Critical evidence synthesis on rehabilitation following arthroscopic shoulder stabilisation surgery for traumatic anterior instability: consensus recommendations for clinical practice and research – commissioned by the British Elbow & Shoulder Society

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ABSTRACT

Arthroscopic shoulder stabilisation surgery (ASSS) is a common procedure for treating anterior shoulder instability. Postoperative rehabilitation remains a crucial, but under-researched, aspect of patient recovery. Despite its importance, no comprehensive rehabilitation guideline based on robust clinical trials has emerged, leaving a gap in evidence-based practice.

To address this, the British Elbow & Shoulder Society appointed the Allied Health Professional Clinical Guideline Group to review current practices and establish clinical guidance on rehabilitation. This evidence synthesis aims to provide a critical synthesis and discussion on rehabilitation following ASSS. The intended outcome is to highlight areas of uncertainty and make recommendations for clinical practice and further research.

The development of this evidence synthesis followed a rigorous five-stage process: (1) systematic literature review, (2) UK national practice survey, (3) expert consensus (Delphi) study, (4) updated literature search and review and (5) synthesis of the previous four stages. Stages 1–3 have been published previously. This evidence synthesis comprised stages 4 and 5.

10 key domains for postoperative rehabilitation from immediate postsurgery to return to normal function, including sports, were identified. This paper synthesises current knowledge and provides a platform for recommendations in clinical practice and future research. In particular, early shoulder movement was recommended during the 'immobilisation period', but confined to shoulder elevation up to 90°, anterior to the scapular plane, with neutral external rotation. Further high-quality primary research is needed to address uncertainties and expand the evidence base, thereby informing and challenging clinical practice.

INTRODUCTION

Anterior traumatic shoulder instability is defined as excessive anterior translation of the humeral head on the glenoid fossa due to trauma.[1] It is common, particularly among young, active individuals.[2] After a first dislocation, the risk of recurrent dislocation varies from 21% to 88%, influenced by factors such as sport, lifestyle, number of dislocations, age, sex, occupation and ligamentous laxity.[2] If structural damage and persistent symptoms hinder recovery, patients may opt for shoulder stabilisation surgery.[3] Arthroscopic shoulder stabilisation surgery (ASSS), also known as Bankart repair, is the most common procedure for anterior shoulder instability.[4]

Postoperative rehabilitation is recommended after ASSS to optimise outcomes.[5] However, no rehabilitation guidelines have been developed based on robust clinical trials and high-quality research to guide rehabilitation decisions is currently lacking.[6 7] This leads to significant variations in practice (such as period of immobilisation and timescales to begin movement and return to sports) and research heterogeneity.[3 8] In the UK, the British Elbow & Shoulder Society (BESS) has acknowledged the need to address uncertainties in postoperative rehabilitation for ASSS. In 2021, the BESS Council appointed the Allied Health Professional Clinical Guideline Group (AHPCGG) to commence a programme of work to review current practices and establish clinical guidance on rehabilitation.

This evidence synthesis, developed by the BESS AHPCGG, aims to provide a critical synthesis and discussion on rehabilitation following ASSS for anterior shoulder instability by integrating current practice in the UK, expert opinion in the UK and international evidence. The intended outcome is to highlight commonality between these sources, highlight areas of uncertainty and make recommendations for clinical practice and further research.

METHODS

Scope and target population

The population of interest for this evidence synthesis is patients of any age who have received postoperative physiotherapy following ASSS (also commonly known as Bankart repair) for anterior shoulder instability. There are no exclusions based on, for example, comorbidities. Rehabilitation following bone block stabilisation, such as Latarjet, is out of the scope of this paper.

The programme of work to develop this evidence synthesis was led by the BESS AHPCGG and took place in five stages:

1. Systematic literature review.[8]
2. UK national practice survey.[3]
3. Delphi consensus study.[7]
4. Update literature search and review.
5. Evidence synthesis.

Stages 1–3 have been published elsewhere, with only a brief synopsis provided here. These initial stages were led by nine musculoskeletal physiotherapists (AJ, EW, IGH, JB, JG, JO'S, MB, NM and RC), all specialising in the shoulder at an advanced or consultant level. Two independent authors and musculoskeletal physiotherapists (CW and BR), not involved in the first three stages, were later invited to join the AHPCGG to integrate previous results and contribute to this evidence synthesis. The working group consists of physiotherapists and researchers with various levels of clinical and research experience. Further details can be found in online supplemental file 1.

Stage 1: systematic literature review

The results from an initial review, carried out in 2020, which prompted the development of the BESS AHPCGG, were published in 2022.[8] This review, which included 12 studies,[9–20] highlighted that only two studies had compared different rehabilitation programmes and potentially offered evidence on whether one rehabilitation approach is superior to another.[14 17] One study allowed participants to choose between home-based or supervised exercise and compared these approaches, but it did not address treatment milestones or progression.[14] The second study compared different immobilisation periods and is included in our analysis below.[17]

Stage 2: UK national practice survey

The BESS AHPCGG developed a 36-item questionnaire hosted on the Health Survey Platform (www.onlinesurveys.ac.uk), with results published in 2023.[3] The questionnaire covered the duration and nature of postoperative immobilisation, as well as timescales and factors influencing rehabilitation progression. Response options included Likert scales, multiple choice and dichotomous answers. Physiotherapists and surgeons involved in the postoperative management of patients who had undergone soft tissue stabilisation surgery were invited to participate through BESS membership, X (formerly Twitter), email and peer-to-peer snowballing. 110 physiotherapists and 28 surgeons (27 of whom were consultants who completed specialist training) responded, and their views as 'survey respondents' reflect current clinical practice in the results section below. Raw data from the Delphi study can be found in online supplemental file 5.

