Rehabilitation Following Shoulder Arthroscopic Stabilisation Surgery: A survey of UK practice

Background

Optimal rehabilitation following arthroscopic shoulder stabilisation for traumatic anterior instability is unknown. The purpose of this study was to establish current UK practice for this patient group.

Methodology

A self-administered online questionnaire was developed and distributed to UK surgeons and physiotherapists.

Results

138 responses were received. Routine immobilisation was reported in 79.7% of responses with a cross body sling being the preferred position (63.4%). Duration of immobilisation and timescales to initiate movement were highly variable. Return to light work was advised when patients felt able (25.4%) or after 6 weeks (26.1%). 58.7% recommended waiting for 12 weeks to return to manual work. 56% recommended non-contact sport could be resumed after 12 weeks. For contact sport, recommendations varied from 6 weeks (3.8%) to 6 months (5.8%). Psychological readiness was the most frequently cited criteria for return to play (58.6%). Factors such as hyperlaxity (40.6%), age (32.6%) and kinesiophobia (28.3%) were not considered as relevant as reported quality of surgical fixation (50%).

Conclusion

There is no clear consensus regarding optimal post-operative rehabilitation following arthroscopic shoulder stabilisation. Further work is required to establish high value, personalised pathways for this patient group.

1. Introduction

The glenohumeral joint (GHJ) is the most common joint to dislocate, accounting for over 50% of all joint dislocations [1]. Traumatic anterior shoulder dislocation (TASD) is the most common, contributing to between 95% of all shoulder dislocations and predominantly affecting the young and active population [2]. It is most frequently experienced in those aged between 15-29 years old and occurs nearly 3 times more often in males compared to females [3].

Following a first-time dislocation, the reported likelihood of recurrent dislocation is widely variable and ranges from 21-88% depending upon risk factors and characteristics such as sport and lifestyle, number of dislocations, age, occupation, and generalised ligamentous laxity [4]. Passive, static structures such as the joint capsule, glenohumeral ligaments and labrum contribute to overall stability, therefore pathological damage can play a significant role in the development of persistent anterior instability [5]. This is due to their mechanoreceptor activity and the influence on proprioception. In instances where structural pathology exists and symptoms persist to a sufficient level to prevent a satisfactory return to function, patients may choose to undergo shoulder stabilisation surgery [5]. Often performed arthroscopically,

surgery aims to repair structural damage that has occurred during the dislocation(s) including Bankart lesions (avulsion of the anterior inferior labrum/capsule complex) and Hill-Sachs lesions (a compression fracture of the postero superolateral humeral head), [6]. Post-operative rehabilitation is generally considered important following stabilisation surgery [7]. However, periods of immobilisation, exercise prescription and progression, and return to function, including sport, remains highly variable [8].

Reported content of rehabilitation following shoulder stabilisation is rarely described in enough detail to replicate [9]. Most studies refer to the importance of restoring the required strength and range of movement at the GHJ but rarely detail the process by which these were restored [9]. Accelerated rehabilitation programmes, with minimal postoperative immobilisation, have gained increasing popularity over the last 5-10 years [10], although current practice in some sports has moved away from these as there is anecdotal evidence that recurrent problems are more frequent. However, as there is a lack of robust, high-quality evidence to inform decision making regarding the optimal type of rehabilitation following arthroscopic surgery, protocols are often set within local teams. As a result, there appears to be a wide variation in care [7] and no best practice guidelines exist, including which selected patient reported outcome measures (PROMS) and physical performance tests used by practitioners to aid decisions regarding patients' rehabilitation process and return to function. Indeed, the Bern Consensus statement 2022 concluded that there is an absence of high quality evidence to support rehabilitation and return to sport decisions following shoulder injury [11].

The British Elbow and Shoulder Society (BESS) allied health professional clinical guideline group (AHPCGG) was convened to address this need. To begin the

process of developing improved guidance for post-operative rehabilitation following arthroscopic shoulder stabilisation surgery, the aim of this study was to establish current UK rehabilitation practice following primary arthroscopic stabilisation surgery for recurrent traumatic shoulder instability.

2. Methods

2.1. Survey design and development

The BESS AHPCGG developed a self-administered online questionnaire for participating physiotherapists and surgeons to complete. In addition to key demographic information, items covered the type, nature and duration of immobilisation following surgery and the key timescales and decision-making factors that influence progress through the stages of rehabilitation. 36 closed style questions were asked with a combination of response options including dichotomous yes/no answers, multiple choice and 5-point Likert scales. The survey questions are provided in Supplementary File 1.

2.2. Ethical approval

Health Research Authority (HRA) approval was not required but ethical oversight and governance was overseen by Gloucestershire Hospitals NHS Foundation Trust's Scientific Review Group (reference 21/076/GHT).

2.3 Pilot study

Various drafts of the survey questions were reviewed independently by BESS AHPCGG members, until satisfactory wording was agreed upon. The structure of

the online survey was piloted using different scenarios to ensure the logic built into the survey software was free from fault or misrouting.

2.4 Study population

To be eligible for participation in the study, respondents were required to be a surgeon or physiotherapist based in the United Kingdom involved in the care of a patient who had undergone soft tissue stabilisation surgery for traumatic shoulder instability within the last 2 years.

