

The anatomic configuration of the shoulder joint (glenohumeral joint) is often compared to a golf ball on a tee. This is because the articular surface of the round humeral head is approximately four times greater than that of the relatively flat shoulder blade face (glenoid fossa)¹ (Figure 1). The stability and movement of the shoulder is controlled by the rotator cuff muscles, as well as the shoulder ligaments, the capsule of the shoulder and the glenoid labrum. The labrum is a fibrocartilagenous ring which attaches to the bony rim of the glenoid fossa.¹ The labrum doubles the depth of the glenoid fossa to help provide stability.² An analogy would be a parked car on a hillside with a block under the tirethe round tire being the humeral head, the road being the glenoid fossa and the block being the labrum.

The labrum also serves as the anchor for the long head of the biceps. A large portion of the long head of the biceps originates from the top (superior) portion of the labrum. Overhead sports can create significant forces at this attachment site. This can ultimately lead to injury and tears of the biceps off this attachment. This is called a SLAP lesion (Superior Labral Anterior to Posterior tear). These injuries can also occur from trauma, such as falling on your arm, bracing your arm in an accident, arm tackling in football or any large sudden force applied to the arm. There are four basic types of SLAP tears.³ A Type II SLAP tear is the most common type of SLAP tear requiring surgical reconstruction (Figure 2).³ In this type of tear the long head of the biceps remains attached to the labrum but the labrum has been detached from the

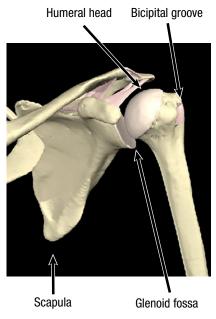
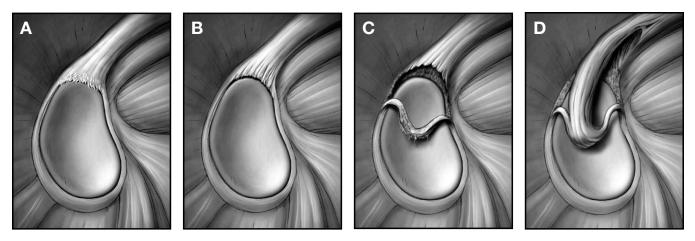


Figure 1 Anatomical configuration of the shoulder joint (glenohumeral joint) Reprinted with permission from Primal Pictures, Ltd.

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Figures 2-A through 2-D The classification system for SLAP lesions. Figure 2-A A Type-I SLAP lesion consists of degenerative fraying on the inner margin of the superior aspect of the labrum. Figure 2-B With a Type-II SLAP lesion, the biceps attachment and the adjacent superior aspect of the labrum have pulled off the superior glenoid tubercle. Figure 2-C A Type-III SLAP lesion is a superior labral bucket-handle tear. Figure 2-D A Type IV SLAP lesion is a superior labral bucket-handle tear. Figure 2-D A Type IV SLAP lesion is a superior labral bucket-handle tear.

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bony glenoid.⁴ This is repaired surgically by placing suture anchors (Figure 3) in the glenoid fossa, passing sutures through the labrum and then tying special surgical knots to approximate the labrum back to the bony glenoid rim.

Full return to throwing and contact sports occurs in 80-90% of athletes.4,5 Successful return to sport and activity is dependent on following post-operative precautions and completing a structured post-operative rehabilitation program. Our rehabilitation program is outlined below. The rehabilitation guidelines are presented in a criterion based progression. General time frames are given for reference to the average, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehabilitation compliance and injury severity. These factors will also affect how long it takes each individual to meet the required criteria for return to sport and activity.4

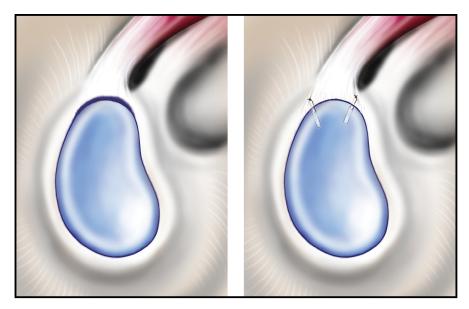


Figure 3. The first illustration shows a Type II SLAP tear extending from 10:00 to 2:00. The second illustration shows this tear repaired with sutures and anchors anterior to and posterior to the long head of the biceps. The number of suture anchors needed varies from case to case.

PHASE I (Surgery to 4-6 weeks after surgery)

Appointments	• Rehabilitation appointments begin within 7 days of surgery, continue 1-2 times per week	
Rehabilitation Goals	 Protection of the post-surgical shoulder Activation of the stabilizing muscles of the glenohumeral and scapulo-thoracic joints 	
Precautions	 Sling immobilization required for soft tissue healing Hypersensitivity in axillary nerve distribution is a common occurrence No long head biceps tension for 6 weeks to protect repaired tissues – this includes avoiding range of motion with long lever arm shoulder flexion, as well as resisted supination or elbow flexion Limit external rotation to 40° in neutral for the first 4 weeks. Avoid abduction and external rotation for 6 weeks No extension or horizontal abduction past body for 4 weeks Dr. Scerpella's patients should also avoid forward flexion past 130° for 6 weeks. 	
Range of Motion Exercises (Please do not exceed the range of motion specified for each exercise and time period)	 Gentle active/active assistive range of motion for elbow and wrist Pain free, gentle passive range of motion for shoulder flexion, abduction, internal rotation and external rotation within the limits of the precautions. 	
Suggested Therapeutic Exercise	 Begin week 3, sub-maximal shoulder isometrics for internal rotation, external rotation, abduction and adduction within the limits of the precautions Hand gripping Cervical spine and scapular active range of motion Desensitization techniques for axillary nerve distribution 	
Cardiovascular Fitness	 Walking, stationary bike - sling on No treadmill (Avoid running and jumping due to the distractive forces that can occur at landing) 	
PHASE II (begin after meeting Phase I criteria, usually 6 to 12 weeks after surgery)		
Appointments	Rehabilitation appointments are once every 1-2 weeks	
Rehabilitation Goals	Full active range of motionFull rotator cuff strength in a neutral position	

