


**Please cite the Published Version**

Littlewood, Christopher , Mazuquin, Bruno, Moffatt, Maria and Bateman, Marcus (2021) Rehabilitation following rotator cuff repair: a survey of current practice (2020). *Musculoskeletal Care*, 19 (2). pp. 165-171. ISSN 1478-2189

**DOI:** <https://doi.org/10.1002/msc.1514>

**Publisher:** Wiley

**Version:** Accepted Version

**Downloaded from:** <https://e-space.mmu.ac.uk/626454/>

**Usage rights:**  In Copyright

**Additional Information:** This is the peer reviewed version of the following article: Littlewood, C., Mazuquin, B., Moffatt, M. and Bateman, M. (2021), Rehabilitation following rotator cuff repair: A survey of current practice (2020). *Musculoskeletal Care*, 19: 165-171, which has been published in final form at <https://doi.org/10.1002/msc.1514>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions. This article may not be enhanced, enriched or otherwise transformed into a derivative work, without express permission from Wiley or by statutory rights under applicable legislation. Copyright notices must not be removed, obscured or modified. The article must be linked to Wiley's version of record on Wiley Online Library and any embedding, framing or otherwise making available the article or pages thereof by third parties from platforms, services and websites other than Wiley Online Library must be prohibited.

**Enquiries:**

If you have questions about this document, contact [openresearch@mmu.ac.uk](mailto:openresearch@mmu.ac.uk). Please include the URL of the record in e-space. If you believe that your, or a third party's rights have been compromised through this document please see our Take Down policy (available from <https://www.mmu.ac.uk/library/using-the-library/policies-and-guidelines>)

# Rehabilitation following rotator cuff repair: a survey of current practice (2020)

Running title: Rehabilitation after rotator cuff repair

## **Chris Littlewood (Corresponding author) <sup>1</sup>**

1. Department of Health Professions, Faculty of Health, Psychology & Social Care, Manchester Metropolitan University, UK. [c.littlewood@mmu.ac.uk](mailto:c.littlewood@mmu.ac.uk)

## **Bruno Mazuquin <sup>1,2</sup>**

2. Warwick Clinical Trials Unit, University of Warwick, UK. [bruno.mazuquin@warwick.ac.uk](mailto:bruno.mazuquin@warwick.ac.uk)

## **Maria Moffatt <sup>1</sup>**

1. Department of Health Professions, Faculty of Health, Psychology & Social Care, Manchester Metropolitan University, UK. [mmoffatt408@hotmail.co.uk](mailto:mmoffatt408@hotmail.co.uk)

## **Marcus Bateman <sup>3</sup>**

3. Derby Shoulder Unit, University Hospitals Derby & Burton NHS Foundation Trust, Derby, UK. [marcus.bateman@nhs.net](mailto:marcus.bateman@nhs.net)

Sources of funding; CL is supported by a National Institute for Health Research (NIHR Post-Doctoral Fellowship, Dr Chris Littlewood, PDF-2018-11-ST2-005). The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the National Institute for Health Research or the Department of Health and Social Care.

All authors declare they have no competing interests.

# Rehabilitation following rotator cuff repair: a survey of current practice (2020)

## Abstract

**Introduction:** Approaches to rehabilitation following rotator cuff repair are variable but typically include four to six weeks of immobilisation followed by a gradual introduction of movement and activity. However, research has questioned whether such an approach is optimal. The aim of this study was to undertake an updated survey to understand whether practice has evolved in line with contemporary research.

**Methods:** An electronic survey was developed describing three case scenarios (medium-sized rotator cuff repair (2cm), large-sized rotator cuff repair (4cm), and large-sized rotator cuff repair with biceps tenodesis). Clinicians involved with rehabilitation following rotator cuff repair were invited to participate.

**Ethical Approval:** Health, Psychology and Social Care Research Ethics and Governance Committee, Manchester Metropolitan University (Ref: 22274).

**Results:** 129 responses were received (UK = 87, other regions = 42). Respondents would most commonly recommend four to six weeks of immobilisation for all case scenarios. Passive movement would commence during this period, with active movement recommended from four to six weeks. Resisted exercise would commence between seven to 12 weeks along with return to driving. There were some minor differences in recommendations between respondents from the UK and other regions, including a greater proportion from the UK recommending sling immobilisation rather than abduction brace immobilisation.