Stage 3: expert consensus (Delphi) study

The BESS AHPCGG hosted a three-stage online Delphi study, based on the same survey questions, on the Health Survey Platform (www.onlinesurveys.ac.uk), with results published in 2024.[7] Following OMERACT guidelines, consensus was set at 70% agreement.[21] In the first round, items with 30%–70% agreement were revisited in the second round, while those with <30% were excluded. This process was repeated in the third round. Participants were invited at the BESS Scientific Conference in 2022, and patient representatives were invited via established Patient and Public Involvement and Engagement groups. 22 physiotherapists, 11 surgeons and 4 patients responded. All 35 participants completed rounds 1 and 3, of which 33 of them completed round 2. Their views are presented as 'experts' or 'expert' consensus in the results section. Raw data from the Delphi study can be found in online supplemental file 6.

Stage 4: updated literature search and review

Given the publication of additional studies since the original review, an updated literature search was conducted in January 2024 for the period 2020 to 2023 using MEDLINE, EMBASE (via Ovid) and CINAHL. Search terms were expanded to include case series. Two independent reviewers screened all retrieved titles, abstracts and then full texts of potentially eligible papers (NM, JB, JO'S, IGH, AJ, RC and CW). The search terms for MEDLINE can be found in online supplemental file 2. The updated search was exploratory, aimed at capturing relevant postoperative rehabilitation protocols for comparison and discussion. Critical appraisal of the included studies was not conducted as the data extraction focused on the components and description of the rehabilitation protocols instead of the findings and conclusions from the studies. When appropriate, their limitations were critically reviewed and discussed. Rehabilitation protocols identified from the updated and original systematic reviews[8] provided the evidence of rehabilitation practice in the literature, alongside which our survey and Delphi study were examined.

Stage 5: evidence synthesis

Results from stages 1 to 4 were integrated in this paper using a narrative synthesis approach. 10 key domains were identified for postoperative rehabilitation following ASSS. Relevant findings from the survey, expert consensus and current evidence were critically discussed in each domain, focusing on informing and challenging clinical practice and providing research recommendations based on uncertainties. The synthesis was completed by two authors (CW and RC), with regular input from a third author (AJ), and reviewed in detail by the BESS AHPCGG before finalising recommendations.

Patient and public involvement

Four patient representatives participated in the expert consensus study, which informed the findings and discussion of this evidence synthesis.[7] Patient and public were not involved in the design and preparation of this evidence synthesis. The findings and recommendations of this evidence synthesis will be disseminated through publication, conference presentations and social media to engage patients, the public, clinicians and policy stakeholders.

Equity, diversity and inclusion

The author team includes five women and five men, consisting of physiotherapists and researchers with various levels of clinical and research experience (online supplemental file 1) and of different ethnicities (64% White British, 9% Asian/British Asian—Indian, 9% White and Asian, 9% Asian/British Asian—Chinese, 9% White—Other/Mixed). The expert consensus study included participants across different ages (31–70), sex (46% female, 52% male), ethnicities (76% White British or European, 14% Asian/British Asian— Indian, 3% White and Asian and 3% Black Caribbean) and clinical experience (physiotherapists and shoulder surgeons).[7] Four patient representatives involved in the expert consensus study included two males and two females, aged 21–30 (one Black Caribbean and three White Europeans).

