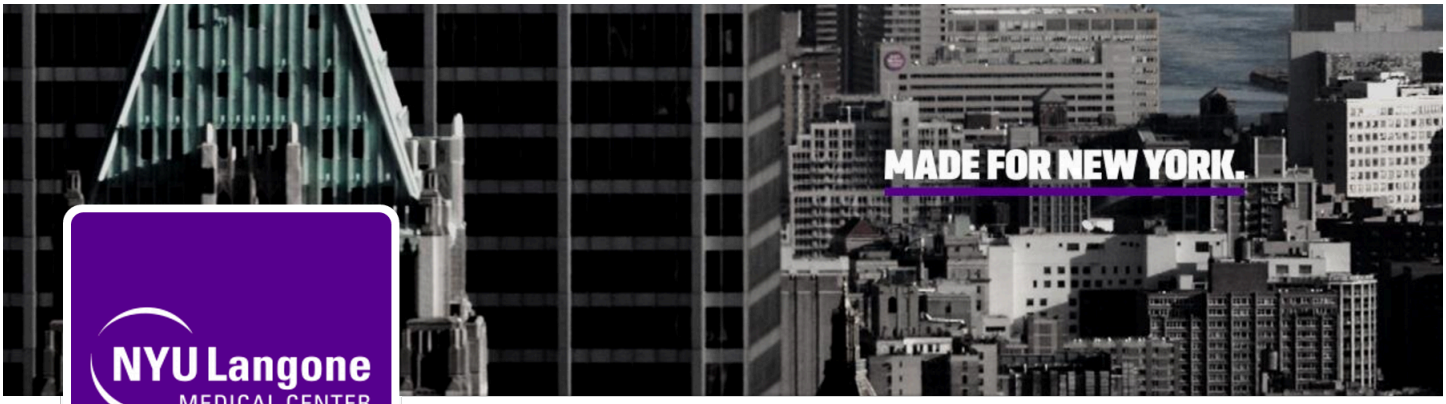

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Rehabilitation Protocol After Arthroscopic Rotator Cuff Repair

The anatomic configuration of the shoulder joint (glenohumeral joint)is often compared to that of 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 at shoulder blade face (glenoid fossa)[1.] This configuration provides less boney stability than a truer ball and socket joint, like the hip. The stability and movement of the shoulder is controlled primarily by the rotator cuff muscles, with assistance from the ligaments, glenoid labrum and capsule of the shoulder. The rotator cuff is a group of four muscles: subscapularis, supraspinatus, infraspinatus and teres minor (Figure 1).

Rotator cuff tears can occur from repeated stress or from trauma. Throwing a baseball can create up to 750 newtons of distractive force on the shoulder[2]. This places a significant amount of stress on the rotator cuff while trying to dissipate this force. This stress and force may be even greater if there is improper form or mechanics while throwing. This repeated stress may lead to rotator cuff tears. Rotator cuff trauma also may result from falling on your arm, bracing your arm in an accident, arm tackling in football or any large sudden force applied to the arm. Most rotator cuff tears involve the supraspinatus and/or the infraspinatus. Occasionally isolated tears of the subscapularis can occur. This usually results from trauma rotating the shoulder outward.

The rotator cuff tendons also undergo some degeneration with age. This process alone can lead to rotator cuff tears in older patients. Patients over 50 years of age are more susceptible to sustaining a significant rotator cuff tear from trauma3.