2.5 Invitation and consent

The survey was hosted on the Health Survey (online survey system) platform which can be found at www.onlinesurveys.ac.uk. An invitation to complete the survey was advertised to the BESS membership and circulated to the wider surgical and physiotherapy population via Twitter and email. Invitations were also sent by members of the working group across their professional networks with peer-to-peer snowball sampling encouraged. The survey opened on the 7th December 2021 and remained live for 5 weeks due to similar studies using this timeframe[12–14]. When accessing the survey, respondents were directed to an online information leaflet outlining the purpose of the study. This leaflet provided assurances of anonymity and that completion of the survey was voluntary. Submission of the survey was deemed to be consent and this was explicit in the information leaflet. Responders were made aware that due the anonymous nature of the study, withdrawal of results following submission would not be possible. Contact details and processes for outlining any concerns regarding the study were made explicitly clear. Confirmation of eligibility

was required prior to commencing the survey. Ineligible responders were unable to proceed. Our target sample was a minimum of 100 participants to be comparable to similar studies[13].

2.6 Data analysis

Data were imported into Excel (Microsoft Corps, Redmond, CA, USA) and analysed using descriptive statistics.

3. Results

One hundred and thirty eight responses were recorded. Of these 110 (79.9%) were physiotherapists and 28 (20.3%) were surgeons. Further details of the levels of experience and workplace settings of respondents can be seen in Table 1. Consultants were the most common responders from surgeons. The majority of physiotherapists (87%) who responded worked within the National Health Service (NHS). NHS secondary care services was the most common workplace with 85 (61.6%) working within that setting.

Table 1: Characteristics of respondents

		n	%
Profession	Physiotherapist	110	79.9
	Surgeon	28	20.3
Grade (Surgeon)	Consultant	27	96.5
	Surgeon Specialist Grade	1	3.6
Grade* (Physiotherapist)	Band 5	3	2.7
	Band 6	20	18.2
	Band 7	28	25.5
	Band 8a	41	37.3
	Band 8b	3	2.7
	Band 8c and above	1	0.9 %
	Works outside NHS pay structure	14	12.7
Primary workplace	Primary care	14	10.1
	Secondary care	85	61.6
	Tertiary care	20	14.5
	Private practice	14	10.1
	Elite sport	5	3.6
	Armed forces	0	0

	Charitable sector	0	0

*Based on NHS Agenda for Change (AfC) pay and grading structure

3.1 Use of post-operative protocols

Post-operative protocols were routinely used by 129(93.5%) responders. 93(72.1%) had a single post operative protocol used by all surgeons and physiotherapists. 29 (22.5%) have at least 2 different protocols in place, 4(3.1%) have at least 3 protocols and 3(2.3%) had more than 4 different protocols. Although not specifically asked, this may have been due, in part, to each surgeon at these hospitals having their own individual protocols. Protocols were reported to be written jointly between surgical and physiotherapy teams in 93(72.1%) of responses. 17(13.2%) were written by the physiotherapy team, 10(7.8%) were written by surgeons. 1(0.8%) response reported different protocols requiring different answers and 8(6.2%) were unaware as to who had written the protocol.

3.2 Immobilisation following surgery

Immobilisation of the shoulder following arthroscopic stabilisation surgery was reported as routine by 110(79.9%) of respondents. 13(9.4%) of respondents reported that shoulders were not routinely immobilised following their surgery. For those who had several protocols, 9(6.5%) reported that the majority of those protocols involved routine immobilisation whilst 2(1.4%) responded that the majority of the protocols did not. 2(1.4%) who have several protocols had no clear trend towards whether the shoulder should be immobilised or not. 2(1.4%) did not know whether routine immobilisation was a feature of their protocol.

		n	%
Method of immobilisation used	Sling	109	88.6%
	Collar & cuff	5	4.1%
	External rotation brace	9	7.3%
Most common position of immobilisation	High sling	5	4.1%
	Cross body	78	63.4%
	Neutral	35	28.5%
	Low abduction	4	3.3%
	Abduction	1	0.8%
How long are shoulders immobilised for?	As pain allows/patient is free to determine the length of time	9	7.3%
	Timescales are individualised to the patient, but they are not free to choose	10	8.1%
	< 48 hours	1	0.8%

	Between 48-72	0	0%
	Up to 1 week	4	3.3%
	Up to 2 weeks	15	12.2%
	Up to 3 weeks	25	20.3%
	Up to 4 weeks	32	26%
	Up to 5 weeks	0	0%
	Up to 6 weeks	27	22%
	Up to 7 weeks	0	0%
	Up to 8 weeks	0	0%
During the immobilisation period, are there any specific shoulder movements that are restricted?	There are no restrictions at all	1	0.8%
	There are some movements (e.g. external rotation) that patients are not allowed to perform at all	57	46.3%
	Patients can move their shoulder in any direction but only within their “safe zone”	65	52.8%
During the immobilisation period, are patients allowed to remove their sling?	Patient is allowed to wean themselves from the sling as they see fit	1	0.4%

	Full restriction – patient is not allowed to remove their sing at all	3	1.3%
	Patient is allowed to remove their sling for hygiene purposes only	68	29.7%
	Patient is allowed to remove their sling to perform exercises	93	40.6%

3.3 Starting movement

15(7.5%) of responders reported that passive movements are not used as part of their protocol. If passive movements are used, in the majority of cases 113(56.5%), the passive movement is performed by the patient, for example by the patient stepping back with their arms fully supported on a surface. Passive movements were performed by the physiotherapist in 51(25.5%) or by a third party (friend/family/carer) in 21(10.5%) of cases.