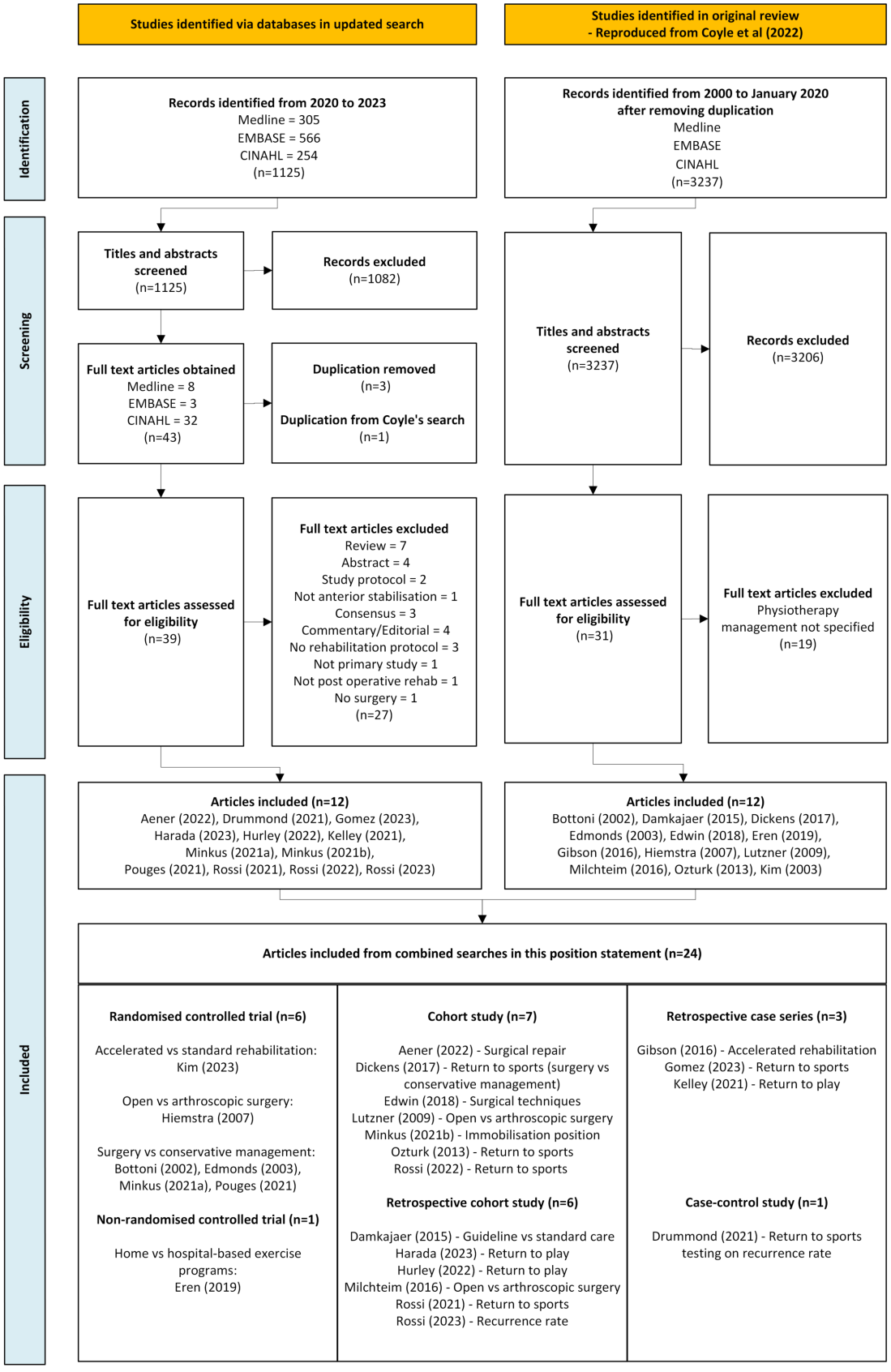

Figure 1 PRISMA flow chart of the literature search. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

RESULTS, RECOMMENDATIONS AND DISCUSSION

Update literature search

The updated search yielded 1125 citations, of which 39 full texts were retrieved and reviewed. 12 new papers were identified, covering 14 rehabilitation protocols.[22–33] No additional studies comparing rehabilitation programmes were found. The remaining

studies involved treatment programmes delivered by physiotherapists in practice, treatment rehabilitation protocols used in observational studies, or comparisons of different surgical approaches or surgery vs physiotherapy. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow chart for the review and references for all 24 publications (28 rehabilitation protocols in total) is in figure 1. References for included and excluded studies can be found in online supplemental files 3 and 4. Data extracted from reviews can be found in online supplemental file 7.

Domain development

10 key domains were identified based on their relevance, potential impact on clinical practice and themes that emerged from the narrative synthesis. These domains will be presented according to rehabilitation timescales. Due to the limited availability of high-level empirical evidence, recommendations were based on the best available evidence (primarily expert opinion) and supported by relevant rehabilitation protocols from the literature. Uncertainties within each domain were highlighted and critically discussed. Readers are encouraged to approach the recommendations with a critical perspective. Additionally, it should be recognised that the domains discussed in this synthesis are not exhaustive and were selected purposefully based on the scope and aim of this paper. A list of clinical and research recommendations can be found in the online supplemental file 8. Infographics of the recommendations can be found in figure 2 and online supplemental file 9.

Domain 1: immobilisation

Immobilisation of the shoulder postsurgery was reported as routine practice by 80% of survey respondents, with 88% using a sling. Expert consensus (70%) in the Delphi study agreed that the shoulder should be immobilised postsurgery, and a sling was the recommended method. This is supported by the literature, where all rehabilitation protocols immobilised patients, with 24 rehabilitation protocols using a sling.[9–15 17 19 20 22–29 31–33]

None of the studies compared immobilisation with no immobilisation. However, 9% of survey respondents did not adopt routine immobilisation. Expert consensus showed only moderate agreement (70%) on this practice, just meeting the minimum threshold required for consensus. Further research should explore the reasoning and practice of no immobilisation.

Research comparing different sling positions is limited. Only one cohort study evaluated clinical outcomes with two immobilisation positions (60° internal rotation vs 15° external rotation), suggesting position of immobilisation did not influence mid to long-term (time points not specified in the study) recurrence rate of dislocation and shoulder functional scores (short-term data for these outcomes not reported).[29] In clinical practice, immobilisation was typically in a cross-body (63%) or neutral (28%) position.[3] Although experts favoured the cross-body sling (60%), no consensus position was reached.

