

# Review and Update on SLAP Shoulder Injuries

The focus of this review article is a specific shoulder injury known as a SLAP tear. SLAP stands for superior labral anterior-posterior. It refers to an injury affecting the labrum, a fibrous rim of cartilage around the edge of the shoulder joint. Because the shoulder has such a wide range of motion, the shoulder socket can't be too deep. But if it's too shallow, there is an increased risk of shoulder dislocation. The labrum gives a little lip to the socket to help balance out the need for mobility with the need for stability.

Overhead throwing athletes such as volleyball players and baseball pitchers often develop SLAP tears requiring surgery. In a SLAP tear, the labrum pulls away from the acetabulum (shoulder socket) from the front (anterior) all the way to the back (posterior). It is classified into four groups or categories depending on severity and associated soft tissue injury. The most common SLAP injury is type II. This refers to a tear near the site where the biceps muscle inserts into the bone.

Diagnosing a SLAP tear can be quite a challenge -- even with today's improved methods of imaging. The injury may occur as a result of injury or chronic overuse, but it can also develop slowly and without apparent cause. There isn't one test that is 100 per cent reliable. In fact, most of the clinical tests available and in use today lack the necessary statistical sensitivity and specificity to be relied upon. The surgeon uses the patient history, observation, and examination as a starting point to determine what's wrong. Muscle weakness, muscle atrophy(wasting), and loss of throwing speed and/or loss of control while throwing offer clues to the underlying problem.

Location of the pain, patterns of instability, and impaired movement patterns are carefully considered. The physician often compares the healthy, uninvolved side with the injured, painful side to identify specific changes present. It's not until the surgeon performs an arthroscopic exam or repair procedure that the final diagnosis is made. But compared to even just 10 years ago, surgeons are better able to identify and treat SLAP tears with good results. The goal is to return the player to full participation in his or her sport. Or for the older adult with degenerative changes requiring treatment, restore full function in daily activities.

New knowledge about the blood supply to the labrum, shape of the labrum, and function of the labrum has helped us understand this unique injury. For example, the inner portion of the labrum doesn't have a blood supply. That's why it can't heal on its own without some kind of surgical intervention. The back and lower part of the labrum has a better blood supply than the front and top of the labrum.

Whether or not the biceps is torn away (type II injury) depends on where the tendon inserts into the joint. It's not the same in everyone and sometimes the fibers are attached in more than one place. Sixty (60) per cent of all the tendon attaches to a bony bump called the supraglenoid tubercle. The rest of the tendon inserts directly into the labrum. Even the attachment to the labrum varies from person to person. Sometimes it's more toward the front (anterior) labrum and sometimes it attaches more toward the back of the labrum (posterior anchor). Understanding these differences has helped surgeons find better ways to reattach the disrupted soft tissues and return normal motion without stiffness to the patient.

Understanding the anatomical details of the labrum is of great importance for the surgeon. In order to restore the patient's normal biomechanical function (and throwing abilities), it is necessary to repair the damage in such a way that the patient isn't left with loss of motion or function. Too tight of a repair will leave the person with a stiff shoulder. Too loose and the joint is no longer stable, but rather, at risk of dislocation. Without a fully intact labrum, there can be too much external rotation, which also increases the athlete's risk of an anterior (forward) dislocation.

Anatomical and mechanical variations may explain why some overhead throwing athletes never have a problem while others develop SLAP lesions. The amount of natural shoulder rotation that is present as well as any retroversion (twist) of the bone can make a difference. Tightness or contractures of the ligaments or capsule can alter the way the shoulder moves, setting off a cascade of biomechanical events that leads to a SLAP injury.

Not everyone needs surgery for this condition. Some older adults develop thinning of the labrum with frayed edges that constitute a Type I SLAP but there are no symptoms. These types of degenerative labral tears don't require repair. In other cases, minor tears with no damage to the biceps may not create any mechanical symptoms if the tear is small enough. Surgery can even make some people worse by increasing stiffness and making rehab much longer than it would have been without surgery.

Conservative care with Physical Therapy and rehab to restore normal flexibility, strength, and stability of the soft tissues around the shoulder joint may be all that's needed. Rest, followed by a gradual return to throwing (or in the case of older adults, daily activities) is often part of the program. The therapist analyses the athlete's throwing mechanics in order to alter any problematic patterns.

Most of the time, it's painful and limited shoulder motion that brings the patient in for treatment. The painful symptoms are made worse by heavy lifting, pushing, or overhead motions. These are referred to as mechanical symptoms because they occur when the shoulder is in a certain position or trying to perform a task that requires movement.

Surgery may be as simple as shaving away the frayed edges of the damaged labrum. This procedure is called a debridement. For unstable tears, the surgeon clears away any fragments and reattaches the rest of the labrum to the acetabulum where it belongs. Reattachment of the soft tissues is called fixation and is accomplished using absorbable tacks, suture anchors, or stitches without knots. If the biceps tendon has pulled away, it must be repaired as well. Repair techniques vary depending on whether the tear is located more anterior or posterior. The author offers advice and suggestions on repair techniques, ways to make sutures, and when to use each method of fixation.

A final focus of this report was a summary of research results so far. For example, studies show more favorable results using suture anchors instead of bioabsorbable tacks. Patients treated with the tacks were more likely to experience ongoing night pain, limited return to sports participation, and low scores in function. No matter what type of fixation device is used, there still isn't enough research to show which one is stronger and holds up better and which one results in better outcomes. It is clear that unstable SLAP tears need more than just debridement. Without fixation, the damaged area breaks down again two years after the surgery.

In summary, there's more to SLAP tears than meets the eye. As more and more information is gathered and reported, surgeons will learn from one another and gain a better understanding of the anatomy, pathology, and risk factors behind SLAP tears. These injuries are difficult to diagnose quickly and accurately. Often there are other shoulder injuries present at the same time. There is no formula that can be used to predict who will need surgery or how their surgery will turn out. Each patient must be examined as an individual, carefully and completely, so as not to miss any additional problems that could compromise the treatment selected.

#### Reference:

Jay D. Keener, MD, and Robert H. Brophy, MD. Superior Labral Tears of the Shoulder: Pathogenesis, Evaluation, and Treatment. In *Journal of the American Academy of Orthopaedic Surgeons*. October 2009. Vol. 17. No. 10. Pp. 627-637.