**Conclusion:** For many respondents to this survey, rehabilitation for the three case scenarios was similar and has not evolved in line with contemporary research evidence. The reasons behind this need to be explored and incorporated into the design of future research evaluating rehabilitation following rotator cuff repair.

## Key Words

Rehabilitation; rotator cuff repair; physiotherapy; survey

## Introduction

Surgical repair of the rotator cuff is a common orthopaedic procedure and over time surgical repairs have become more secure and less invasive (Funk, 2012). Following this surgery, patients undergo a programme of rehabilitation, usually supported by a physiotherapist, with the aim of restoring movement, strength and supporting a return to usual activities of daily living, including work and leisure (Littlewood and Bateman, 2015). Effective rehabilitation is important to help patients achieve the best clinical and quality of life outcomes (Coda *et al.*, 2020; Kane *et al.*, 2020).

In 2015, it was reported that, although there is a degree of variation, rehabilitation following rotator cuff repair typically consisted of four to six weeks immobilisation in a sling (Littlewood and Bateman, 2015). During this period of sling immobilisation, passive movement was recommended before active movement was introduced towards the end of this phase. Resisted exercise was recommended from seven weeks to 12 weeks postoperatively, alongside return to light work. A progressive resumption of function, including manual work and sport, was recommended from approximately 13 weeks (Littlewood and Bateman, 2015).

Since 2015, further randomised controlled trials (RCTs) have been published questioning whether such an approach, incorporating sling immobilisation is the optimal approach to post-operative rehabilitation (Sheps *et al.*, 2015, 2019; Tirefort *et al.*, 2019). Sheps *et al.* (2015, 2019) randomly allocated a total of 395 participants with full-thickness tears of the rotator cuff to standard rehabilitation (sling for six weeks and no active movement of the shoulder) or early mobilisation (sling as needed and active movement for activities of daily living). Allocation was concealed in both RCTs, reducing risk of selection bias, and all tear sizes were included (mean 1.8cm and 2.1cm respectively). Follow-up was two years. Tirefort *et al.* (2019) allocated a total of 80 participants with small- to medium full-thickness tears (< 3cm) of the rotator cuff to sling use for the first four weeks after surgery or no sling use. Methods of random sequence generation and concealment of allocation were not adequately reported so the risk of selection bias is unclear. Follow-up was six months. These RCTs have reported that early mobilisation and sling removal speeds up recovery without long-term consequence, including no increase in rotator cuff re-tear rates, compared with delayed approaches incorporating sling immobilisation (Sheps *et al.*, 2015, 2019; Tirefort *et al.*, 2019). Data regarding large tears, (> 3cm) remains limited though.

In the context of these research findings and questions about existing approaches to rehabilitation following rotator cuff repair, the aim of this study was to undertake an updated survey of current practice to understand whether practice has evolved in line with contemporary research since the previous survey in 2015 (Littlewood and Bateman, 2015).

## Methods

### Design

We undertook a cross-sectional online survey which was hosted by Online Surveys (<https://www.onlinesurveys.ac.uk>).

### Objectives

1. To describe current typical practice for rehabilitation following surgical repair in three scenarios:
  - i. Medium-sized rotator cuff repair (2cm)
  - ii. Large-sized rotator cuff repair (4cm)
  - iii. Large-sized rotator cuff repair (4cm) with biceps tenodesis.
2. To describe differences between current typical UK practice and other regions.

### Survey development and testing

The survey (Supplementary File One) was developed based on the previous survey undertaken and published in 2015 when 100 responses were received (Littlewood and Bateman, 2015) and was designed with reference to three case scenarios (Table 1). Case scenario one was based on the previous survey and case scenarios two and three were developed by the study team to reflect aspects of clinical uncertainty, i.e. increased tear size, and an additional procedure alongside the rotator cuff repair.

Table 1 Case scenarios on which the survey was based

The survey was piloted by three members of the study team and two further clinical physiotherapists prior to circulation. The survey was modified accordingly, including adding 'not applicable' responses where indicated, and amalgamating questions and changing wording to improve flow and understanding. Based on the findings from the pilot testing, the survey took less than 10 minutes to complete. Each question was mandatory and, as such, had to be fully completed to enable submission. The survey was open for one month (27 April to 27 May 2020).