	Commencing passive movement		Commencing active-assisted movement		Commencing active movement		Through range resisted movement	
Immediately	44	31.9%	26	18.8%	9	6.5%	3	2.2%
As pain allows/as patient feels able	30	21.7%	31	22.5%	21	15.2%	12	8.7%
Within 48 hours	12	8.7%	4	2.9%	1	1.4%		
Within 72 hours	2	1.4%	0	0	0	0		
Within 1 weeks	9	6.5%	9	6.5%	2	1.4%	1	0.7%
After 1 week	4	2.9%	8	5.8%	2	1.4%	2	1.4%
After 2 weeks	12	8.7%	10	7.2%	12	8.7%	3	2.2%
After 3 weeks	12	8.7%	20	14.5%	27	19.6%	13	9.4%
After 4 weeks	6	4.3%	21	15.2%	29	21%	20	14.5%
After 5 weeks	0	0	1	0.7%	0	0	0	0
After 6 weeks	2	1.4%	6	4.3%	31	22.5%	54	39.1%
After 7 weeks	0	0	1	0.7%	1	0.7%	0	0
After 8 weeks	0	0	1	0.7%	1	0.7%	9	6.5%
After 9 weeks							3	2.2%

After 10 weeks		4	2.9%
After 11 weeks		0	0
After 12 weeks		12	8.7%
After more than 12 weeks		2	1.4%

Note: Grey shaded area indicates no available option for participant to provide answer.

3.4 Return to work

	At what point following surgery do you suggest the patient should return to light work – e.g computer use		After what point following surgery do you suggest the patient is able to return to manual work?	
Immediately	4	2.9%	0	0
As pain allows/as patient feels able	35	25.4%	7	5.1%
Within 1 week	2	1.4%	0	0
After 1 week	2	1.4%	0	0
After 2 weeks	15	10.9%	0	0
After 3 weeks	8	5.8%	2	1.4%
After 4 weeks	18	13%	1	0.7%
After 5 weeks	1	0.7%	0	0

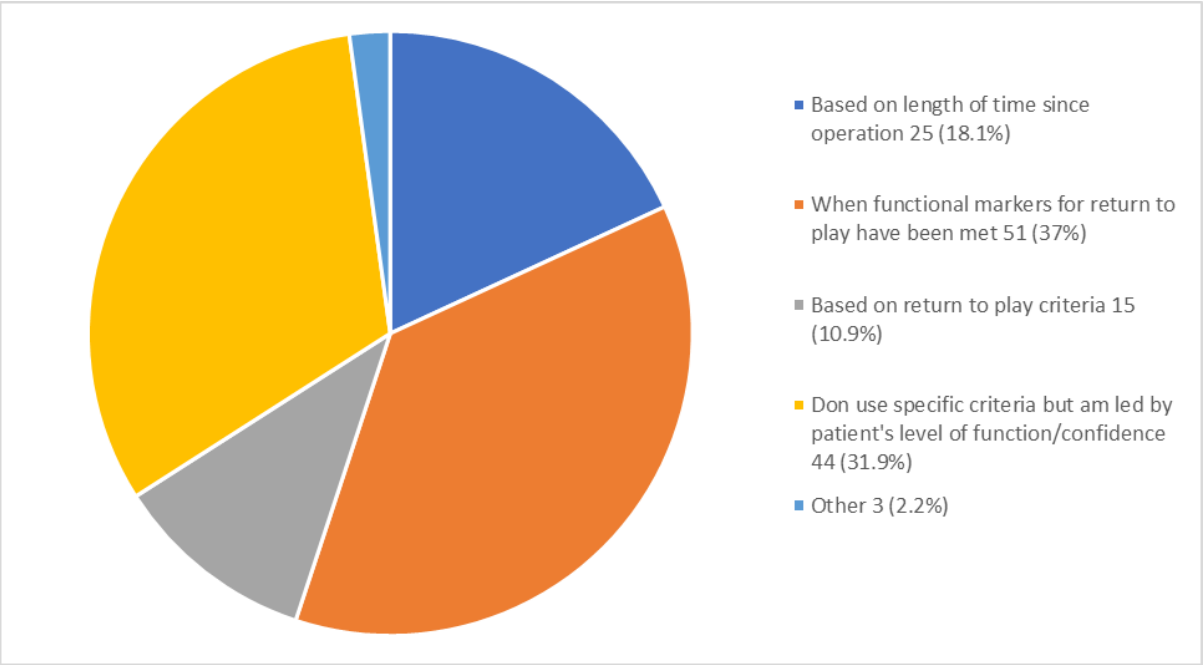
After 6 weeks	36	26.1%	10	7.2%
After 7 weeks	1	0.7%	1	0.7%
After 8 weeks	9	6.5%	18	13%
After 9 weeks	0	0	0	0
After 10 weeks	0	0	2	1.4%
After 11 weeks	0	0	0	0
After 12 weeks	5	3.6%	81	58.7%
After more than 12 weeks	2	1.4%		
After 13 weeks			1	0.7%
After 14 weeks			0	0
After 15 weeks			0	0
After 16 weeks			8	5.8%
After more than 16 weeks			7	5.1%

Note: Grey shaded area indicates no available option for participant to provide answer.