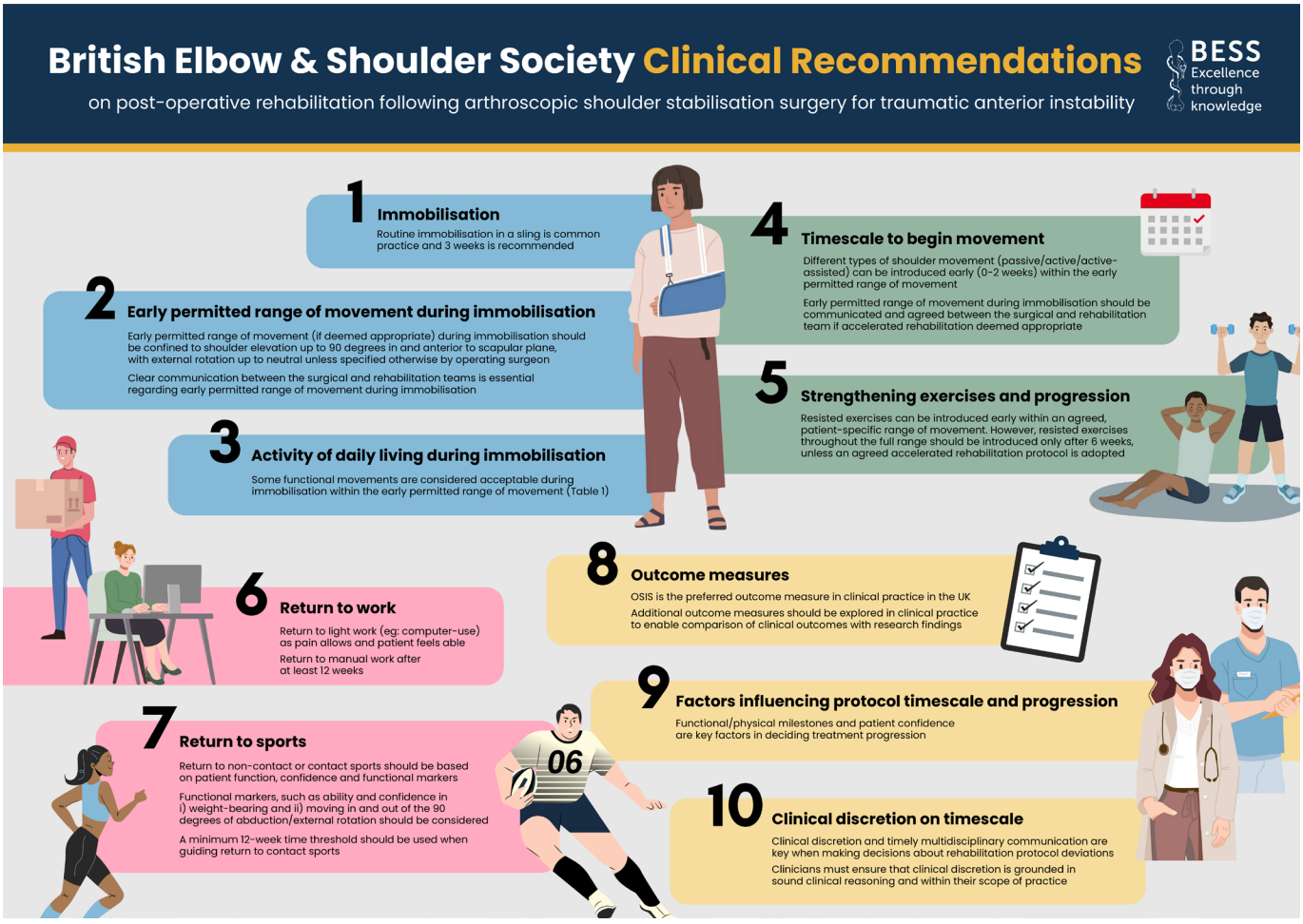

Figure 2 Infographic of clinical recommendations on postoperative rehabilitation following arthroscopic shoulder stabilisation surgery for traumatic anterior shoulder instability (online supplemental file 9). BESS, British Elbow & Shoulder Society.

Clinical recommendation:
⇒ Routine immobilisation in a sling is common practice and three weeks is recommended.

Research recommendations:
⇒ Explore clinical reasoning regarding the need for immobilisation, selected position and duration.
⇒ Compare immobilisation for different timescales, using 'standard practice/expert opinion' of 3 weeks in a sling as one comparator group and patient-preferred sling duration as another.

A 2–4 week immobilisation period was adopted by 58% of survey respondents, and an additional 22% used up to 6 weeks. In the literature, 23 of 28 rehabilitation protocols reported immobilisation periods of 2–4 weeks, aligning with the expert consensus of 3 weeks.[9 12–17 19 22–33] Experts agreed that the sling could be discarded earlier if patients felt ready, similar to the 15% of survey respondents who followed individualised timescales based on pain or patient preference. No studies compared the length of the immobilisation period, and it remains unclear whether a fixed duration is necessary.

Domain 2: early permitted range of movement during immobilisation

During immobilisation, early restriction of shoulder movement in at least one direction was commonly observed in both clinical practice and research. 98% of survey respondents reported implementing early movement restrictions postsurgery. Of these, 46% imposed an absolute restriction on shoulder movement during immobilisation, while 52% allowed patients to move within a 'safe zone'. This suggests that permission of range of movement (ROM) during immobilisation was a common practice among half of the survey respondents. This practice was supported by expert consensus (84%) that patients should be able to move their shoulder in any direction within this restriction zone.

In the literature, all 28 published rehabilitation protocols implemented precautions and early movement restrictions postsurgery, which aligns with the clinical practice reported in the survey. However, there was variability in the duration, extent and direction of movement restriction across these rehabilitation protocols. None of the rehabilitation protocols explicitly justified the chosen duration of restriction, and only one provided reasoning for the chosen degrees of restriction.[29] Of particular interest, five rehabilitation protocols permitted early ROM during immobilisation, reflecting a similar approach to that adopted in clinical practice.[12 15 22 25 29]

Historically, surgeons have advocated for absolute immobilisation, based on the assumption that early mobilisation could compromise the surgical repair. However, this conservative approach has been questioned by Funk. Drawing on advances in the understanding of tendon healing and mechanical adaptation, Funk suggested that early controlled shoulder movement could enhance strength, facilitate tendon healing, support kinetic chain function and improve proprioception postsurgery.

