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Rehabilitation for Patients With Posterior Instability and Multidirectional Instability

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The glenohumeral joint is an inherently unstable joint that relies on the interaction of the dynamic and static stabilizers to maintain stability. Disruption of this interplay or poor development of any of these factors may result in instability, pain, and a loss of function. Rehabilitation varies based on the type of instability present and the key principles described. A comprehensive program designed to establish full range of motion, balance capsular mobility, along with maximizing muscular strength, endurance, proprioception, dynamic stability, and neuromuscular control of the glenohumeral and scapulothoracic joints is essential. A functional approach to rehabilitation using movement patterns and sport-specific positions along with an interval sport program allows a gradual return to athletics. The focus of the program should minimize the risk of recurrence and ensure that the patient can safely return to functional activities.

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Introduction

Shoulder instability is a common pathology often seen in the orthopaedic and sports medicine setting. An appropriate rehabilitation programs plays a vital role in the successful outcome following a shoulder instability episode. The glenohumeral joint allows tremendous amounts of mobility to function, thus making it inherently unstable and the most frequently dislocated joint in the body.[1] Owing to the joint's poor osseous congruency and capsular laxity, it greatly relies on the dynamic stabilizers and neuromuscular system to provide functional stability.[2] Therefore, differentiation between normal translation and pathologic instability is often difficult to determine. This is especially true in individuals with congenital laxity.

The 3 most common forms of instability are anterior, posterior, and multidirectional. Anterior instability is the most common traumatic type of instability seen in the general orthopaedic population. It has been reported that this type of instability represents approximately 95% of all traumatic shoulder instabilities.[3] Conversely, a patient with atraumatic or congenital instability, often known as multidirectional laxity (MDL) or instability (MDI), presents with a history of repetitive injuries and symptomatic complaints owing to the unique characteristic of excessive capsular laxity and capsular redundancy. Often the patient does not complain of a single instability episode but rather a feeling of shoulder laxity or an inability to perform specific tasks. Often the patient experiences episodes of traumatic subluxations rather than dislocations. Moreover, varying degrees of shoulder instability exist, ranging from a subtle subluxation to gross (uncontrollable) instability. The term subluxation refers to the complete separation of the articular surfaces with spontaneous reduction.[4] Conversely, a dislocation is a complete separation of the articular surfaces and requires a specific movement or manual reduction to relocate the joint.[4]

Nonoperative rehabilitation is often implemented for patients diagnosed with a variety of shoulder instabilities. Often the success of the rehabilitation program is based on the accurate recognition and the well-designed treatment program designed to treat the specific type of instability present. Based on the classification system of glenohumeral instability as well as several key factors,[5] a nonoperative rehabilitation program may be developed. In this article, we discuss and overview these factors along with the nonoperative rehabilitation and

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postoperative programs for posterior shoulder instability to return the patient to their previous level of function.

Rehabilitation for Atraumatic Shoulder Instability

A General Overview

Rehabilitation of patients with congenital shoulder instability poses a significant challenge for the rehabilitation specialist. The patients typically present with several episodes of instability, which limits them from performing certain tasks, including daily work and recreational or sports activities. This type of instability may arise from several factors including excessive capsular redundancy and capsular laxity, poor osseous configuration such as a flattened glenoid fossa, or weakness in the glenohumeral and scapular musculature resulting in poor neuromuscular control. Any of these factors, individually or in combination, may contribute to pathologic glenohumeral instability.

MDI or MDL can be identified as shoulder instability in more than 1 plane of motion. Patients with MDL have a congenital predisposition and exhibit ligamentous laxity owing to excessive collagen elasticity of the capsule. Furthermore, Rodeo et al[6] reported that such patients exhibit a greater concentration of elastin than collagen and also smaller-diameter collagen fibrils. The authors consider an inferior displacement of greater than 8-10 mm during the sulcus sign (Fig. 1) with the arm adducted to the side as significant hypermobility, thus suggesting significant congenital laxity.[2]

Figure 1 Sulcus sign to assess GH laxity. GH, glenohumeral.

The focus of the rehabilitation program for patients with atraumatic instability is to improve proprioception, dynamic stability, and neuromuscular control; increase muscle tone; and optimize scapular position and muscle strength to gradually return the patient to functional activities without limitations. As previously mentioned, the early phase of rehabilitation involves reducing shoulder pain and muscular inhibition while abstaining from activities that cause apprehension to the patient.

Shoulder muscle activation has been shown to differ in patients with congenital laxity vs in those with a normal, stable shoulder.[7-12] Normal force coupling that exists to dynamically stabilize the glenohumeral joint is altered, resulting in excessive humeral head migration and a feeling of subluxation by the patient. Burkhead and Rockwood[13] found that an exercise program was effective in the management of 80% of patients who exhibited atraumatic instability. Misamore et al[14] reported improved results in 28 of 59 atraumatic, athletic patients in a long-term follow-up study.

The rehabilitation program for patients with atraumatic instability focuses on muscle activation and control, scapular positioning and stabilization, enhancing proprioception and neuromuscular and finding a tolerable level of activity that the patient can perform without any symptoms. The patients often present with excessive range of motion (ROM), therefore passive range-of-motion (PROM) activities are not the focus of the rehabilitation program. Special attention is placed to avoid positions, movements, or stretches to the involved tissues that may place the shoulder in an unstable position. Modalities such as cryotherapy, iontophoresis, laser therapy, and transcutaneous electrical nerve stimulation may be used to minimize pain and inflammation about the joint. Reducing shoulder pain may also be accomplished through gentle motion activities to neuromodulate pain, nonsteroidal anti-inflammatory drugs prescribed by the physician, and abstaining from painful arcs of active and passive ROM.

The primary focus of the early phase of the rehabilitation program is to promote muscle activation and dynamic stabilization and improve proprioception. Exercises are focused on creating dynamic stability, improving scapular position, enhancing proprioception, and increasing muscle tone throughout their body. Isometric contraction exercises may be performed for the glenohumeral muscles particularly the rotator cuff. Rhythmic stabilization drills may also be performed to facilitate a muscular co-contraction or coactivation to improve neuromuscular control and enhance the sensitivity of the afferent mechanoreceptors.[15] The goal is to create a more efficient agonist-antagonist co-contraction to improve force coupling and joint stability during active movements.

The authors of this article believe that exercises such as rhythmic stabilization drills and weight-bearing exercises to promote a co-contraction and an improvement in proprioception are beneficial for this patient population. Axial compression or weight-bearing exercises are progressed from standing weight shifts on a tabletop to hand on wall with the shoulder in the scapular plane. Often we use the plank position against the wall instead of the push-up position (Fig. 2). We