The effectiveness of rehabilitation for nonoperative management of shoulder instability: a systematic review
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CRD summary
This relatively well-conducted review assessed the effectiveness of conservative management as the primary management strategy for shoulder instability. Whilst the evidence suggests that recurrence is lower in patients managed surgically than those managed conservatively, the authors acknowledged that the quantity and quality of the evidence were low and that further research is required.

Authors' objectives
To assess the effectiveness of conservative management as the primary management strategy for shoulder instability.

Searching
MEDLINE, CINAHL, DARE, AMED, PubMed and the Cochrane Library were searched from January 1980 to April 2003 for studies published in the English language; the search terms were reported.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), quasi-RCTs, cohort studies and case series studies were eligible for inclusion in the review.

Specific interventions included in the review
Studies that assessed non-operative management, including immobilisation and physical therapy techniques, were eligible for inclusion in the review. Studies of surgical techniques, relocation and splinting approaches were excluded. Further details of the immobilisation and rehabilitation techniques were given.

Participants included in the review
Studies of adults (aged 16 to 55 years) with a history of shoulder instability (subluxation or dislocation) were eligible for inclusion in the review. Studies of patients with a history of prior shoulder surgery, stroke or hemiplegia were excluded. Some of the studies included military personnel or university athletes of single or both sexes with specific conditions. Other studies were conducted in patients of either sex with shoulder instability, subluxations or dislocations.

Outcomes assessed in the review
The studies had to report recurrence of instability, return to pre-morbid function, or resolution of associated symptoms to be eligible for inclusion in the review.

How were decisions on the relevance of primary studies made?
One reviewer assessed titles identified by the search strategy for inclusion. Abstracts were then collected and two reviewers assessed them for inclusion. Any disagreements were resolved by consensus, or with the help of a third reviewer if necessary.

Assessment of study quality
Validity was assessed on the basis of 24 criteria relating to study design, participants, intervention, outcomes and analysis. A score of 0 was given for a low-quality research design or unmet criterion; a score of 1 was given for a fair-quality design or if the methodological criterion was only partially met; and a score of 2 was given for a high-quality approach to this element of research design. Further information on the validity assessment tool was reported in a separate publication (see Other Publications of Related Interest). A score of 18 out of a possible 48 was the inclusion
threshold for the review. Two reviewers independently assessed validity. Consensus was used to resolve any differences to within one point on the validity assessment scale.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data on the results, as reported in each individual study, and potential result modifiers (e.g. patients lost to follow-up or recovery complications) were extracted.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative according to the type of intervention and outcomes assessed.

How were differences between studies investigated?
Heterogeneity was not assessed. Study details and results were tabulated, allowing the reader to compare the studies.

Results of the review
Fourteen studies were included in the review: three RCTs (84 participants), eight cohort studies (513 participants) and three case-series studies (185 participants).

The scores on the validity assessment scale ranged from 18 to 41 out of a possible 48, with a median score of 22. Five studies were excluded as they did not meet the predefined quality threshold for inclusion.

Immobilisation with general strengthening or stabilisation exercises.

Recurrence of instability: one prospective study reported that recurrence at the 1-year follow-up was 17% for patients immobilised for 3 weeks, compared with 26% for those only immobilised for 1 week. Two small case-series studies reported that 75% and 80% of military personnel managed conservatively had re-dislocated within an average of 36 and 23 months, respectively, compared with only 11% and 14% of surgically treated personnel. A small cohort study reported that 15% of naval academy personnel had re-dislocated at 6 months, while 10% experienced subluxation at 13 and 36 months after 3 weeks’ immobilisation followed by restricted activity and a progressive strengthening programme. Another small cohort study reported 92% recurrence among military cadets choosing conservative management, compared with 22% who opted for surgical intervention; there were statistically significantly fewer recurrences of instability when rehabilitation commenced after surgery. A small RCT reported 47% recurrence at the 2-year follow-up after 3 weeks’ immobilisation followed by a 12-week range-of-motion and strengthening programme, and 16% recurrence in patients who had stabilisation surgery prior to the same immobilisation and rehabilitation programme; this difference was statistically significant.

Return to pre-morbid status: three studies of military and naval academy personnel reported that patients returned to full active duty at 4 months, after 3 weeks’ immobilisation followed by progressive strengthening. However, in two studies that asked patients to rate their overall outcomes, conservatively managed patients rated their overall outcomes significantly worse than those in a surgical comparison group. An additional study compared immobilisation for 1 week with immobilisation for 3 weeks and found statistically significantly less weeks lost from work during rehabilitation for those immobilised for 1 week; however, the functional outcomes for these patients were significantly poorer.

