically takes between 2-6 weeks	No recuperation needed
Activity restrictions	Avoid heavy lifting for 7-21 days, overhead activities for 6 weeks and pushing through your hands for 3 months	No activity restrictions
Time off work	Depends on recovery and demands of job. Usually a few weeks after surgery	No time off work
Driving	You can start driving as soon as you feel able to steer. This is normally after one week	No driving limitations
Costs	Out-of-pocket costs for surgery are generally high. There may also be out-of-pocket costs for physiotherapy after surgery	No surgical costs BUT there may be out- of-pocket costs for physiotherapy or injections

Summary of benefits, harms, and other practical issues

NON-SURGICAL OPTIONS

Potential benefits

- May improve by itself (within 6 months half of people will recover) or with non-surgical options (ie. injections, exercise, or medication)
- Avoid surgery

Potential harms

- May decide to have surgery later
- Cost of non-surgical options (eg. injection, physiotherapy)
- Time to attend health appointments (eg. for physiotherapy)
- Regardless of what treatment you have, your symptoms may not improve

SURGERY FOLLOWED BY 3-12 MONTHS REHABILITATION

Potential benefits

- May provide slight improvement in pain and function compared to non-surgical options
- Potential harms
- Possible surgical harms (eg. frozen shoulder, infection)
- Your symptoms may not improve with surgery
- Symptoms will temporarily be worse after surgery due to the operation (eg. pain when sleeping or moving your arm)
- Rehabilitation for 3-12 months after surgery and time to attend rehabilitation
- May take up to 6 weeks after subacromial decompression and 12 weeks after rotator cuff repair to perform daily activities (eg. reach above your head, lift heavy objects)
- May take 3-4 months after subacromial decompression and 6-12 months after rotator cuff repair to return to heavy manual work, exercise, or sport
- Out-of-pocket costs are generally higher for surgery than non-surgical options. There may be costs for rehabilitation after surgery and due to time needed off work

Are there other things I can do?

- Strength and endurance exercises for your shoulder might help reduce pain and improve function.
- Modifying your activities and using pain relieving medicines when needed might help reduce pain.
- Seek advice from a health professional about the options that best suit your needs.
- Consider surgery at a later point if the above points do not help

Questions to consider when talking with your doctor...

- Do I need arthroscopic surgery?
- What happens if I don't have arthroscopic surgery?
- Do I know enough about the benefits and harms of: » having arthroscopic surgery of the shoulder? » not having arthroscopic surgery?
- Am I clear about which benefits and harms matter most to me?
- Do I have enough information and support to decide?

Questions to consider when talking with a health professional...

- Q Do I need surgery? What happens if I don't have surgery? What happens if I do nothing?
- Is surgery suitable for me? Which surgery is suitable for my diagnosis?
- **Can I have surgery later? If so, how long should I wait before considering surgery?**
- Have I considered my situation before making any decisions (eg. age, pain severity, activity levels, job demands, insurance coverage, caring responsibilities, involvement in sport, etc)?
- Do I understand enough about my condition and the benefits and harms of having surgery and not having surgery?



Items	Guide questions/description	Location
Interviewer/facilitator	Which author/s conducted the interview or focus group?	Line 158
Credentials	What were the researcher's credentials? e.g., PhD, MD	Line 158
Occupation	What was their occupation at the time of the study?	Line 158
Gender	Was the researcher male or female?	Line 158
Experience and training	What experience or training did the researcher have?	Line 157
Relationship established	Was a relationship established prior to study commencement?	Line 161
Participant	What did the participants know about the researcher? e.g.,	Line 161
knowledge of the interviewer	personal goals, reasons for doing the research	
Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g., Bias, assumptions, reasons and interests in the research topic	Line 158
Methodological orientation and theory	What methodological orientation was stated to underpin the study? e.g., grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Line 182
Sampling	How were participants selected? e.g., purposive, convenience, consecutive, snowball	Line 134
Method of approach	How were participants approached? e.g., face-to-face, telephone, mail, email	Line 124-134
Sample size	How many participants were in the study?	Line 206
Non-participation	How many people refused to participate or dropped out? Reasons?	Line 210
Setting of data collection	Where was the data collected? e.g., home, clinic, workplace	Line 156
Presence of non- participants	Was anyone else present besides the participants and researchers?	Line 158
Description of sample	What are the important characteristics of the sample? e.g., demographic data, date	Table 1
Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Supplementary Files 5 and 6
Repeat interviews	Were repeat interviews carried out? If yes, how many?	Line 209
Audio/visual recording	Did the research use audio or visual recording to collect the data?	Line 163
Field notes	Were field notes made during and/or after the interview or focus group?	Line 160
Duration	What was the duration of the interviews or focus group?	Line 157
Data saturation	Was data saturation discussed?	Line 194

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Transcripts returned	Were transcripts returned to participants for comment	Line 165
	and/or correction?	
Number of data	How many data coders coded the data?	Line 183
coders		
Description of the	Did authors provide a description of the coding tree?	Supplementary
coding tree		File 12
Derivation of themes	Were themes identified in advance or derived from the	Line 182
	data?	
Software	What software, if applicable, was used to manage the data?	Line 187
Participants checking	Did participants provide feedback on the findings?	Line 208
Quotations presented	Were participant quotations presented to illustrate the	Supplementary
	themes / findings? Was each quotation identified? e.g.	File 12
	participant number	
Data and findings	Was there consistency between the data presented and the	Supplementary
consistent	findings?	File 12 and 13
Clarity of major	Were major themes clearly presented in the findings?	Supplementary
themes	R	File 12
Clarity of minor	Is there a description of diverse cases or discussion of	Supplementary
themes	minor themes?	File 12 and 13