### Participants

In this open survey, we recruited a convenience sample of clinicians, of any professional background, involved in rehabilitation following rotator cuff repair. Potential participants were invited to participate via email to the professional networks of the study team and via Twitter.

### Data analysis

Descriptive statistics, generated automatically by Online Surveys describe the number of responses to each item within the survey questions, for example the number of respondents who would use sling immobilisation (yes/no). Data were exported to IBM SPSS Statistics and Microsoft Excel to enable analysis of the difference in proportion of responses between the UK and other regions, for example regional difference in response to the question who would use sling immobilisation (yes/no), using the Chi-Square test. Statistical significance was set at  $p \leq 0.05$ .

### Ethical approval

This study was reviewed by the Health, Psychology and Social Care Research Ethics and Governance Committee at Manchester Metropolitan University and was given a favourable ethical opinion on 27 April 2020 (Ref: 22274).

### Results

129 responses were received (113 physiotherapists, 14 surgeons, one athletic trainer, one sports trainer). Eighty-seven responses were from within the UK and 42 from other regions (Europe (not UK) = 22, North America = 10, South America = 2, Africa = 3, Asia = 1, Oceania = 4).

### Size, location and other factors mandating immobilisation after surgical repair

Table 2 describes the size (anterior-posterior direction), location of rotator cuff tear and other factors that respondents indicated would mandate immobilisation following surgical repair. Respondents were asked to mark all factors that apply (yes/no). The differences in proportions of responses between the UK and OR were not statistically significant for all factors (Table 2). As tear size increases with addition of a subscapularis tear, the proportion of respondents who would recommend immobilisation increases. The most common size and location mandating sling immobilisation was a large posterior/ superior tear with torn subscapularis, indicated by 80 (62%) respondents. The most common other factors mandating sling immobilisation were surgical repair not regarded as secure and poor tendon quality, indicated by 71 (55%) respondents.

Table 2 Size, location of rotator cuff tear and other factors mandating immobilisation after surgical repair

Of the nine (7%) 'Other' factors, seven respondents reported that all patients were immobilised following rotator cuff repair, one respondent reported surgeon preference as a factor, and one respondent reported tissue healing as a factor.

### Immobilisation

Of all respondents, 103 (79.8%) would recommend immobilisation for case one (UK 71 (81.6%), other regions 32 (76.2%)). 118 (91.5%) would recommend immobilisation for case two (UK 80 (92.0%), other regions 38 (90.5%)). 121 (93.8%) would recommend immobilisation for case three (UK 82 (94.3%), other regions 39 (92.9%)). The differences between the UK and other regions were not statistically significant.

### Type of immobilisation

#### Case One

Of all respondents, 93 (72.1%) would recommend sling immobilisation for case one (UK 71/87 (81.6%), other regions 22/42 (52.4%),  $p < 0.001$ ) with a greater proportion of respondents from the UK recommending sling immobilisation. Of all respondents, 14 (10.9%) would recommend abduction bracing for case one (UK 3/87 (3.4%), other regions 11/42 (26.2%)) with a greater proportion of respondents from other regions recommending abduction bracing.

#### Case Two

Of all respondents, 98 (76.0%) would recommend sling immobilisation for case two (UK 76/87 (87.4%), other regions 22/42 (52.4%),  $p < 0.001$ ) with a greater proportion of respondents from the UK recommending sling immobilisation. Of all respondents, 26 (20.2%) would recommend abduction bracing for case two (UK 7/87 (8.0%), other regions 19/42 (45.2%)) with a greater proportion of respondents from other regions recommending abduction bracing.

#### Case Three

Of all respondents, 102 (79.1%) would recommend sling immobilisation for case three (UK 79/87 (90.1%), other regions 23/42 (54.8%),  $p < 0.001$ ) with a greater proportion of respondents from the UK recommending sling immobilisation. Of all respondents, 24 (18.6%) would recommend abduction bracing for case three (UK 5/87 (5.7%), other regions 19/42 (45.2%)) with a greater proportion of respondents from other regions recommending abduction bracing.

### Length of immobilisation

The most frequently reported length of immobilisation was four to six weeks for all three cases (Figure 1). The differences in proportions of responses between the UK and other regions were not statistically significant; therefore, Figure 1 represents merged data from UK and other regions.