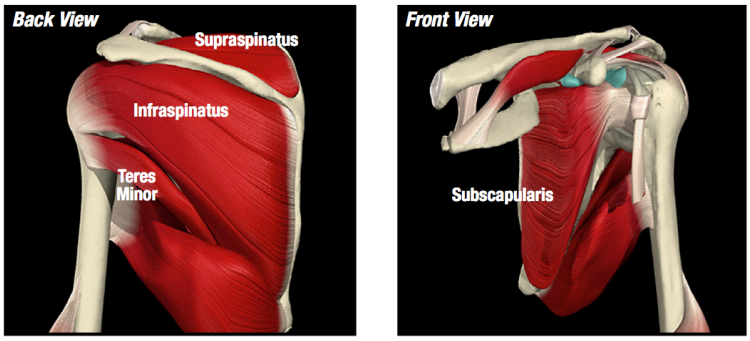

Figure 1 *Rotator cuff anatomy*

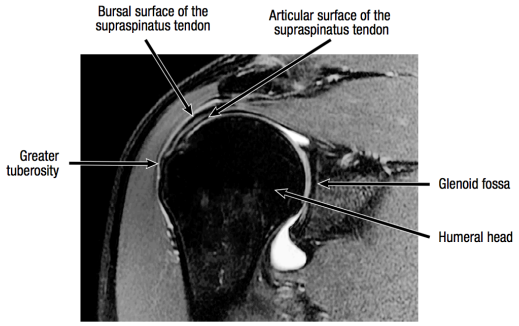

Figure 2. *Coronal MRI Image of the Supraspinatus Note the black line of the bursal surface and articular surface. In this normal shoulder this tendon continues all the way to the greater tuberosity, the attachment site on the humerus. When there is a rotator cuff tear these black lines will become disrupted before reaching the greater tuberosity.*

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Rotator cuff tears can be classified in various ways. The first classification is a partial thickness or a full thickness tear. Normal tendon thickness is 9 to 12 mm. Partial thickness tears start on one surface of the tendon, but do not progress through the depth of the tendon. These can be bursal surface tears or articular sided tears . Figure 2 shows the normal anatomy of the bursal and articular side of the rotator cuff. Bursal surface tears occur on the outer surface of the tendon and may be caused by repetitive impingement. Articular sided tears (Figure 3) occur on the inner surface of the tendon, and are most often caused by internal impingement or tensile stresses related to overhead sports. Full thickness or complete tears (Figure 4) extend from one surface of the tendon all the way through to the other surface of the tendon. Full thickness tears are often caused by trauma, such as falling on the arm. Since a portion of the tendon is completely disrupted, there also will be some tendon retraction. Retraction is movement of the tendon away from its insertion point back toward the muscle.[4] After determining the type of tear, a classification system is used to assess the size of the tear. Type I tears are tears less than 2 cm in width and Type II tears are greater than 2 cm.

Surgical repair of a rotator cuff tear can be done arthroscopically or with a mini- open procedure. A 2007 review published in The Journal of Bone and Joint Surgery stated that equally successful outcomes can be attained from either technique5. The primary goal of a rotator cuff repair is to restore the normal anatomy by approximating the rotator cuff tendon back to its normal attachment site on the greater tuberosity of the humerus. This is done by passing sutures through the tendon and then tying the tendon down to suture anchors that have been placed in the humerus. Prior to bringing the tendon back to its insertion, the edges of the tear may need to be brought together, referred to as side-to-side repair or convergence (Figure 5). Not all rotator cuff tears are repairable. A tear may be un-repairable if the tear is too large, there is too much retraction, or the tissue quality is too poor. The degree of success for tears that are repaired is related to various factors, including tear size, the number of tendons involved, patient age, associated injuries and post operative rehabilitation [6, 7.]

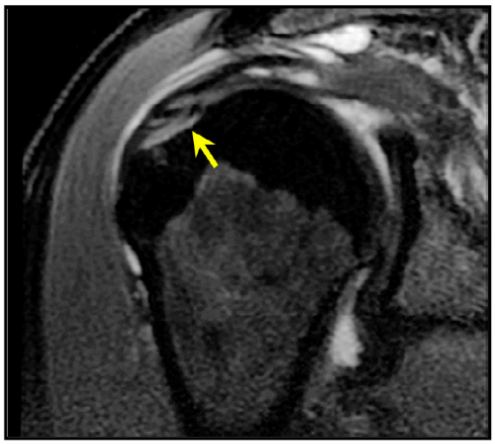

Figure 3 *Coronal MRI image of an articular surface tear of the supraspinatus. Note the top black line has maintained continuity but the undersurface black line is disrupted.*

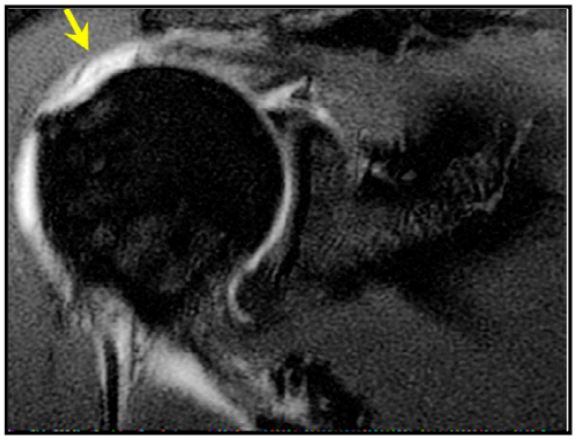

Figure 4 *Coronal MRI image of a full thickness tear of the supraspinatus. Note the white fluid present where the dark tendon should be.*

