

## **Shoulder Capsulolabral Reconstruction**

### Surgical Indications and Considerations

*Anatomical Considerations:* The function of the shoulder joint is described in terms of static and dynamic terms. There are several joints that affect the stability and function of the shoulder joint, such as the acromioclavicular (AC) joint, sternoclavicular (SC) joint, the glenohumeral (GH) joint and the scapulothoracic (ST) articulation. In regards to the GH joint, the capsule and labrum are intimately related to the stability of this joint. The labrum deepens the surface of the glenoid. One-third of the humeral head contacts the glenoid fossa at any given time. There is negative pressure in the GH joint that allows for optimal functioning. When the labrum is torn it interrupts this negative pressure seal and diminishes the glenohumeral joint stability. The capsule and the ligaments, which are thickenings of the capsule, provide static support of the GH joint. The major ligaments and their functions are the:

- Inferior glenohumeral ligament – preventing anterior and inferior translations
- Middle glenohumeral ligament (attached to the labrum superiorly) – resists external rotation and abduction
- Superior glenohumeral ligament (attached to labrum and as well as the long head of biceps) prevents superior translation

The dynamic support of the GH joint is provided by the rotator cuff muscles. There are nearly 20 muscles that act on the shoulder joint complex. The major dynamic muscles and their function are as follows:

- Supraspinatus and the deltoid assist in abduction
- Subscapularis assists in decreasing displacement during external rotation and abduction
- Infraspinatus decreases the anterior translation (along with the long head of the biceps)

*Pathogenesis:* The mobility of the shoulder complex occurs at the expense of stability. The superior/anterior part of the labrum is meniscal in nature and is loosely attached to the glenoid. If there is mobility of the inferior aspect of the labrum then there is a strong indicator of pathology. High repetitive forces generate degenerative changes in the capsule, rotator cuff, and labrum. This leads to abnormal humeral head translation, which leads to rotator cuff pathology. Many individuals with shoulder instabilities eventually require surgery.

*Epidemiology:* Capsule and labral tears are frequent in the athletic population. Injuries that occur to the capsulolabral complex are many times multidirectional. Dislocations and subluxations are caused by falling on an outstretched arm, sliding into a base head/arm first, or having the arm jerked or pulled by a dog or during an athletic game. Repetitive motions also cause injury to the labrum and capsule, (e.g. in baseball and volleyball players). The labral detachment can occur in any of the above scenarios requiring intervention such as surgery and rehab. Therefore, capsulolabral reconstruction was developed to restore preinjury level of function.

## Diagnosis

- Pain with throwing or during activities requiring use of the arm in the overhead throwing position
- Palpatory tenderness anterior over long head biceps, rotator cuff insertions and bony landmarks of the AC, SC, ST and GH joints
- Normal or hypermobile GH internal and external rotation ROM
- Load and shift test – clunk with axial loading with anterior and posterior shift
- Apprehension test with combination of the relocation test
- Positive sulcus sign
- Rule out cervical spine and elbow conditions mimicking shoulder pathology
- MRI can be helpful in demonstrating the presence, location, and severity of the tear(s) – with and without contrast

*Nonoperative Versus Operative Management:* Instability of the shoulder joint can be very painful and may continue to cause further complications if surgery is not performed, such as continued articular cartilage. Surgery can, ideally, repair and reconstruct the pathology. Even though surgery is warranted the person may have stability but be limited in mobility that could affect their career if they were a professional athlete, dancer, or musician. Another challenge is open versus closed procedures. Open procedures are usually recommended for individuals with multiple dislocations and possible contact sports such as football and rugby. Arthroscopic procedures are usually used for the overhead athlete since it traditionally provides stability without compromising range of motion.