Figure 1 Length of immobilisation recommended by respondents

Table 3 reports the most frequently reported time for commencement of all activities for each case including movement, exercise, work, sport and driving.

### Commencement of passive movement

The most frequently reported time for commencement of passive movement was within one week for all three cases (Case 1: 80 (62%), Case 2: 69 (53.5%), Case 3: 65 (50.4%)).

A greater proportion of respondents from the UK would commence passive movement within one week for case one (UK 60/87 (69.0%), other regions 20/42 (47.6%),  $p = 0.019$ ). A greater proportion

of respondents from other regions would commence passive movement between one to three weeks for case one (UK 18/87 (20.7%), other regions 20/42 (47.6%),  $p = 0.001$ ).

A greater proportion of respondents from the UK would commence passive movement within one week for case two (UK 52/87 (59.8%), other regions 17/42 (40.5%),  $p = 0.039$ ).

A greater proportion of respondents from the UK would commence passive movement within one week for case three (UK 51/87 (58.6%), other regions 14/42 (33.3%),  $p = 0.007$ ).

Any other differences between the UK and other regions for the three cases were not statistically significant.

#### Commencement of active movement

The most frequently reported time for commencement of active movement was four to six weeks for all three cases (Case 1: 62 (48.1%), Case 2: 52 (40.3%), Case 3: 53 (41.1%)). However, a greater proportion of respondents from other regions would commence active movement between seven to 12 weeks for case three (UK 21/87 (24.1%), other regions 18/42 (42.9%),  $p=0.030$ ). Any other differences between the UK and other regions were not statistically significant.

#### Commencement of resisted exercise

The most frequently reported time for commencement of resisted exercise was seven to 12 weeks for all three cases (Case 1: 56 (43.4%), Case 2: 64 (49.6%), Case 3: 67 (51.9%)). Any differences between the UK and other regions were not statistically significant.

#### Commencement of light work, e.g. computer operation.

The most frequently reported time for commencement of light work was four to six weeks for case one (43 (37.2%)) and seven to 12 weeks for the other cases (Case 2: 56 (43.4%), Case 3: 54 (41.9%)). Any differences between the UK and other regions were not statistically significant.

#### Return to manual work

The most frequently reported time for return to manual work was 13 to 24 weeks for all three cases (Case 1: 75 (58.1%), Case 2: 64 (49.6%), Case 3: 64 (49.6%)). A greater proportion of respondents from other regions would recommend commencement of manual work between seven and 12 weeks for case two (UK 11/87 (12.6%), other regions 12/42 (28.6%),  $p = 0.026$ ). Any other differences between the UK and other regions were not statistically significant.

#### Return to non-contact sport

The most frequently reported time to return to non-contact sport was 13 to 24 weeks for all three cases (Case 1: 75 (58.1%), Case 2: 69 (53.5%), Case 3: 72 (55.8%)). A greater proportion of respondents from the UK would recommend return to non-contact sport between seven and 12 weeks for case one (UK 27/87 (31.0%), other regions 6/42 (14.3%),  $p = 0.041$ ). Any other differences between the UK and other regions were not statistically significant.

#### Return to contact sport

The most frequently reported time to return to contact sport was greater than 24 weeks for all three cases (Case 1: 92 (71.3%), Case 2: 99 (76.7%), Case 3: 98 (76.0%)). Any differences between the UK and OR were not statistically significant.

#### Return to driving

The most frequently reported time to return to driving was seven to 12 weeks for all three cases (Case 1: 58 (45.0%), Case 2: 69 (53.5%), Case 3: 68 (52.7%)). A greater proportion of respondents from other regions would recommend return to driving between one to three weeks for case two

(UK 1/87 (1.1%), other regions 4/42 (9.5%),  $p = 0.020$ ). A greater proportion of respondents from the UK would recommend return to driving between four to six weeks for case two (UK 29/87 (33.3%), OR 7/42 (16.7%),  $p = 0.047$ ). Any other differences between the UK and other regions were not statistically significant.