Precautions	 Gradual initiation of biceps tension from weeks 6-8 to protect repaired tissues No passive range of motion for abduction with external rotation or extension
Range of Motion Exercises (Please do not exceed the range of motion specified for each exercise and time period)	 Active range of motion for shoulder flexion in side lying to lessen biceps tension Active range of motion for shoulder abduction in supine or prone to lessen biceps tension Active range of motion for shoulder internal rotation – avoid internal rotation up the back type stretching since internal rotation and extension may place too much stress on the healing superior labrum

Suggested Therapeutic Exercise	 Scapular squeezes Internal and external rotation in neutral with exercise band resistance to neutral – make sure patient is not supinating with external rotation movement
Cardiovascular Fitness	 Walking, stationary bike without using arms (No Airdyne) No treadmill, swimming or running

PHASE III (begin after meeting Phase II criteria, usually 10 weeks after surgery)

Appointments	Rehabilitation appointments are 1-2 times per week
Phase III Goals	 Full active range of motion in all cardinal planes with normal scapulo-humeral movement Normal (rated 5/5) rotator cuff strength at 90° of shoulder abduction in the scapular plane Normal (rated 5/5) peri-scapular strength
Precautions	 All exercises and activities to remain non-provocative and low to medium velocity Avoid activities where there is a higher risk for falling or outside forces to be applied to the arm No swimming, throwing or overhead sports Patients can develop posterior capsule tightness that inhibits rehabilitation progress; continue to evaluate for this and treat if necessary
Suggested Therapeutic Exercise	 Mobilization and motion Posterior glides and sleeper stretch if posterior capsule tightness is present upon assessment Strength and Stabilization Flexion in prone, horizontal abduction in prone, full can exercise, D1 and D2 diagonals in standing Theraband/cable column/ dumbbell (light resistance/high repetition) internal rotation and external rotation in 90° of abduction Rowing with Theraband or resistance machines Balance board in push-up position (with rhythmic stabilization), prone Swiss ball walkouts, rapid alternating movements in supine, and D2 diagonal closed kinetic chair stabilization with narrow base of support
Cardiovascular Fitness	 Walking, biking, stairmaster and running (if Phase II criteria are met) No swimming
Progression Criteria	Patient may progress to Phase IV if they have met the above stated goals and have no apprehension, internal impingement or active irritation/inflamation of the long head of the biceps

PHASE IV (begin after meeting Phase III criteria, usually 16 weeks after surgery)

Appointments	Rehabilitation appointments are 1 time every 3 weeks
Phase IV Goals	 Patient to demonstrate stability with higher velocity movements and change of direction movements Normal (rated 5/5) rotator cuff strength with multiple repetition testing at 90° of shoulder abduction in the scapular plane Full multi-plane active shoulder range of motion
Precautions	 Progress gradually into provocative exercises by beginning with low velocity, known movement patterns
Suggested Therapeutic Exercise	 Mobilization and motion Posterior glides and sleeper stretch if posterior capsule tightness is present upon assessment Strength and Stabilization Dumbbell and medicine ball exercises that incorporate trunk rotation and control with rotator cuff strengthening at 90° of shoulder abduction; begin working towards more functional activities by emphasizing core and hip strength and control with shoulder exercises Theraband/cable column/ dumbbell internal rotation and external rotation in 90° of abduction Rowing with Theraband or resistance machines Higher velocity strengthening and control, such as inertial, plyometrics and rapid exercise band drills. Plyometrics should start with 2 hands below shoulder height and progress to overhead, then back to below shoulder with one hand, progressing again to overhead Begin education in sport specific biomechanics with very initial program for throwing, swimming or overhead racquet sports
Cardiovascular Fitness	 Walking, biking, stairmaster and running (if Phase III criteria are met) No swimming
Progression Criteria	 Patient may progress to Phase V if they have met the above stated goals and have no apprehension or internal impingement signs
PHASE V (begin after meeting	Phase IV criteria, usually 22 weeks after surgery)
Appointments	Rehabilitation appointments are 1 time every 2-3 weeks
Phase V Goals	 Patient to demonstrate stability with higher velocity movements and change of direction movements that replicate sport specific patterns (including swimming, throwing, etc.) No apprehension or instability with high velocity overhead movements Improve core and hip strength and mobility to eliminate any compensatory stresses to the shoulder Work capacity cardiovascular endurance for specific sport or work demands

Precautions	Progress gradually into sport specific movement patterns
Suggested Therapeutic Exercise	 Mobilization and motion Posterior glides and sleeper stretch if posterior capsule tightness is present upon assessment Strength and Stabilization Dumbbell and medicine ball exercises that incorporate trunk rotation and control with rotator cuff strengthening at 90° of shoulder abduction and higher velocities; begin working towards more sport specific activities Initiate throwing program, overhead racquet program or return to swimming program depending on the athlete's sport High velocity strengthening and dynamic control, such as plyometrics and rapid exercise band drills
Cardiovascular Fitness	 Design to use sport specific energy systems
Progression Criteria	 Patient may return to sport after receiving clearance from the Orthopedic surgeon and the physical therapist/athletic trainer

These rehabilitation guidelines were developed collaboratively by Marc Sherry, PT, DPT, LAT, CSCS (msherry@uwhealth.org) and the UW Health Sports Medicine physician group.

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