To operationalise this approach, Funk introduced the concept of the 'safe zone' for mobilisation, which refers to the passive range achievable without undue stress on the surgical repair, as observed intraoperatively by the surgeon. This concept serves as a framework for communication between surgical and rehabilitation teams, ensuring that early mobilisation is both effective and protective of the repair.[15 34] This concept can be considered analogous to the early permitted ROM found in some rehabilitation protocols and clinical practice. However, there is currently no direct evidence to support or dispute the effects of tension on surgical repair or the optimal tension to avoid disruption or promote healing in the patient cohort following ASSS. Further research is warranted.

The authors acknowledge that the early permitted ROM should be clearly defined and standardised to guide both clinical practice and research. According to expert consensus, 60% of respondents permitted shoulder elevation up to 90° in and anterior to the scapular plane, with external rotation to neutral. 40% permitted a less conservative limit of 180° of elevation and external rotation to 90°. This suggests, as a minimum, that shoulder elevation up to 90° in and anterior to the scapular plane, with external rotation to neutral, is an acceptable early permitted ROM.

To date, only one study has clearly defined the 'safe zone' and implemented an early permitted ROM within a case series design.[15] In this study, patients undergoing accelerated rehabilitation were allowed to mobilise their shoulders up to 140° of elevation in the scapular plane and 50% of their preoperative external rotation range in neutral. Considering the results from expert consensus and the best available definition, it is recommended that, if early permitted ROM is deemed appropriate during immobilisation, shoulder elevation can take place up to 90° in and anterior to the scapular plane, with external rotation up to neutral position, unless specified otherwise by the operating surgeon.

Clinical recommendations:
⇒ Early permitted range of movement (if deemed appropriate) during immobilisation should be confined to shoulder elevation up to 90° in and anterior to scapular plane, with external rotation up to neutral unless specified otherwise by operating surgeon.
⇒ Clear communication between the surgical and rehabilitation teams is essential regarding early permitted range of movement during immobilisation.

Research recommendation:
⇒ Explore the effect of tension on surgical repair at different ranges of movement in a laboratory setting.

Domain 3: activities of daily living during immobilisation

There is limited information in the literature on activities of daily living (ADLs) that can be performed without the sling during the immobilisation period. Light ADLs out of the sling, such as using a computer, writing and eating, were reported in only two studies.[14 25] In the survey, 29% of respondents allowed patients to remove the sling only for hygiene, while 40% allowed removal for exercises. Examples of functional movements reached expert consensus considered as acceptable if they occur within the early permitted ROM are listed in box 1. These movements are not exhaustive. Loading/unloading contents of a dishwasher (60%) and tipping out a small saucepan of water (54%) were considered unacceptable by more than 50% of experts but failed to reach the consensus threshold. Limitations of ADLs during immobilisation should be clinically reasoned based on individual needs and the balance between promoting function and minimising discomfort.

Box 1 Expert consensus on acceptable functional movement during immobilisation with the level of expert consensus in brackets

Examples of functional movements considered acceptable if they occur within the early permitted range of movement
⇒ Using a knife and fork (97%)
⇒ Lifting a cup of tea (87%)
⇒ Pulling up clothing—for example, underwear, socks, trousers, skirt (86%)
⇒ Using utensils, for example, a spatula or wooden spoon to cook (80%)
⇒ Wiping a table surface clean/light dusting (80%)
⇒ Slicing a loaf of bread (78%)
⇒ Washing/drying dishes (76%)

Clinical recommendation:
⇒ Some functional movements are considered acceptable during immobilisation within the early permitted range of movement (see box 1).

Research recommendation:
⇒ No research recommendation—ADLs allowed should be individualised based on factors presented in this paper and cannot be standardised for comparison in research.

Domain 4: timescale to begin movement

The survey highlighted different views on when to begin mobilisation, consistent with different rehabilitation protocol timescales. Regardless of the type of movement (passive vs active-assisted vs active), the survey responses supported commencing early movement either (1) immediately or within 48 hours postsurgery or (2) as pain allows/as the patient feels able. 62% of survey respondents commenced early passive movement when tolerated, followed by active-assisted movement (44%) and active movement (23%).

Expert opinion supported commencing active-assisted (97%), passive (80%) and active movement (80%) during the immobilisation period within the early permitted ROM, advocating for early movement with caution. In summary, there is concordance between the majority of clinical practice and expert opinion recommending early mobilisation while in the sling, with the caveat of expert opinion that this should happen within the early permitted ROM. However, no consensus position can be reached on the timescale to allow through-range passive, active-assisted and active movement outside of the early permitted ROM. Early shoulder movement within the first 2 weeks was adopted in ten rehabilitation protocols.[15 17–19 22 27 29 31–33]

Only one randomised controlled trial compared an accelerated rehabilitation programme (early shoulder movement immediately postsurgery) with conventional rehabilitation (sling immobilisation for 3 weeks).[17] While there was no difference at long-term follow-up, the accelerated programme showed short-term benefits at 6 weeks, including reduced postoperative pain, faster restoration of external rotation ROM and quicker return to activities, without increasing recurrence rates. A case series also suggested that an accelerated rehabilitation programme with early mobilisation within restricted ROM could facilitate an early return to sports with low recurrence rates.[15]

A smaller proportion of survey respondents, but 12 published rehabilitation protocols, favoured a later start to shoulder movement after surgery.[10–14 16 17 23 24 26 28 30] 17% of respondents began passive movement 2–3 weeks postsurgery, while 29% and 40% started active-assisted and active movement at 3–4 weeks, respectively. This practice aligns with the rehabilitation protocols in the literature that adopt delayed movement, allowing shoulder movement after 2 weeks.