Table 3 Most frequent time to commencement of movement, exercise and activities for all respondents

## Discussion

The findings from this survey suggest that respondents would most commonly recommend four to six weeks of sling immobilisation following rotator cuff repair. Passive movement would commence during this period, with active movement recommended from four to six weeks along with recommencement of light work. Commencement of resisted exercise would be between seven to 12 weeks along with return to driving. Return to non-contact sport and manual work would most commonly be recommended between 13 to 24 weeks, and return to contact sport from 24 weeks. There were some differences in recommendations between respondents from the UK and other countries, including a greater proportion from the UK recommending sling immobilisation rather than immobilisation with an abduction brace, and a greater proportion of respondents from the UK recommending commencement of passive movement within one week, rather than between one to three weeks. The most common factors mandating sling immobilisation were surgical repair not regarded as secure and poor tendon quality.

With the exception of return to light work, these results mirror the findings of the survey of practice of rehabilitation following rotator cuff repair reported in 2015 (Littlewood and Bateman, 2015) which, in turn, reflect practice recommendations published in 2002 (Cohen, Romeo and Bach, 2002). Respondents to this current survey would recommend return to light work between four to six weeks, whereas respondents to the 2015 survey recommended seven to 12 weeks. Hence, despite surgical progress in terms of less invasive operations and stronger implants resulting in more secure repairs (Funk, 2012), in tandem with evidence raising questions about current approaches to rehabilitation including the need for, or value of immobilisation, rehabilitation practice of most respondents does not seem to have evolved. The recommendation to immobilise following rotator cuff repair and to introduce passive movement during this time has been reflected in other international surveys (Coda *et al.*, 2020; Kane *et al.*, 2020).

It has previously been reported that early mobilisation promotes a faster recovery of function without increased risk of re-tear following rotator cuff repair (Mazuquin *et al.*, 2018; Sheps *et al.*, 2019). There is now consistency in findings from RCTs and systematic reviews with regards to small and medium sized rotator cuff tears, but data is limited regarding large and massive tears (Littlewood *et al.*, 2015; Mazuquin *et al.*, 2018). There are likely to be many reasons why such research findings are not permeating clinical practice and facilitating change including surgeon-led rehabilitation protocols, lack of communication between physiotherapists and surgeons, perceived lack of autonomy of physiotherapists in this context, and the perceived risk of re-tear if sling removal and early mobilisation is recommended, among many possible contributing factors. In other areas of clinical practice however, early mobilisation is promoted as a way of facilitating repair and remodelling rather than being seen as a threat to this process (Doherty *et al.*, 2017). It is therefore apparent that future research needs to take full account of current clinical concerns and barriers to implementation and be designed to address these, including consideration of concern about rotator cuff re-tear following sling removal and early mobilisation.



### Study limitations

This survey reflects the responses of a limited number of self-selected responders and as such should not be generalised to the wider population of clinicians involved in rehabilitation following rotator cuff repair with confidence. Furthermore, only an English language version of the survey was available which means it is likely that responses from non-English speaking countries were limited.

### Conclusion

For most of the respondents to this survey, rehabilitation following rotator cuff repair includes four to six weeks of immobilisation using a sling along with a gradual introduction of active and resisted exercise and return to functional activity over a number of weeks and months. Thus, we conclude, that rehabilitation following rotator cuff repair has not evolved for almost two decades despite surgical advancement and research evidence challenging the basis of current approaches. The reasons behind this need to be explored and incorporated into the design of any future research evaluating rehabilitation following rotator cuff repair.