3.5 Return to sport

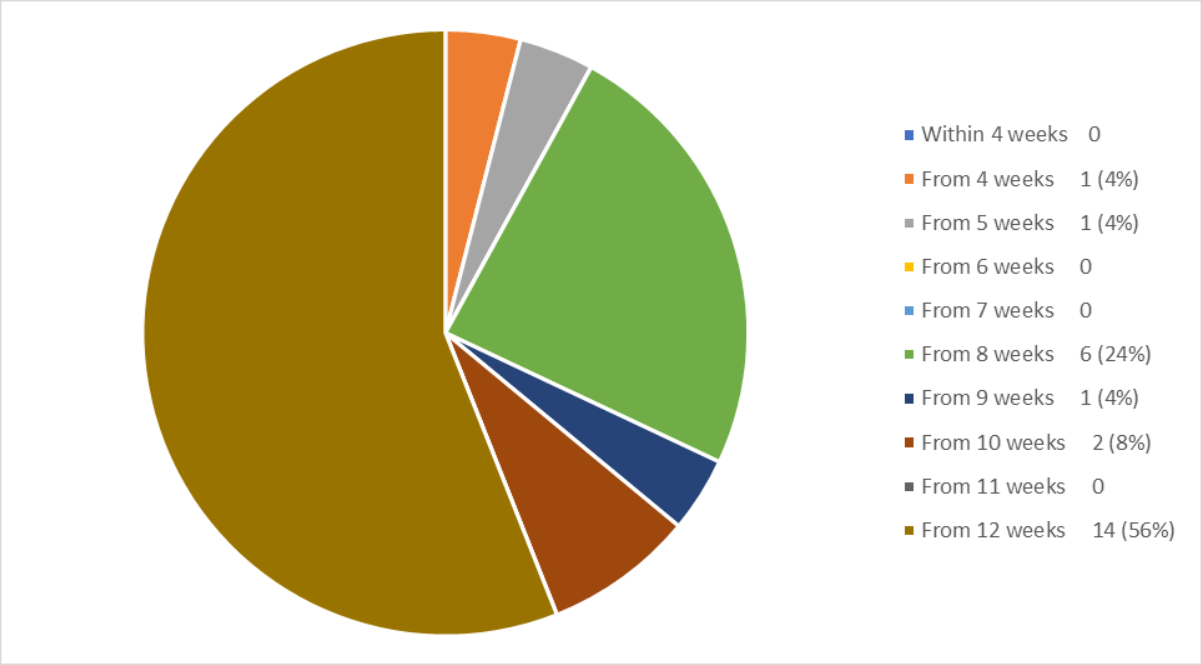
Survey participants were asked on which factors they based their recommendations for when patients were able to return to non-contact sport. Figure 1 shows that meeting functional markers for return to play have been met, was the most common response with 51(37%). 44(32%) did not use specific criteria but were led by the patient's level of function/confidence and 25(18%) based this decision on the length of time since the operation.

Figure 1: Recommendations for return to non-contact sport



Of the 25(18%) of responders who based their recommendation to return to sport on the length of time since surgery, the reported range of timescales is varied as can be seen in Figure 2.

