



REVIEW ARTICLE

The effect of exercise-based management for multidirectional instability of the glenohumeral joint: a systematic review

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Background: The most commonly recommended treatment for multidirectional instability (MDI) of the glenohumeral joint is exercise-based management. The primary objective of this review was to evaluate the effectiveness of exercise-based management in patients with MDI. The secondary aim was to observe the types of exercise protocols and outcomes used, as well as any adverse results associated with exercise.

Methods: The Cochrane Database of Systematic Reviews, Medline, Embase, CINAHL (Cumulative Index to Nursing and Allied Health Literature), PEDro, Current Contents, Allied and Complementary Medicine (AMED), Australasian Medical Index (AMI), Ausport, and Clinical Trials Registers were searched for published and unpublished studies from the inception date to June 2012 using the keywords multidirectional instability, glenohumeral, and exercise. Selection criteria included all study designs (except case reports and case series) and participants with clinically diagnosed MDI using exercise-based management. Inclusion criteria were not limited by outcomes. The authors' own risk-of-bias tool was used for quality assessment of studies. The GRADE approach (Grading of Recommendations, Assessment, Development and Evaluation) was used to synthesize the evidence.

Results: The risk of bias was high in all 7 included studies. For before-and-after comparisons of exercise-based management, GRADE assessment showed very low-quality evidence for improvements in shoulder kinematics, the Rowe score, overall status rating, and peak muscle strength.

Conclusions: The effect of exercise-based management on MDI was variable across the included studies because of study heterogeneity and a high level of bias. There is a need for high-quality intervention studies to be undertaken to validate the effect of exercise for MDI.

Level of evidence: Level IV, Systematic Review.

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Keywords: Multidirectional instability; glenohumeral; shoulder; exercise-based management; impairment; patient focused

No ethics committee approval was required to conduct and produce this systematic review.

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Multidirectional instability (MDI) is symptomatic glenohumeral joint subluxation or dislocation occurring in more than 1 direction.^{1,2,5,15} Discrepancies exist in the current literature concerning the precise definition, classification, and pathogenesis of MDI,^{2,5,35} making selection of the most appropriate management regimen challenging.^{2,5,35} The classification of shoulder instability exists as a continuum of pathologies, with traumatic, structural, unidirectional instability at one extreme and atraumatic, nonstructural, multidirectional instability at the other.^{29,34} Many patients fall somewhere between these extremes, which contributes to difficulties in definitive diagnoses.^{29,34}

There is general agreement that MDI is due to repetitive microtrauma imposed on a congenitally lax and redundant joint capsule.^{1,15,26,35,40} Patients with MDI can present with a variety of symptoms ranging from reports of vague shoulder pain without the perception of instability to daily occurrences of symptomatic subluxations or frank dislocations with activities of daily living.² Typically, patients have reduced scapula upward rotation, an imbalance of muscle strength, and suboptimal neuromuscular control of shoulder function when compared with normal control subjects.^{28,31,35,38} MDI is fundamentally a different pathology than unidirectional instability, which is typically the result of a traumatic event imposed on a normal glenohumeral joint.^{10,29}

The most commonly recommended treatment for MDI is nonoperative with an emphasis on exercise-based management.^{1,2,5,8,10,15,35,48} This is based on the rationale that strengthening the scapula and rotator cuff muscles compensates for the lack of passive stability and assists in active control of the shoulder.^{5,15,35} Surgery to tighten the glenohumeral joint capsule, usually an inferior capsular shift, may be indicated in some cases in which conservative management has failed.^{2,5,15} However, the long-term outcomes of surgery on a capsule that has a high susceptibility to stretch³⁵ are still unknown.^{3,5,15} Given the important role that muscle plays in the stability of the shoulder³⁵ and given that poor muscle patterning is a contributing factor to instability in this population,²⁹ rehabilitation is considered the primary treatment option.^{5,15}

To date, there have been no published systematic reviews investigating the conservative management of MDI. Because MDI is a pathology that is becoming increasingly recognized in the clinical setting,⁵² it is appropriate to review the scientific literature to evaluate what is currently known about the efficacy of exercise-based management for MDI to allow for planning of future research in this area.

The primary objective of this systematic review was to evaluate the evidence on exercise-based management in patients with clinically diagnosed MDI. The secondary objective of this review was to identify the exercise protocols and outcomes used, as well as any adverse results associated with exercise-based management, within the included studies.

Methods

The authors of this article, before conducting a literature search, developed a review protocol that is summarized herein.

Eligibility criteria

Study design

This review included both randomized and nonrandomized studies (NRS). Non-controlled “before-and-after” studies with 10 patients or fewer were classified as case reports or case series and were excluded⁴² because of their inherently high level of bias.²⁵ Including NRS enabled the reviewers (S.A.W., T.P., and J.J.F.) to examine the case for undertaking future research by providing an explicit evaluation of the weaknesses, benefits, and harms of available NRS.²⁵

Participants

Studies were included if they involved at least 1 group of human participants with clinically diagnosed MDI, with instability in at least 2 directions. The diagnosis of MDI must have been established by a physiotherapist, medical doctor, or surgeon and based on the following:

1. A positive sulcus sign or test for inferior laxity⁴⁹
2. A positive load-and-shift test or positive sign of pain and/or apprehension in loading of the glenohumeral joint in at least 1 of the positions that stress the anterior (arm abduction at 90°, external rotation) or posterior (flexion, adduction) joint complex^{13,36,44,49,50}

Although there are discrepancies in the diagnostic criteria for MDI,^{2,5,15} the reviewers made the decision to use the previously mentioned inclusion criteria to reduce the likelihood that participants with unidirectional instability would be included, which could confound the outcomes of the review. Where necessary, authors were emailed to clarify any uncertainties regarding their participant inclusion criteria. If an author did not respond within 2 months, the article was excluded.

Types of interventions

Studies were included if at least 1 group with MDI received exercise-based management. Studies using only surgical intervention or non-exercise-based conservative management (eg, acupuncture) were excluded.

Types of outcome measures

Inclusion criteria were not limited by outcome measures because it is recommended to search for studies investigating all effects of an intervention when including NRS.²⁵

Search methods and study selection

Studies published in any language were located by a comprehensive computer-aided search of the following databases from the date of inception to June 30, 2012: Medline, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Embase, PEDro, Current Contents, Allied and Complementary Medicine (AMED),

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