Labral Tears: Diagnosis, Treatment and Rehabilitation

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Since the earliest times, shoulder instability has been a difficult problem for which there was no simple solution. Hippocrates recommended the use of a red hot poker placed in the axilla of the patient with shoulder instability to scar the shoulder and prevent recurrent dislocations. Up until the mid-1900s, treatments were not much better. Most procedures were directed at restricting external rotation, thereby preventing the arm from reaching a position where dislocation would occur. The problem with these procedures such as the Magnuson-Stack, the Bristow, and the Putti-Platt were that they overconstrained the shoulder and led to severe degenerative changes in the shoulder over a period of 10 to 20 years.

It was not until pioneers such as Jobe, Matsen, and others began to recommend anatomic repair of the labrum that an effective solution was achieved.

Why did this seemingly obvious solution take so long? Surgical repair of the labrum is probably one of the most technically difficult operations in orthopedics. Access to the shoulder joint is difficult and the tight confines of the joint make anatomic repair of the labrum very demanding. However, surgical breakthroughs such as shoulder arthroscopy and suture anchors have made the operation much easier to perform, thus allowing the average surgeon to achieve good, reproducible results. This paper will help athletic trainers and therapists better understand the pathology, repair, and rehabilitation of injuries to the glenoid labrum in athletes.

Anatomy

The labrum consists of fibrocartilage and lines the rim of the shoulder socket, which is called the glenoid. Attached to the labrum is the capsule of the shoulder which includes the glenohumeral ligaments, the most important being the anterior-inferior glenohumeral ligament, or AIGHL. The shoulder differs from other joints in that it is inherently unstable since the glenoid is very shallow and does not encompass the head of the humerus. Stability is achieved by the ligaments and rotator muscles about the shoulder joint helping to compress the head into the socket during movement.

The labrum helps stabilize the joint in three ways. First it serves to enlarge and deepen the glenoid, increasing coverage of the head by 50%. Second, the labrum acts like a “chock block,” preventing the humeral head from sliding out of the glenoid at the extremes of motion. Third, the labrum allows a suction seal to form between the glenoid and the humeral head, thanks to the combination of joint fluid and the way the labrum effectively increases the coverage area of the glenoid. But all of these stabilizing mechanisms are negated by the presence of a labral tear. In traumatic i-
stability of the shoulder, the labral tear is the essential lesion, and anatomic repair of the labrum is the goal of modern surgical techniques.

**Mechanism of Injury**

The glenoid labrum is commonly torn during traumatic dislocations of the shoulder, mostly anterior dislocations. The labrum is usually detached from the rim at its anterior and inferior margin. Commonly termed a Bankart lesion, it is named after one of the first physicians to describe it and often includes a piece of bone that can be seen on X-rays of the shoulder. The labrum, although most often torn anteriorly, can be torn anywhere in its 360° circumference.

One variant of this is the SLAP tear (superior labrum anterior posterior) first described by Snyder in the 1980s. This tear occurs at the base of the insertion of the long head of the biceps tendon on the superior labrum at the 12 o'clock position, destabilizing the biceps and causing pain in this area with activity. This type of labral tear can occur with or without associated shoulder instability and other more common types of labral tears (see Figure 1).

Anterior shoulder dislocations usually occur with a posteriorly directed force on the arm while in a maximally abducted and externally rotated position. In this position the AIGHL, which is the primary ligament that resists anterior translation of the humeral head, is at maximal tension. With further force, the labrum with attached AIGHL cannot absorb the resultant stress and fails at the interface of the labrum with the glenoid rim, allowing the humeral head to slip forward into the resultant defect, thus causing dislocation. Important to note is that not only does the labrum tear but the AIGHL also undergoes a significant degree of stretching. This residual laxity in the AIGHL can lead to residual postsurgical instability if it is not addressed during surgical reconstruction.

Direct force can also result in shoulder dislocations and labral tears. This is sometimes seen in motor vehicle accidents, falls, and contact sports. Careful history-taking is important, as the direction of the applied force determines the direction of dislocation, with posterior forces causing anterior dislocations and anterior forces causing posterior dislocations. Often patients are unable to tell which direction the shoulder has dislocated, making the mechanism of injury even more important to a correct diagnosis.

**Signs and Symptoms**

Pain is by far the most common complaint associated with labral tears, yet it can be quite variable in its severity and frequency. It is not uncommon for a patient with a completely avulsed labrum to be entirely asymptomatic. It is only when the patient has an episode of instability that pain occurs. Other patients may have a constant dull, aching pain that is poorly localized and occurs with or without activity. Anterior instability is the most common type of instability and accounts for 80% of cases. These patients often relate an initial dislocation that either reduced spontaneously or required a reduction in the emergency room.

The location of the pain can be an indication as to the direction of instability, with pain usually felt on the side of the instability. In addition, there may be point tenderness on the side of the dislocation as well as pain related to secondary irritation of the rotator cuff. The patient may avoid placing the arm in an overhead or “throwing position” for fear of subluxing the shoulder. Throwers relate pain in the “late cocking” phase of throwing as well as a loss of throwing velocity and accuracy. Usually, however, there is rarely any true loss of motion in the shoulder and very little muscle atrophy or other outward sign of injury.

**Physical Exam**

In the patient with a history of recurrent anterior instability, the exam begins with evaluating the patient for any obvious muscle atrophy or asymmetry. Usually there