Clinical recommendations:
⇒ Different types of shoulder movement (passive/active/active-assisted) can be introduced early (0–2 weeks) within early permitted range of movement.
⇒ Early permitted range of movement during immobilisation should be communicated and agreed between the surgical and rehabilitation team if accelerated rehabilitation is deemed appropriate.

Research recommendations:
⇒ Compare the risk and benefit of early movement (0–2 weeks) versus delayed movement (2–4 weeks).
⇒ Explore the reasoning underpinning different start points for passive versus active assisted versus active movements with reference to the healing process.

Advances in surgical techniques, materials and technology have facilitated the safe implementation of accelerated rehabilitation protocols following various orthopaedic procedures, including anterior cruciate ligament reconstruction, rotator cuff repair and knee arthroplasty.[35] While accelerated rehabilitation has gained traction in both clinical practice and the literature following ASSS, delayed movement rehabilitation protocols remain prevalent. Given the limited robust research on this subject, the efficacy of accelerated rehabilitation following ASSS remains uncertain compared with its application in other orthopaedic surgeries. Therefore, further investigation is warranted to cautiously explore and compare accelerated rehabilitation with delayed rehabilitation approaches, particularly within specific patient cohorts, such as athletes, to provide clarity on this emerging area.

All 28 rehabilitation protocols included ROM exercises (passive, active and/or active-assisted) in their rehabilitation protocols, though there was considerable variability in when these exercises were introduced. Passive ROM exercises were included in 18 rehabilitation protocols.[10 12–14 16–20 22 23 27–33] This aligns with current practice, as 92% of survey respondents reported using passive movement in their practice. The movement was typically performed by the patients (56%), physiotherapists (25%) or family/friends (10%).

Eleven rehabilitation protocols included both passive and active ROM exercises without specifying the order in which these commenced,[10 12 14 16 17 19 20 23 27 28 30] while six rehabilitation protocols explicitly introduced passive ROM exercises before active/active-assisted ROM exercises.[18 22 23 31–33] This trend was mirrored in the survey, where passive ROM exercises were typically introduced earlier than active-assisted and active exercises. The order of introducing ROM exercises was not explored in the expert consensus. It is unclear whether ROM exercises need to be started progressively (eg, passive first, then active).

The timescale for progressing shoulder ROM was poorly reported in the literature. Only three studies provided specific timescales and criteria for progressing ROM exercises,[13 14 17] while the others provided only generic descriptions. This lack of detail made comparisons challenging. Specific timescales and progression criteria were not explored in the survey or expert consensus, leaving the optimal progression of ROM exercises uncertain. Factors influencing rehabilitation protocol timescales and progression, including ROM, will be discussed in another section of this paper.

Domain 5: strengthening exercises and progression

Besides ROM exercises, various strengthening exercises are used in rehabilitation programmes, as reported in the literature.

Isometric exercises

Isometric exercises were used inconsistently across studies, with eight studies[9 10 13–15 17 24 26] reporting their inclusion. The timescales varied from 1 day to 8 weeks postsurgery. Six studies started isometric exercises in the first week postsurgery,[9 10 14 15 17 24] while two began after four and 7–8 weeks, respectively.[13 26] However, none of the studies provided specific progression criteria for comparison. The use of isometric exercises was not addressed in the survey or expert consensus, leaving the optimal timing for their introduction in rehabilitation uncertain.

Resisted exercises

There was significant variation in the timing of introducing through-range resisted exercises across 15 studies.[10 13–17 19 20 22 23 26 27 31–33] Three studies by the same author did not specify a timescale but allowed resisted exercises when patients could perform active forward elevation above shoulder level.[31–33] Two studies used 'accelerated rehabilitation' protocols, starting with resisted exercises at 2–3 weeks.[15 17] The remaining 10 studies did not allow resistance exercises before 6 weeks postsurgery,[10 13 14 16 19 20 22 23 26 27] aligning with expert consensus that such exercises should not be introduced before this time (75%). Early strengthening exercises with movement restrictions were discussed among experts, but the agreement was too low (57%) to form a consensus. The use of closed and open kinetic chain strengthening exercises was not explored within the scope of this evidence synthesis.

Plyometric exercises

Plyometric exercises were reported in only six studies, introduced 12–16 weeks postsurgery.[10 14 15 19 26 27] None of the studies provided details on the definition and details of plyometric exercises or progression criteria. Plyometric training, by definition, uses the stretch-shortening cycle, involving a rapid eccentric (lengthening) movement immediately, followed by a concentric (shortening) action.[36] Therefore, simply referring to fast concentric or eccentric movements as plyometric exercises may be inaccurate. Future research should clearly define the types of exercises used and provide sufficient detail about the exercise programmes to support understanding and replication in both research and clinical practice. The timing for introducing plyometric exercises was not addressed in the survey or expert consensus. Therefore, we recommend that the prescription of plyometric exercises should follow the expert consensus that resisted exercises throughout the full ROM should be avoided for 6 weeks.