Figure 2: Timescales for return to non-contact sport

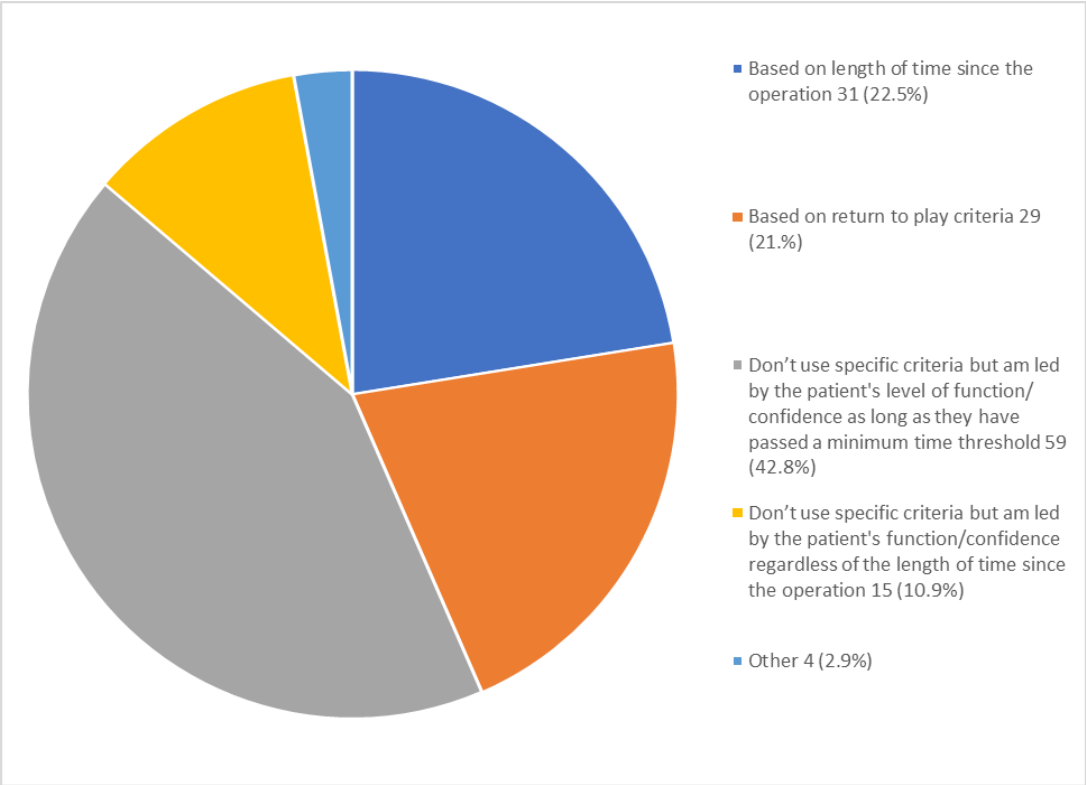


For the 15 (10.9%) of those who used return to play criteria, use of the following was reported; psychological readiness 10 (40%), presence of kinesiophobia 6 (24%), Kerlan-Jobe orthopaedic clinical score (KJOC) 3 (12%). Other return to play criteria provided within free text answers included force plate testing, Oxford Instability Score, the shoulder instability return to sport after injury (SIRSI) scale and using sports specific pathways.

When asked about decision making regarding return to contact sports, Figure 3 shows that 59(42.8%) of respondents reported that their protocol did not require the use of specific criteria and clinicians were led by the patient's level of function/confidence as long as they have passed a minimum time threshold. 31(22.5%) made decisions based solely on the length of time since the operation. 29(21%) used specific return to play criteria and 15(10.9%) reported that whilst they did not use specific criteria they were led by the patient's function/confidence

regardless of the length of time since the operation. 4(2%) reported other measures which, upon analysis, were a combination of time thresholds, functional markers and confidence.

Figure 3: Recommendations for return to contact sport



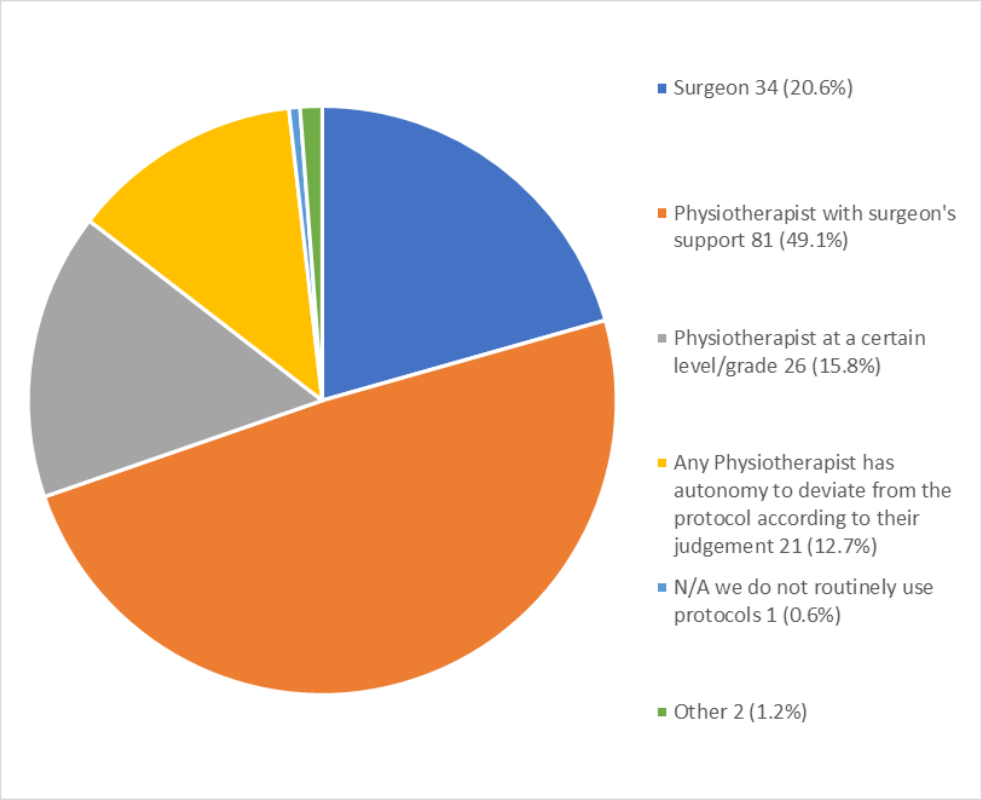
Of the 31(22.5%) of responders who based their recommendation to return to contact sport based on the length of time since surgery, 13(50%) reported that 16 weeks onwards was an acceptable point. 12(46.2%) recommended that contact sport could be resumed from 12 weeks and 1(3.8%) suggested 6 weeks. From free text "other" responses, 7(5.1%) of responders used 6 months as their recommended time point for return.