*Surgical Procedure:* There are over 100 open surgical techniques described in the literature. They all have their goals of providing capsular tightening, bone block transfer or osteotomies. The two most common procedures, stated by Donatelli and Jobe et al, are the open Bankhart reconstruction and the anterior or posterior capsulolabral reconstruction. A Bankhart tear is located in the front lower part of the labrum and a SLAP tear occurs on the top part of the labrum – Superior Labrum from Anterior to Posterior. The Bankhart lesion specifically refers to an injury where part of the ligaments and capsule of the shoulder joint are pulled away from the bone.

Donatelli states that the basic goal of the Bankhart procedure is repairing the capsular-periosteal separation at the anterior glenoid neck. It attempts to correct the inferior GH ligamentous complex. Jobe et al states that the goal of the capsulolabral reconstruction is to reduced the capsular shift by providing a double-thickness affect for the anterior or posterior capsule – thus, providing reinforcement at the site of the previous instability. Sutures and tacs/anchors are done according to the preference of the surgeon. During the capsular shift procedure in conjunction with the Bankhart procedure, it is important that the surgeon considers the placement of the sutures and the position of the flaps for reasons to protect the labrum as stated by Jobe et al. Before closing the site, passive motion must be performed to ensure at least 90° of abduction and 45° of external rotation. This capsular tightness observed will determine the safe zone for postoperative splinting and rehabilitation guidelines.

### *Preoperative Rehabilitation (for 6 months)*

- Rest (no throwing activities, etc.)
- Nonsteroidal anti-inflammatory medications
- Three steroid injections
- Strengthening program for rotator cuff muscles and scapular muscles (trapezius, rhomboids, and serratus anterior)

## POSTOPERATIVE REHABILITATION

Note: The following rehabilitation progression is a summary of the guidelines provided Jobe, Giangarra, Kvitne and Glousman. As with all protocols your surgeon may have one that is specific to his or her surgical technique.

### **Phase I** for Controlled Mobilization and Rehabilitation: Day one -2 weeks

Goals: Control edema and pain

Maintain range of motion

Protect repair (mainly by controlling excessive motion)

Intervention:

- Postoperative orthosis in a position of 90° of abduction, 45° external rotation and 30° of forward flexion.
- NMES and ice
- Strengthening exercises to include elbow flexion and extension, isometric abduction, active-assisted horizontal adduction and abduction
- Passive range of motion of abduction, flexion and external rotation  
NOTE: perform abduction and external rotation in the scapular plane with no forced motion (protect anterior capsule)  
NOTE: If a posterior repair occurred then perform no posterior glides, internal rotation and horizontal adductions will be limited initially

### **Phase II** Rehabilitation: Weeks 2-6

Goals: Control any residual symptoms of edema and pain

Continue to protect repair

Improve strength

Improve range of motion

Intervention:

- Discontinue orthosis – instead use abduction brace/pillow at about 20° abduction as needed
- Actively abduct from neutral to beyond 90°
- Strengthening continued and progressed to add shoulder shrugs, and shoulder external rotation
- May use home over the door pulley or pool therapy for gentle range of motion

**Phase III for Rehabilitation:** 6 weeks - 5 months

Goals: Improve strength of GH and ST muscles  
 Full active range of motion  
 Begin synchronization of motor control

Intervention:

- Strengthening of the rotator cuff muscles, shoulder flexion, horizontal adduction beginning at 6-8 weeks post-op
- By week 9 add strengthening regimen for scapular rotators, biceps, coracobrachialis, pectoralis, and deltoid muscles (should be continued for minimum of 1 year)
- Upper extremity ergometer – low resistance
- Progress to total body conditioning

**Phase IV for Rehabilitation:** 6-9 months

Goals: Return to sport activity  
 Improving endurance of the sport specific musculature  
 Re-established coordinated/synchrony of motion

Intervention:

- Isokinetic testing okay, progression of total body conditioning program
- Progress sport specific activities, such as throwing
- By 9<sup>th</sup> month patients should be performing sport specific activity 30 minutes each day

### Selected References:

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