## References

- Coda, R. *et al.* (2020) 'A Review of Online Rehabilitation Protocols', *Arthroscopy, Sports Medicine, and Rehabilitation*. Arthroscopy Association of North America, pp. 1–12. doi: 10.1016/j.asmr.2020.03.006.
- Cohen, B., Romeo, A. and Bach, B. (2002) 'Rehabilitation of the shoulder after rotator-cuff repair', *Operative Techniques in Orthopaedics*, 12(3), pp. 218–224.
- Doherty, C. *et al.* (2017) 'Treatment and prevention of acute and recurrent ankle sprain: an overview of systematic reviews with meta-analysis', *British Journal of Sports Medicine*, 51(2), pp. 113 LP – 125. doi: 10.1136/bjsports-2016-096178.
- Funk, L. (2012) 'Arthroscopic shoulder surgery has progressed, has the rehabilitation?', *International Musculoskeletal Medicine*, 34(4), pp. 141–145.
- Kane, L. T. *et al.* (2020) 'Comparing expert opinion within the care team regarding postoperative rehabilitation protocol following rotator cuff repair', *Journal of Shoulder and Elbow Surgery*. Elsevier Inc., pp. 1–8. doi: 10.1016/j.jse.2020.01.097.
- Littlewood, C. *et al.* (2015) 'Rehabilitation following rotator cuff repair: a systematic review', *Shoulder & Elbow*, 7, pp. 115–124.
- Littlewood, C. and Bateman, M. (2015) 'Rehabilitation following rotator cuff repair: a survey of current UK practice', *Shoulder & Elbow*, 7, pp. 193–204.
- Mazuquin, B. F. *et al.* (2018) 'Effectiveness of early compared with conservative rehabilitation for patients having rotator cuff repair surgery: an overview of systematic reviews', *British Journal of Sports Medicine*, 52, pp. 111–121. doi: 10.1136/bjsports-2016-095963.
- Sheps, D. *et al.* (2015) 'Early mobilisation following mini-open rotator cuff repair: a randomised control trial', *The Bone & Joint Journal*, 97(9), pp. 1257–1263.
- Sheps, D. M. *et al.* (2019) 'Early Active Motion Versus Sling Immobilization After Arthroscopic Rotator Cuff Repair: A Randomized Controlled Trial', *Arthroscopy*. Elsevier, 35(3), pp. 749–760.e2. doi: 10.1016/j.arthro.2018.10.139.
- Tirefort, J. *et al.* (2019) 'Postoperative Mobilization After Superior Rotator Cuff Repair: Sling Versus No Sling: A Randomized Prospective Study.', *The Journal of bone and joint surgery*, 101(6), pp. 494–503. doi: 10.2106/JBJS.18.00773.

CASE ONE: A 65-year old patient has undergone a surgical repair of a full-thickness tear ( <b>2cm</b> ) of supraspinatus.
CASE TWO: A 65-year old patient has undergone a surgical repair of a full-thickness tear ( <b>4cm</b> ) of supraspinatus.
CASE THREE: A 65-year old patient has undergone a surgical repair of a full-thickness tear ( <b>4cm</b> ) of supraspinatus as well as a biceps tenodesis.

Table one

Size, location and other factors	All (%)	UK (%)	Other regions (%)	p-value (UK vs OR)
Small (<1cm) posterior/superior tear with intact subscapularis	35 (27.1)	23 (26.4)	12 (28.6)	0.798
Small (<1cm) posterior/superior tear with torn subscapularis	41 (31.8)	27 (31.0)	14 (33.3)	0.792
Medium (1-3cm) posterior/superior tear with intact subscapularis	51 (39.5)	33 (37.9)	18 (42.9)	0.591
Medium (1-3cm) posterior/superior tear with torn subscapularis	65 (50.4)	42 (48.3)	23 (54.8)	0.489
Large (3-5cm including infraspinatus) posterior/superior tear with intact subscapularis	74 (57.4)	48 (55.2)	26 (61.9)	0.468
Large (3-5cm including infraspinatus) posterior/superior tear with torn subscapularis	80 (62.0)	51 (58.6)	29 (69.0)	0.252
Intact posterior/superior rotator cuff with torn subscapularis	46 (35.7)	30 (34.5)	16 (38.1)	0.688
Size and location do not mandate immobilisation	42 (32.6)	32 (36.8)	10 (23.8)	0.140
Patient's age > 60 years	23 (17.8)	15 (17.2)	8 (19.0)	0.801
Patient's age >65 years	19 (14.7)	11 (12.6)	8 (19.0)	0.336
Patient's age >70 years	23 (17.8)	15 (17.2)	8 (19.0)	0.801
Patient's age > 75 years	23 (17.8)	15 (17.2)	8 (19.0)	0.801
Surgical repair not regarded as secure	71 (55.0)	53 (60.9)	18 (42.9)	0.053
Poor tendon quality	71 (55.0)	49 (56.3)	22 (52.4)	0.673
Poor bone quality	41 (31.8)	24 (27.6)	17 (40.5)	0.140
Patient is a regular smoker	37 (28.7)	24 (27.6)	13 (31.0)	0.692
Patient reports alcohol intake over recommended limits	28 (21.7)	19 (21.8)	9 (21.4)	0.957
Patient is diabetic	32 (24.8)	22 (25.3)	10 (23.8)	0.855
None of these factors	33 (25.6)	20 (23.0)	13 (31.0)	0.331
Other	9 (7.0)	6 (6.9)	3 (7.1)	0.958