Clinical recommendation:

⇒ Resisted exercises can be introduced early within an agreed, patient-specific range of movement. However, resisted exercises throughout the full range should be introduced only after 6 weeks, unless an agreed accelerated rehabilitation protocol is adopted.

Research recommendations:

⇒ Explore the risk and benefits of early introduction of resisted exercises.

⇒ Explore the progression of through-range resisted exercises and, if appropriate, later-stage rehabilitation such as plyometric exercises.

⇒ Report exercise programme using standardised reporting guideline for interventions, such as Template for Intervention Description and Replication (TIDieR) or Consensus on Exercise Reporting Template (CERT).[38 39]

⇒ Assess the quality of exercise therapy programmes in future research study using i-Content tool.[40]

Domain 6: return to work

There was considerable variation in advice on returning to 'light work' (eg,computer work). 25% of survey respondents allowed return to light work based on pain tolerance or patient ability, aligning with expert consensus (76%) that patients should be able to resume light work as pain allows or as the patient feels able. Another 28% of survey respondents recommended a return 2–4 weeks postsurgery, while 26% suggested waiting until 6 weeks.

For returning to manual work, there was more agreement between practice and expert opinion. While 20% of survey respondents recommended a 6–8-week return, 58% suggested 12 weeks, which aligns with expert consensus (81%) that manual work should not resume until at least 12 weeks postsurgery.

The literature on return-to-work timescales was poorly reported. Only three studies explicitly reported that patients could return to work from 3 to 6 months without providing any further details on workload demand, such as light duties or heavy manual labour.[9 11 13] Other studies provided no details. Current research to guide return-to-work decisions is limited.

Clinical recommendations:

⇒ Return to light work (eg, computer use) as pain allows and patient feels able.

⇒ Return to manual work after at least 12 weeks.

Research recommendation

⇒ Explore the risks and benefits of early return to work, including its impact on self-efficacy and recovery.

Domain 7: return to sports

Recommendations for returning to non-contact sports varied widely. 37% of survey respondents based their recommendations on functional markers (discussed below). This aligns with expert consensus (70%) that patients could return to non-contact sports when functional markers have been met. An additional 10% reported the use of at least one specific return-to-play criterion, including psychological readiness (67%), presence of kinesiophobia (40%), Kerlan-Jobe orthopaedic clinical score (KJOC) (20%). Force-plate testing, Oxford Shoulder Instability Score (OSIS), Shoulder instability Return to Sport after Injury score and sports-specific pathways were used by individual respondents through free text responses. Details and the protocols of force-plate testing and sports-specific pathways were not provided by the respondents.

The remaining 50% of respondents reported more variation in their practice. Of these, 32% relied on the patient's function and confidence without specific criteria, and 18% based recommendations on time postsurgery. Of those considering time, 36% would allow return to non-contact sports at 8–10 weeks, while 56% recommended waiting until 12 weeks.

When recommending return to contact sports, patient function, confidence and time since surgery were key factors. 42% of survey respondents based their recommendations on both the patient's function and time since surgery, while 22% relied solely on time. Of those considering time, 46% deemed 12 weeks and 50% deemed 16 weeks postsurgery acceptable. This aligns with expert consensus

Clinical recommendations:
⇒ Return to non-contact or contact sports should be based on patient function, confidence and functional markers.
⇒ Functional markers, such as ability and confidence in (1) weight-bearing and (2) moving in and out of the 90° of abduction/external rotation should be considered.
⇒ A minimum 12-week time threshold should be used when guiding return to contact sports.

Research recommendation:
⇒ Explore return-to-sport criteria and timescales for different types of sports.

(70%) that return to contact sports should depend on patient function and confidence, with a minimum of 12 weeks postsurgery. However, 10% of survey respondents considered only the patient's function and confidence, without factoring in surgery timing.

The literature did not clearly distinguish between non-contact and contact sports. 10 studies reported a gradual return to sports-specific training starting at 3 months, with contact sports resuming between 4 and 6 months postsurgery.[9 12–14 16 19 22–25] Four rehabilitation protocols, however, allowed return to sports when patients were pain-free, without apprehension, and had restored ROM and strength.[10 31–33] One rehabilitation protocol lacked sufficient details on the targeted ROM and strength to be restored,[10] while three others from the same author recommended restoring full ROM and preoperative strength before returning to sports.[31–33] Due to variations in practice and research rehabilitation protocols, it remains unclear what factors should guide the timing and decision for returning to non-contact or contact sports, highlighting the need for further research on relevant criteria.

In the absence of strong evidence, expert consensus identified two functional markers to support decision-making in return to sports (both non-contact and contact): the patient's ability and confidence in (1) weight-bearing through the affected shoulder (74%) and (2) moving in and out of 90° abduction/external rotation (71%). Other markers, such as negative apprehension test (60%), psychological readiness (49%), kinesiophobia (49%) and KJOC (0%), were considered by experts but did not achieve consensus.

Domain 8: outcome measures

A range of outcome measures were reported in the literature and our survey. 62% of survey respondents reported using some form of outcome measure, with the OSIS being the most common, used by 56% of respondents. OSIS was also recommended by expert consensus (73%). However, in the literature, OSIS was only used in two studies,[12 24] while a broader range of measures, such as the American Shoulder and Elbow Surgeons Score (ASES), Rowe Score and Western Ontario Shoulder Instability Index (WOSI), were more commonly employed. WOSI (9%) and ASES (4%) were used by fewer survey respondents. While the OSIS is commonly used and recommended in the UK, collecting additional patient-reported outcome measures may be necessary for comparing international study findings.