For the 29(21%) who use return to play criteria, use of the following was reported; psychological readiness 17 (33.3%), presence of kinesiophobia 13 (25.5%), Kerlan-Jobe orthopaedic score (KJOC) 9 (17.6%). 12 (23.5%) used other criteria such as a combination of objective markers and readiness questionnaires, sports specific return to play testing and pre-set, patient specific goals being achieved.

3.6 Clinician discretion

Clinicians were asked in the survey whether there was any freedom for clinical discretion around any timescales that may be set out in their post-operative protocols in relation to return to movement, work or sport. 110(79.7%) said there was scope to exercise clinical discretion but there were variations as to who had the freedom to act as demonstrated in Figure 4. Physiotherapists generally were unable to use their clinical autonomy with only 21(12.7%) of responders stating that any physiotherapist had the ability to do so. It was more common for physiotherapists of a certain grade (26/15.8%) to be able to exercise their discretion or for physiotherapists to do so but with support from the surgeon (81/49.1%)

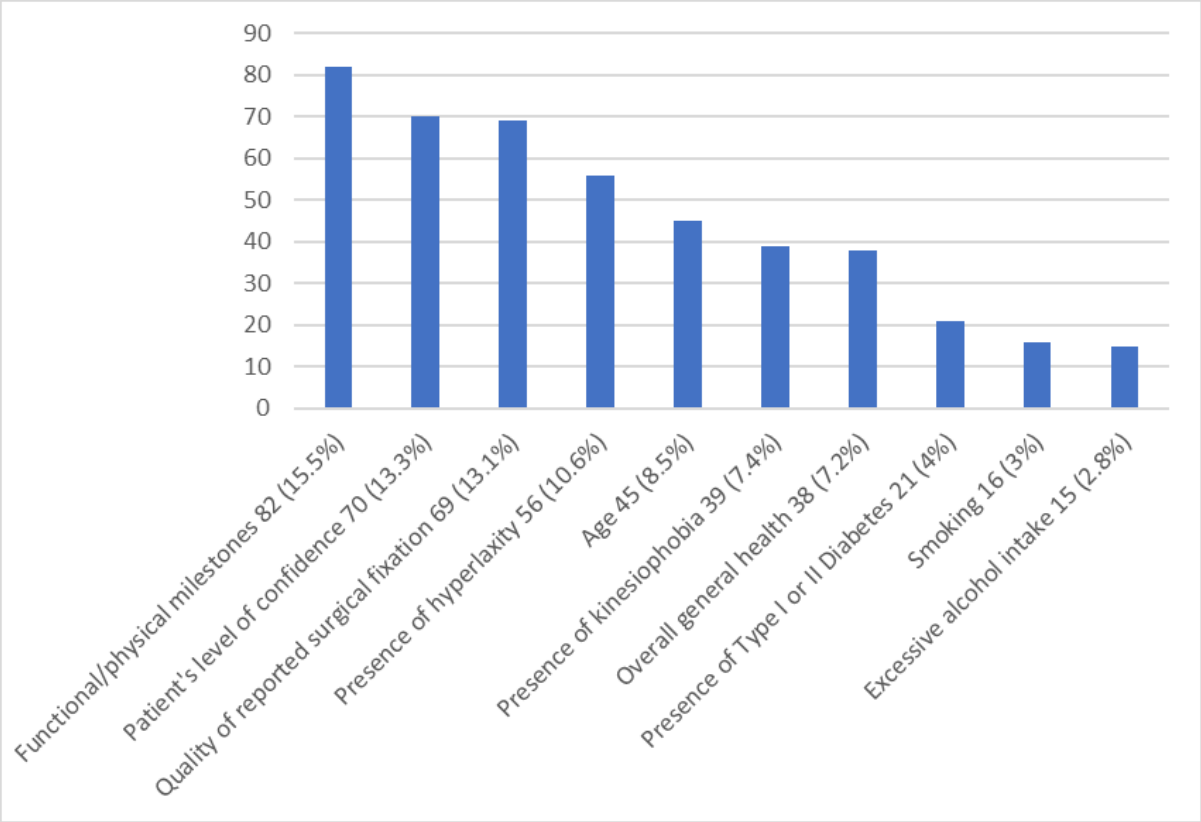
Figure 4: Clinical discretion



3.7 Factors that determine protocol timescales

In addition to being asked about timescales, responders were asked which other factors were taken into consideration when determining progression. 17(3.2%) of responders reported that the protocol is the same for everyone, regardless of potential individual patient factors. 56(10.6%) reported that whilst these factors were not explicitly stated in the protocol, they contributed to decision making. Figure 5 demonstrates the range of factors.