Table two

Activity	Most frequent time to commencement (weeks)		
	Case One	Case Two	Case Three
Passive movement	<1	<1	<1
Active movement	4-6	4-6	4-6
Resisted exercise	7-12	7-12	7-12
Light work	4-6	7-12	7-12
Manual work	13-24	13-24	13-24
Non-contact sport	13-24	13-24	13-24
Contact sport	>24	>24	>24
Driving	7-12	7-12	7-12

Table three

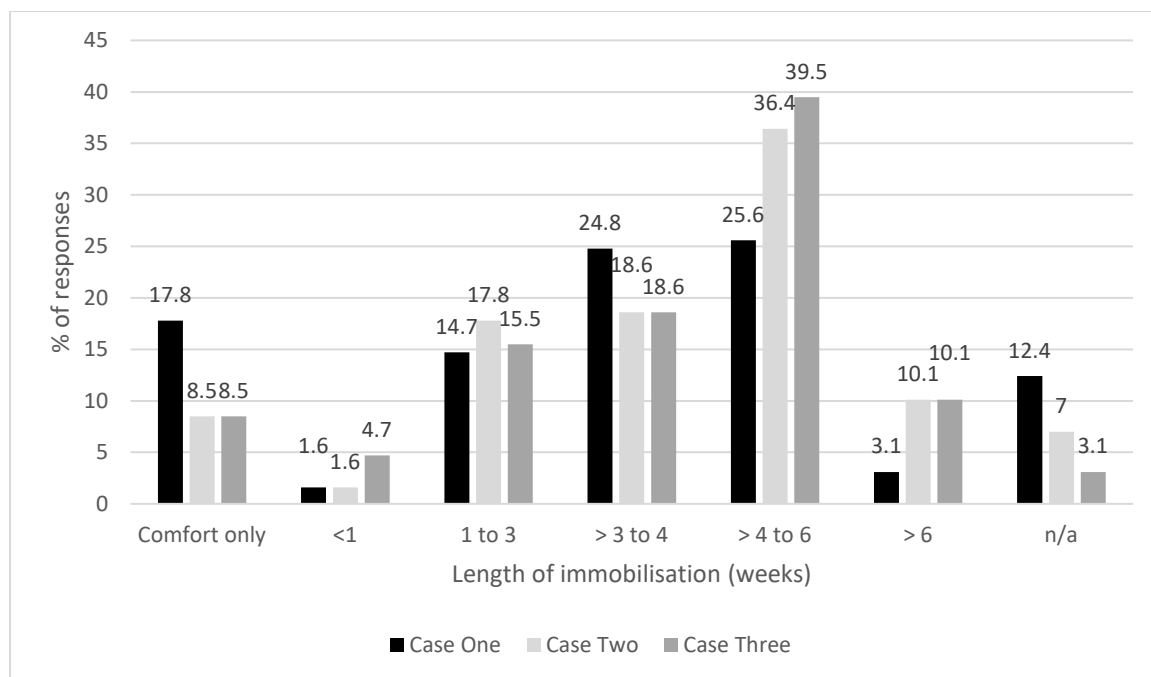


Figure one

## Supplementary File One: The survey tool

### **Preliminary questions:**

1. What is your professional background?

- Physiotherapist
- Surgeon
- Other:

Please state \_\_\_\_\_

2. What is your main place of work?

- UK
- Europe, not including UK
- North America
- South America
- Africa
- Asia
- Oceania

3. Is there a size (anterior-posterior) direction and location of rotator cuff tear that mandates sling immobilisation after surgical repair? (check all that apply)

- Small (<1cm) posterior/superior tear with intact subscapularis
- Small (<1cm) posterior/superior tear with torn subscapularis
- Medium (1-3cm) posterior/superior tear with intact subscapularis
- Medium (1-3cm) posterior/superior tear with torn subscapularis
- Large (3-5cm including infraspinatus) posterior/superior tear with intact subscapularis
- Large (3-5cm including infraspinatus) posterior/superior tear with torn subscapularis
- Intact posterior/superior rotator cuff with torn subscapularis
- No

