

THE REHABILITATION TREATMENT IN GLENOHUMERAL INSTABILITY

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ABSTRACT

The glenohumeral instability is a frequent pathology especially in athletes, but it may also affect sedentary people, because the glenohumeral joint has a high degree of mobility, but a smaller stability. The main symptoms are represented by pain, slipping of the shoulder and sudden weakness of the arm. We must evaluate also the neurological signs, because secondary shoulder instability can appear in patients with stroke or nerve lesions. The functional limitations include reduced motion, muscle weakness and pain that interferes with activities of daily living. The rehabilitation treatment has important goals as reduction of pain, restoration of full range of motion, correction of muscle strength deficits and return to full activity free of symptoms.

Keywords: gleno-humeral instability, functional consequences, rehabilitation treatment

INTRODUCTION

Shoulder instability can present as shoulder subluxation, in which the humeral head partially slips out of the glenoid fossa, or as shoulder dislocation, a complete displacement (1). That pathology is classified as anterior, posterior or multidirectional. Instability can result from macrotrauma (shoulder dislocation), repetitive microtrauma associated with throwing sports, or without trauma, in patients with ligamentous laxity (1).

Anatomy

The glenohumeral joint has a high degree of mobility, but a smaller stability. Muscle action, especially the rotator cuff and scapular stabilizers, is important in maintaining joint stability in midranges of motion. In the extremes degrees of motion the static stabilizers are important such as the glenohumeral ligaments, joint capsule and glenoid labrum (2).

Physiopathology

Athletes who participate in overhead sports can develop anterior instability due to repeated capsular stretch, rotator cuff and superior labral injuries.

Shoulder instability affects in particular young adults, females and athletes, but it may affect also sedentary people (2).

In traumatic instability, the patient falls on the externally rotated and abducted arm or receives a blow in the same position, which causes an anterior dislocation. Posterior dislocation is produced from a fall on the forward flexed and adducted arm or by a direct anterior blow when the arm is above the shoulder (1).

Recurrent shoulder instability after a traumatic dislocation is common in young patients, it may occur in association with overhead activities and usually needs surgical treatment.

Secondary shoulder instability can appear in patients with neurologic problems as stroke, brachial plexus injury or poliomyelitis because of the shoulder muscle weakness and scapular dysfunction.

CLINICAL PRESENTATION

The symptoms usually appear from repetitive activity that occur on the dynamic and static stabilizers of the glenohumeral joint, as it happens in sport activities (swimming, tennis) or work-related activities. The initial symptom is pain, associated

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with impingement of the rotator cuff, or the patients may report a slipping of the shoulder associated with sudden weakness during an overhead activity. If the etiology is neurologic, the symptoms are pain during motion and also scapular and shoulder weakness and the diagnosis is probably the shoulder subluxation (1).

PHYSICAL EXAMINATION

At inspection, we can see the deformity, atrophy of surrounding muscles, asymmetry and scapular winging, as we look from the anterior, lateral and posterior view.

We must palpate the soft tissues and the bone, including the rotator cuff, biceps tendon and sub-acromial region.

We also evaluate the passive and active range of motion (ROM). The differences can be secondary to pain, weakness or neurologic lesions.

The manual muscle testing can evaluate weakness of the rotator cuff muscles and scapular stabilizers (3):

1. The supraspinatus muscle is tested in the scapular plane with internal/external rotation of the shoulder;
2. The external rotators can be tested with the arm at the side of the body;
3. The subscapularis muscle can be tested by the lift-off test, in which the palm of the hand is lifted away from the lower back (Fig. 1);
4. The scapular stabilizers (serratus anterior and rhomboid muscles) can be tested by doing wall pushups.



FIGURE 1

Sensory and motor examination is performed to rule out neurologic causes, as nerve injuries.

Testing the shoulder in the position of 90 degrees of forward flexion with internal rotation can evaluate for rotator cuff impingement and can reproduce the pain (4).

The apprehension test is used to evaluate ligamentous laxity or symptomatic instability. The patient is sitting and the shoulder is stressed anteriorly in the position of 90 degrees of abduction and external rotation to reproduce the feeling that the shoulder is coming out of the joint (4).

FUNCTIONAL LIMITATIONS

In the activities of daily living, limitations include reduced motion, muscle weakness and pain that produces functional limitations, such as reaching a high object or brushing hair. In sport activities, particularly in throwing sports, the athlete experiences a decrease in velocity and precision. Occupational limitations include inability to reach or to lift weight above the level of the head or pain during rotation of the arm with avoidance of activities that require abduction and external rotation (3).

DIAGNOSTIC TESTS

Standard radiographs that evaluate the patient with shoulder symptoms include anteroposterior views in external and internal rotation, outlet view and axillary lateral view, and they can assess the greater tuberosity, the shape of the acromion and irregularities of the glenoid or posterior humeral head.

Magnetic resonance imaging is the current standard technique for evaluation of rotator cuff or labral anomalies because the contrast enhancement and modification of the position of the arm increase the sensitivity in identifying the specific location of capsular or labral changes associated with recurrent instability and dislocation.

TREATMENT OF GLENOHUMERAL INSTABILITY

Acute phase

In the acute phase, the treatment of glenohumeral instability is conservative in many cases and include relative rest, ice and analgesic or anti-inflammatory medication, because the goals in this stage are pain reduction, protection from further injury and beginning of an early rehabilitation program.