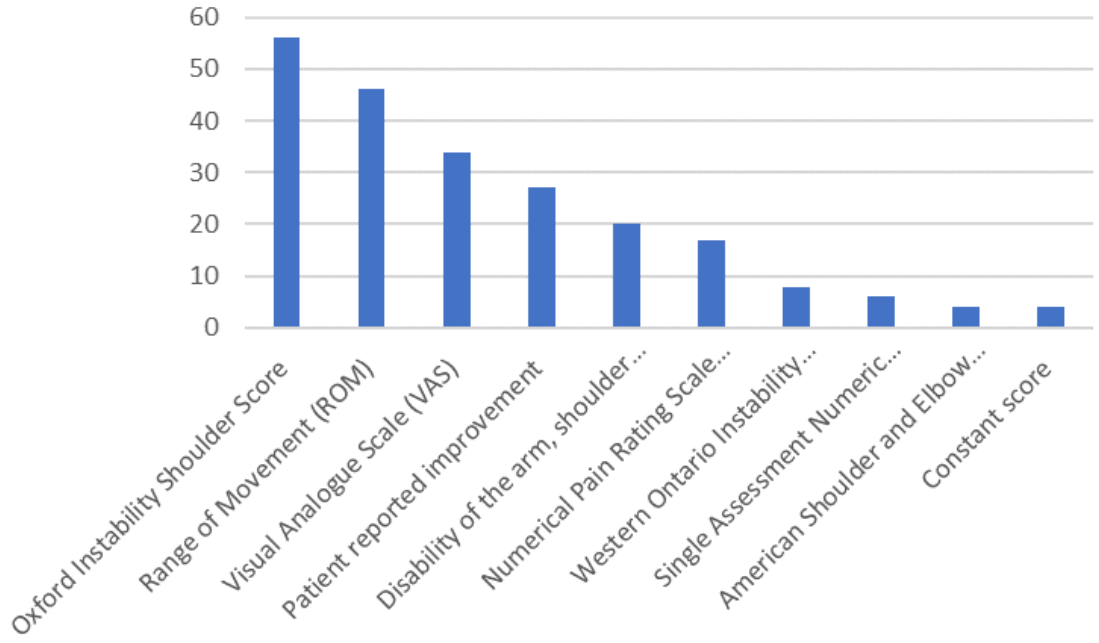
Figure 5: Patient factors that influence protocol timescales



3.8 Use of outcome measures

85(61.6%) of participants responded that outcome measures were routinely collected for this patient group. The remaining 53(38.4%) did not. However, 79(56.8%) do not regularly use the data generated from the use of outcome measures for audit, evaluation or research with 60(43.2%) using the data collected for this purpose. Figure 6 displays the outcome measures reported to be used. When asked in free text response, EQ5D, SIRSI, and data from force decks, handheld dynamometer, and patient specific functional scale (PSFS) ratings were all used to generate outcome data.

Figure 6: Use of outcome measures



4. Discussion

To our knowledge, this survey is the first piece of work that attempts to capture on a national level, current rehabilitation practice surrounding rehabilitation following arthroscopic stabilisation surgery for shoulder instability.

4.1 Main findings

138 responses were returned to the survey, the majority being from physiotherapists (79.9%), with those employed within secondary care NHS settings forming the largest group. A range of grades, mainly Band 7 or above took part, indicating the level experience was high. The responses from surgeons were predominantly from consultant grade clinicians (96.5%).

Post-operative protocols are in widespread use across the UK with 93.5% of participants reporting their use. Three quarters (75%) have a single protocol that is used by all surgeons and physiotherapists whilst other responders had multiple (in some cases more than 4), different protocols in use. In most cases (72.1%) protocols were jointly written between surgical and physiotherapy teams.

Immobilisation of the shoulder following arthroscopic stabilisation was reported as routine by 79.9% of respondents. A cross body sling was the most common position of immobilisation (63.4%) and the duration of immobilisation reported was varied, ranging from less than 48 hours to up to 6 weeks. How much patients were allowed to move during the immobilisation period was also subject to variation. This is consistent with the findings of a systematic review that documented immobilisation periods of between 2 weeks and 2 months following shoulder stabilisation surgery [15]. This was supported also more recently in a study where immobilisation varied between 2 and 6 weeks [8].

There is also a spectrum of timepoints regarding when patients were able to commence passive, active-assisted, active and through range resisted movement with considerable overlap between them. Over half (53.6%) of protocols allowed for patients to commence passive movement either immediately or as soon as they felt able. This rises to 60% for commencing active-assisted movement but falls to 21.7% for active movement. Only 10.9% of protocols made provision for patients self-determining when to commence through range resisted movement.

Protocols leaned in favour of a return to manual work 12 weeks after surgery (58.7%). There was little agreement when determining how soon patients could return to light work. For example, there were near equal numbers of responders

whose protocols suggested they could return to light work as soon as they felt able (25.4%) as opposed to those whose protocol suggested this should be after 6 weeks (26.1%).

When advising return to non-contact sports, protocols became less timescale driven with meeting required functional markers and being led by the patient's level of function and confidence the key determiners. For the 18% who favour length of time since the operation as the primary recommendation, 12 weeks was the most favoured marker (56%). There is a spectrum of time points ranging from 6 weeks (3.8%), 12 weeks (46.2%), 16 weeks (50%) and 6 months (5.1%). Although 42.8% of responders were led by either patient function and/or confidence to determine return to contact sport, this was only under the proviso the patient had passed a minimum time threshold. Only 10.9% were led by function and confidence, irrespective of the length of time since the surgery.