Clinical outcome measures, such as shoulder ROM (54%) and the visual analogue pain scale (40%), were commonly used in both the survey and the literature. A recent Delphi study identified 11 core domains for shoulder instability research, including re-dislocation, instability sensation, sport limitations, patient satisfaction, fear of re-dislocation, ROM, return to function, daily activities, sport, work and trust in the shoulder.[37] However, there are still questions about how to best measure these outcomes.

Clinical recommendations:
⇒ OSIS is the preferred outcome measure in clinical practice in the UK.
⇒ Additional outcome measures should be explored in clinical practice to enable comparison of clinical outcomes with research findings.

Research recommendation:
⇒ Develop a core outcome set, including optimal timepoints, for shoulder instability research.

Domain 9: factors influencing rehabilitation protocol timescale and progression

There was a wide range of factors influencing the overall timescales and progression of rehabilitation protocols. Experts agreed that the key factors for progression were achievement of functional/physical milestones (92%), the patient's level of confidence (95%), and the presence of kinesiophobia (78%). However, agreement among survey respondents was much lower, with only 15% considering functional milestones and 13% considering patient confidence as crucial factors.

Two additional factors were mentioned by 10% or more of survey respondents: the quality of surgical fixation (13%) and the presence of hyperlaxity (10%). While experts did consider these factors, along with patient factors like age, general health, smoking and alcohol use, there was no consensus on their importance.

In the literature, only two studies outlined specific criteria for exercise progression.[15 20] Gibson *et al* based progression on pain, scapula congruence, movement patterns and passive ROM, while Milchteim *et al* focused on the patient's goals, tissue quality and surgical history.

In conclusion, while experts agree that both patient-specific factors (eg, confidence) and physical/functional milestones are important, there is less consensus on the role of surgical fixation quality. The wide variety of factors considered by both survey respondents and experts suggests a shift towards more individualised care, challenging traditional rehabilitation protocol-based approaches.

Clinical recommendation:
⇒ Functional/physical milestones and patient confidence are key factors in deciding treatment progression.

Research recommendations:
⇒ Explore general and person-centred factors to determine milestones progression.
⇒ Compare patient outcomes and satisfaction between individualised care and protocol-driven care.

Domain 10: clinical discretion on timescale

Clinical discretion regarding timescales or deviations from postoperative rehabilitation protocols was identified as a key factor guiding rehabilitation by survey respondents. This was also mentioned in five studies.[10 14–16 23] 79% of survey respondents, including both physiotherapists and surgeons, noted that there was some flexibility to exercise clinical discretion regarding the timing of movement, return to work or sports. However, the scope of discretion was often limited: only 12% of respondents had full autonomy to deviate from rehabilitation protocols based on their judgement. Another 15% stated that only

physiotherapists at certain levels or grades had this autonomy. The remaining 49% required surgeon support to exercise clinical discretion, while 20% reported that only surgeons had the authority to make these decisions.

Two studies reported that part of the progression in the rehabilitation protocols was determined by surgeons,[10 23] while two other studies reported that physiotherapists were responsible for exercise progression.[15 16] One study described a shared role between the surgical and rehabilitation teams.[14] The expert consensus did not explore clinical discretion regarding timescales and rehabilitation protocol deviations. However, due to limited evidence, it is crucial to emphasise that timely multidisciplinary communication is key when making decisions about rehabilitation protocol deviations. These decisions should be based on patient-specific factors such as repair characteristics, physiology and occupational or sporting demands. Clinicians must ensure that clinical discretion is grounded in sound clinical reasoning and within their scope of practice.

Clinical recommendations:

⇒ Clinical discretion and timely multidisciplinary communication are key when making decisions about rehabilitation protocol deviations.

⇒ Clinicians must ensure that clinical discretion is grounded in sound clinical reasoning and within their scope of practice.

Research recommendation:

⇒ Explore clinical reasoning and consensus on the scope of clinical discretion across various levels of clinical practice.

LIMITATIONS

Due to existing uncertainties and the lack of robust evidence, the clinical recommendations were primarily informed by expert consensus, supported by relevant rehabilitation protocols identified in the literature. As a result, the strength and certainty of these recommendations are limited. It is therefore essential that these recommendations be revisited once more research evidence is available. In addition, the discussion and recommendations in this evidence synthesis were based on the findings from the literature review, a practice survey and expert consensus for comparative purposes. Given the specific aim and limited scope of this synthesis, certain relevant areas of practice may not have been adequately addressed.

Prior to implementation in clinical practice, recommendations made in this evidence synthesis should also be carefully discussed and agreed on locally within a multidisciplinary team. Although critical appraisal was conducted in the original review,[8] it was not repeated for studies from the updated search due to its exploratory nature. However, the risk of bias is unlikely to significantly affect the recommendations.

CONCLUSIONS

This evidence synthesis has provided a critical discussion on rehabilitation following ASSS by incorporating current UK practice, expert opinion and international evidence. Clinical and research recommendations were made across 10 key domains, from post-surgical immobilisation to return to contact sports. Further high-quality primary research is needed to address uncertainties and expand the evidence base to inform and challenge clinical practice. Future clinical guidelines should explore the acceptability, feasibility and implementation of these recommendations from the perspectives of clinicians and patients.

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