In athletes, if the dislocation occurs and there is no evidence of vascular or neurologic lesion, reduction may be attempted with traction of the upper arm in forward flexion and slight abduction, and then immobilization in a sling in internal rotation, followed by an exercise program of nonpainful mobilization (5).

The rehabilitation program

The rehabilitation treatment of glenohumeral instability must begin fast after the injury and the goals of nonsurgical treatment are:

1. Reduction of pain;
2. Restoration of full range of motion;
3. Correction of muscle strength imbalances;
4. Achievement of muscle balance;
5. Return to full activity free of symptoms (6).

The treatment has 3 phases:

1. Acute phase;
2. Recovery phase;
3. Functional phase.

The acute phase (1-2 weeks)

The goals of the treatment are to reduce pain and inflammation and allow for tissue healing. The therapeutic intervention is made by active rest, cryotherapy, electrical stimulation, protected motion, isometric and closed chain exercises for shoulder and scapular muscles and nonsteroidal anti-inflammatory drugs.

In this phase, we need to reestablish a nonpainful active range of motion, to prevent muscle atrophy, to reduce scapular dysfunction and to maintain a general fitness (6).

The criteria for advancement in the second phase are:

1. Pain reduction;
2. Recovery of pain-free motion;
3. Strength of the shoulder muscles 4/5.

The recovery phase (2-6 weeks)

The second phase focuses on obtaining a normal passive and active glenohumeral range of motion, restoring posterior capsule flexibility, improving scapular and rotator cuff muscle strength and achieving a normal core muscle strength and balance. It starts when the pain is controlled and it is different, depending of the age and condition of the patient (7).

Young individuals with symptomatic instability progress slowly to the position of shoulder abduction and external rotation, athletes can progress rapidly and make exercises in functional ranges of

motion and older patients may require slower progression, if they have pain and muscle weakness (6,7).

The therapeutic intervention consists in:

- physical modalities – superficial heat, ultrasound and electrical stimulation;
- range of motion exercises and flexibility exercises;
- scapular control – closed chain exercises, proprioceptive neuro-muscular facilitation techniques;
- strengthening exercises for rotator cuff muscles;
- sport-specific exercises;
- gradual return to training for athletes.

The criteria for advancement in the next phase are:

1. Full nonpainful range of motion;
2. Normal strength for the scapular stabilizers and rotator cuff muscles;
3. Correction of posterior capsule inflexibility;
4. Symptom-free progression in a sport-specific program.

The functional phase (6weeks-6 months)

In this phase, we focus on increasing power and endurance of the upper extremity and also to improve neuromuscular control for returning to optimal shoulder function. The rehabilitation treatment is addressed to the entire kinematic chain for specific functional deficits (8).

The training program combines flexibility and strengthening exercises, as well as proprioceptive exercises. If the patient has multidirectional instability we have to work specifically on strengthening the scapular stabilizers and balancing the force couples between the rotator cuff and the deltoid muscle (8).

The therapeutic intervention consists in:

- power and endurance exercises in the upper extremity;
- increased multi-plane neuromuscular control exercises;
- general flexibility training, strengthening, power and endurance exercise program;
- sport – specific progression.

The criteria to end the rehabilitation program are:

1. Normal clinical examination;
2. Normal shoulder mechanics;
3. Normal kinematic chain integration;
4. Completed sports-specific program;
5. Normal throwing motion (7).

INTERVENTIONAL PROCEDURES

If the pain persists secondary to rotator cuff lesion, we can consider a sub-acromial injection under sterile conditions with an anesthetic-corticosteroid medication by an anterior, posterior or lateral approach. Then the patient is instructed to use ice on the shoulder for 15-20 minutes three-four times daily for the next few days and to avoid aggressive overhead activities for the next week (6).

DISEASE EVOLUTION

Complications include recurrent instability with overhead activities, pain, nerve lesions and weak-

ness of the rotator cuff and scapular muscles, especially in patients with multidirectional atraumatic instability.

Functional complications include inability to lift overhead and loss of throwing velocity, especially in athletes.

In older patients, recurrent episodes of instability may also be related to the development of rotator cuff tears.

REFERENCES

1. **Bahr R., Craig E.** The clinical presentation of shoulder instability including on-field management. *Clin Sports Med*, 1995; 14:761-776.
2. **Cordasco F.A.** Understanding multidirectional instability of the shoulder. *J Athl Train*, 2000; 35:278-285.
3. **Bowen J.E., Malanga G.A.** Physical examination of the shoulder in Musculo-skeletal Physical Examination: An evidence-based approach. Philadelphia, Elsevier, 2006:59-118.
4. **Farber A.J., Castillo R., Clough M.** Clinical assessment of three common tests for traumatic anterior shoulder instability. *J Bone Joint Surg Am*, 2006; 88: 1467-1474.
5. **Meister K.** Injuries to the shoulder in the throwing athlete. *Am J Sports Med*, 2000; 28:587-601.
6. **Handoll H.H., Hanchard N.C.** Conservative management following closed reduction of traumatic anterior dislocation of the shoulder. *Cochrane Database Syst Rev* 2006; 1:CD 004962.
7. **Kibler W., Livingston B., Bruce R.** Current concepts in shoulder rehabilitation. *Adv Oper Orthop*, 1995; 3:249-300.
8. **Myers J.B., Lephart S.M.** The role of the sensorymotor system in the athletic shoulder. *J Athl Train*, 2000; 35:351-363.