According to the protocols, clinicians used specific return to play criteria infrequently. It was more common when deciding if patients could return to contact sport (21%) as opposed to non-contact sport (10.9%). Of those using return to play criteria, psychological readiness (33.3%) and presence of kinesiophobia (25.5%) were the most commonly used domains. The BERN consensus, published recently in 2022, recommends six domains should be considered when athletes return to sport after shoulder injury: pain; active shoulder joint range; strength, power & endurance; kinetic chain; psychological readiness; sport-specific demands[11]. These new recommendations are likely to influence future protocol guidance.

Physiotherapists did not generally deviate autonomously from timescales set out in protocols without surgeon support. This is despite clinicians considering a wide

range of factors influencing their decision making. Functional milestones and patient confidence were the two factors most likely to determine progression which appears in contrast to the reliance on temporal guidance that dominates the parts of the protocol that advocate resumption of movement and activity.

Orthopaedic post-operative protocols are embedded within rehabilitation practice. These have traditionally been time-based, rather than milestone-based and standardised across patient groups, irrespective of individual patient factors. The results of this survey show that individual patient factors, such as general health and age do feature, but decisions are still predominantly time-based, despite widespread difference in what those time reference points should be. Such decisions are historically rooted in the biomechanical principles that reason that timescales are to allow for healing and serve a protective function by avoiding excessive pressure and over-tensioning on the repaired structures.[6] Our findings are broadly similar in terms of timescales to the ASSET guidelines, which have four guiding principles, all focussed on anatomy and biomechanics [16]. The main difference being that the ASSET guidelines also specify objective physical and subjective pain milestones before patients can progress to the next phase of rehabilitation.

A randomised study compared “conventional” and “accelerated” rehabilitation and reported that there was no significant difference between groups receiving “conventional” compared to “accelerated” rehabilitation following surgery for TASD [17]. This was a group of nonathletes with recurrent anterior shoulder dislocation and a classic Bankart lesion. It was also noted that patients in the “accelerated” group reported significantly less pain at 6 weeks following surgery and were quicker to regain external rotation and resume their previous level of activity. They concluded

that whilst there did not appear to be any direct benefit of reducing immobilisation periods and commencing earlier range of movement, it did not appear to be harmful.

A potential reason for this is the nature of early rehabilitation programmes that are designed to promote movement but protect excessive tension on the repair. Initial exercises are often performed in the scapular plane, which lies about 30 degrees anterior to the coronal plane of the body. In this position, it is proposed that there is reduced stress on the anterior capsular structures, improved glenohumeral congruence and improved functional activity of the posterior cuff compared to the coronal plane, [6]. Protection of the soft tissue repair is widely considered to be achieved by avoiding constraints to the antero-inferior capsule-labral complex. At 0 degree of abduction, the low-tension zone, also referred to as the “safe zone” is usually around 45 degrees of external rotation, [18]. These findings were supported by a report that stated a combination of passive abduction and external rotation was responsible for a maximum measured force of roughly 17.7 N on a capsule-labral repair [19]. The use of early, safe zone mobilisation can also be supported by claims that most post operative exercises do not lead to significant pressure changes on the inferior labrum but that labral compression mainly occurs in the superior half of the glenoid during exercise, [6].

Feedback from patients following rotator cuff repair (RCR) indicates they were keen to remove their slings and initiate early range of movement with sling use associated with reduced compliance and demoralising restrictions that led to negative effects around dependence and self-identity [20]. Following shoulder stabilisation, patients

have similar immobilisation times to post RCR, therefore in both cases effective rehabilitation should help patients achieve the best clinical and quality of life outcomes [20].

4.2 Study Limitations

The survey reflects a small proportion of the total number of clinicians treating patients after shoulder arthroscopic stabilisation surgery and therefore may not be generally applicable. It is acknowledged that a higher percentage of respondents worked in secondary care than any other setting, however this is most likely due to the survey requesting post-surgical opinions.

5. Conclusion

The findings of this survey suggest that there is wide variation in rehabilitation practice following arthroscopic stabilisation surgery. Decisions appear to be based on patient function, confidence, kinesiophobia and individual patient factors, yet time-based markers and/or minimum time thresholds dominate most points of progression. Whilst progress is often led by the patient's level of function/confidence, there is low level use of specific measurement tools or outcome measures to determine this reliably and objectively. Coupled with an absence of robust evidence around the biomechanical rationale for imposed restrictions, the question arises as to whether protective immobilisation and temporal limitations are necessary or whether they are at best needless and at worst, potentially detrimental.

There was a clear lack of agreement in relation to many of the questions asked during this survey. In the absence of clinical trial data, the AHPCGG will continue to work on developing best practice rehabilitation guidelines for patients undergoing arthroscopic shoulder stabilisation surgery. The results of this survey will form the basis of a Delphi study involving key stakeholders including surgeons, physiotherapists and patients, which is due to take place across 2022/2023. This will provide, where possible, expert clinical consensus on what optimum rehabilitation should look like, including criteria for progression and use of outcome measures.

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