Disease-specific quality of life: a small RCT reported poorer quality-of-life scores in patients who underwent 3 weeks’ immobilisation followed by a 12-week range-of-motion and strengthening programme than in patients who had stabilisation surgery prior to the same immobilisation and rehabilitation programme.

Stabilisation exercises alone.

Recurrence of instability: two poor-quality studies reported poor outcomes and high recurrence rates in patients given only stabilisation exercises.
Return of symptoms: a poor-quality cohort study reported that progressive strengthening of the rotator cuff muscles decreased reports of pain and instability in 77% patients with moderate disability secondary to posterior shoulder instability. However, more severely disabled patients did not have such a high rate of improvement. In a small RCT, 68% of conservatively managed patients reported improvement at 4.8 years after conservative management, compared with 52% patients who underwent surgical intervention after conservative management failed.

Multimodal intervention or undefined protocol.

Recurrence of instability: in a poor-quality cohort study, 16% patients being managed with a multimodal approach reported either dislocation or subluxation within 3.7 years' follow-up, compared with 41% of patients who had undergone previous surgery; this difference was statistically significant. A higher quality cohort study reported that 60% of conservatively managed patients had re-dislocated at 2 years' follow-up, compared with 20% patients managed surgically; this difference was statistically significant.

Return to pre-morbid status: a prospective cohort study reported statistically significantly improved outcomes after conservative management using proprioceptive neuromuscular facilitation (PNF) patterning, biofeedback and strengthening exercises for patients who had not previously undergone shoulder surgery versus those who had undergone prior shoulder surgery. Another cohort study reported no statistically significant differences in outcomes measured between patients who received surgical treatment and those who received conservative management.

Electromyography (EMG) biofeedback.

Return to pre-morbid status and return of symptoms: a small RCT reported statistically significantly improved function at work and in sport at 8 and 52 weeks for patients given visual and auditory EMG feedback of rotator cuff muscle contraction during a functional endurance programme twice weekly than patients given an isokinetic resistance exercise programme of the same frequency. The RCT also reported statistically significantly decreased pain at rest and with activity at 26 and 52 weeks' follow-up for the EMG feedback group compared with baseline scores. The isokinetic exercise group showed no significant change at any time during follow-up.

Authors' conclusions

Immobilisation for 3 to 4 weeks followed by a structured 12-week rehabilitation programme of range-of-motion and glenohumeral and scapular stability exercises for patients with primary dislocations, to maximise return to pre-morbid activity level, is supported by weak evidence. Level II evidence suggests that recurrence is lower in patients managed surgically than in those managed conservatively. The quantity and quality of the evidence were generally low, and further research is required to delineate the optimal approach to rehabilitation and its role in secondary prevention.

CRD commentary

The review question was clear in terms of the intervention, participants, study designs and outcomes of interest. Several relevant electronic databases were searched. However, only English-language publications were included and no attempts to search for unpublished data were made, thus increasing the potential for language and publication biases. The study selection and validity assessment were carried out in duplicate, which helps to reduce errors and reviewer bias, but the authors did not report the approach used for the data extraction. The validity assessment tool appeared to assess appropriate aspects of study quality; full details were reported in a separate publication. Only studies that met a predefined quality threshold were eligible for inclusion, which seems appropriate.

Adequate details of the individual studies were presented in a table and in the text. However, inconsistencies between the two made it difficult to relate the tabulated study details to the results. Given the differences between the studies in terms of interventions, participants and study designs, a narrative synthesis was appropriate. The authors' conclusions appear to follow from the evidence presented. However, as the authors acknowledged, the evidence was of a poor
quality and no direct comparisons between different types of conservative management were performed.

**Implications of the review for practice and research**

Practice: Based on the current best evidence, the authors recommended immobilisation for 3 to 4 weeks followed by a structured 12-week rehabilitation programme of range-of-motion and glenohumeral and scapular stability exercises for patients with primary dislocations, to maximise return to pre-morbid activity levels. However, this cannot be recommended over surgery for decreasing the recurrence of instability. The authors also recommended EMG biofeedback as an adjunct to conservative management. They stated that stabilisation exercises alone cannot be recommended when compared with surgery, nor can general undefined strengthening.

Research: The authors stated that more rigorous research designs with well-defined conservative management protocols and standardised outcome measures are required. Future research should also investigate the feasibility of shoulder orthoses as part of a conservative management programme for shoulder instability.

**Bibliographic details**


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**Other publications of related interest**


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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.