4. Do any of the following factors mandate sling immobilisation after surgical repair? (check all that apply)

- Patient's age > 60 years
- Patient's age >65 years
- Patient's age >70 years
- Patient's age > 75 years
- Surgical repair not regarded as secure
- Poor tendon quality
- Poor bone quality
- Patient is a regular smoker
- Patient reports alcohol intake over recommended limits
- Patient is diabetic
- None of these factors
- Other:

Please provide further detail \_\_\_\_\_



CASE ONE: A 65-year old patient has undergone a surgical repair of a full-thickness tear (**2cm**) of supraspinatus.

5. Would you recommend immobilisation following surgical repair in this case?

- Yes
- No

6. If so, what method of immobilisation would be used?

- Sling
- Abduction brace
- Other:

Please provide further detail\_\_\_\_\_

- Not applicable

7. If you are recommending sling immobilisation, how long would that be for?

- For comfort only
- < One week
- One to three weeks
- > Three and up to four weeks
- > Four and up to six weeks
- > Six weeks
- Not applicable

8. When would you recommend that passive movement commences?

- < One week
- One to three weeks
- Four to six weeks
- > Six weeks

9. When would you recommend that active movement commences?

- < One week

- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

10. When would you recommend that resisted exercise commences?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

11. When do you recommend commencement of light work, e.g. computer operation etc.?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

12. When do you recommend commencement of manual labour, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

13. When do you recommend return to non-contact sport, if applicable?

- < One week
- One to three weeks
- Four to six weeks

- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

14. When do you recommend return to contact sport, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

15. When do you recommend return to driving, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

CASE TWO: A 65-year old patient has undergone a surgical repair of a full-thickness tear (**4cm**) of supraspinatus.

16. Would you recommend immobilisation following surgical repair in this case?

- Yes
- No

17. If so, what method of immobilisation would be used?

- Sling
- Abduction brace
- Other:

Please provide further detail\_\_\_\_\_

- Not applicable

18. If you are recommending sling immobilisation, how long would that be for?

- For comfort only
- < One week
- One to three weeks
- > Three and up to four weeks
- > Four and up to six weeks
- > Six weeks
- Not applicable

19. When would you recommend that passive movement commences?

- < One week
- One to three weeks
- Four to six weeks
- > Six weeks

20. When would you recommend that active movement commences?

- < One week

- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

21. When would you recommend that resisted exercise commences?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

22. When do you recommend commencement of light work, e.g. computer operation etc.?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

23. When do you recommend commencement of manual labour, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

24. When do you recommend return to non-contact sport, if applicable?

- < One week
- One to three weeks
- Four to six weeks

- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

25. When do you recommend return to contact sport, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

26. When do you recommend return to driving, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

CASE THREE: A 65-year old patient has undergone a surgical repair of a full-thickness tear (**4cm**) of supraspinatus as well as a biceps tenodesis.

27. Would you recommend immobilisation following surgical repair in this case?

- Yes

- No

28. If so, what method of immobilisation would be used?

- Sling

- Abduction brace

- Other:

Please provide further detail \_\_\_\_\_

- Not applicable

29. If you are recommending sling immobilisation, how long would that be for?

- For comfort only

- < One week

- One to three weeks

- > Three and up to four weeks

- > Four and up to six weeks

- > Six weeks

- Not applicable

30. When would you recommend that passive movement commences?

- < One week

- One to three weeks

- Four to six weeks

- > Six weeks

31. When would you recommend that active movement commences?

- < One week

- One to three weeks

- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

32. When would you recommend that resisted exercise commences?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

33. When do you recommend commencement of light work, e.g. computer operation etc.?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- > Twelve weeks

34. When do you recommend commencement of manual labour, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

35. When do you recommend return to non-contact sport, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks



- 13 to 24 weeks
- > 24 weeks

36. When do you recommend return to contact sport, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

37. When do you recommend return to driving, if applicable?

- < One week
- One to three weeks
- Four to six weeks
- Seven to twelve weeks
- 13 to 24 weeks
- > 24 weeks

THANK YOU FOR COMPLETING THIS SURVEY.