Rehabilitation Protocol After Arthroscopic Rotator Cuff Repair

Rehabilitation is vital to regaining motion, strength and function of the shoulder after surgery. Initially patients will use a sling to protect the repair site and allow healing of the tendon back to the bone. During this time, passive motion exercises are started to prevent the shoulder from getting stiff and losing mobility. The rehabilitation program will gradually progress to more strengthening and control type exercises. The rehabilitation guidelines will vary depending on the size of the tear and quality of the tendon. The rehabilitation guidelines for Type I and Type II tears of the supraspinatus or infraspinatus and isolated subscapularis tears are presented below 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.

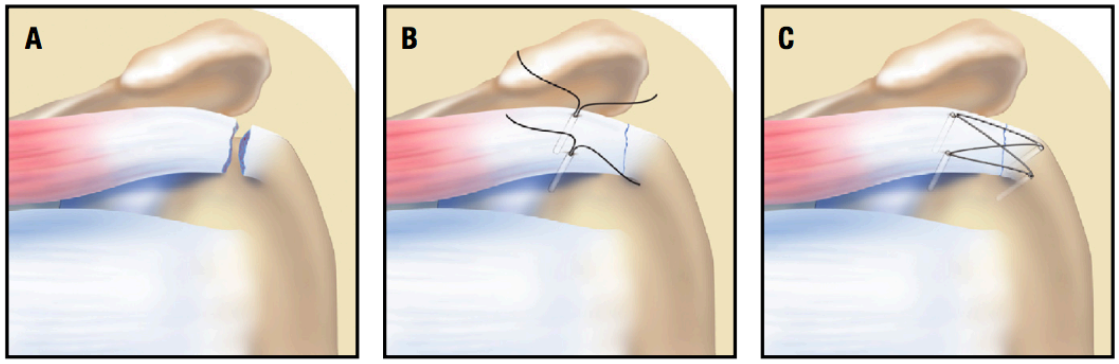

Figure 5 *Rotator cuff repair technique using anchors and sutures. The tear (A) is approximated. Then suture anchors are placed on both sides of the tear (B and C). Finally the tendon is approximated back to the bone with various suture patterns to decrease focal stress.*

Rehabilitation Protocol After Arthroscopic Rotator Cuff Repair

Phase I (Surgery to 4 weeks after surgery)

Precautions	○ Sling immobilization with supporting abduction pillow to be worn at all times except for showering and rehab under guidance of PT (if instructed to start before 4 weeks post surgery)
Range of Motion	o True Passive Range of Motion Only to Patient Tolerance o Goals: 140° Forward Flexion, 40° External Rotation with elbow at side, 60-80° Abduction without rotation, Limit Internal Rotation to 40° with the shoulder in the 60-80° abducted position o Maintain elbow at or anterior to mid-axillary line when patient is supine
Therapeutic Exercises	○ No canes or pulleys during this phase ○ Codman exercises/ pendulums ○ Elbow/wrist/hand range of motion and grip strengthening
Other Suggestions	○ Heat/Ice before and after PT sessions

Phase II (4 weeks to 8 weeks following surgery)

Precautions	○ D/C sling immobilization
ROM	○ 4-6 weeks: Gentle passive stretch to reach ROM goals from Phas I ○ 6-8 week: Begin AAROM -> AROM as tolerated
Range of Motion Exercises	○ Increase Forward Flexion, Internal/External Rotation to full motion as tolerated
Therapeutic Exercises	○ 4-6 weeks: Begin gentle AAROM exercises (supine position), gentle joint mobilizations (grades I and II), continue with Phase I exercises ○ 6-8 weeks: Progress to active exercises with resistance, shoulder flexion with trunk flexed to 45° in upright position, begin deltoid and biceps strengthening
Other Suggestions	○ Modalities per PT discretion

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Rehabilitation Protocol After Arthroscopic Rotator Cuff Repair

Phase III (8 weeks to 12 weeks following surgery)

ROM	○ Progress to full AROM without discomfort
Therapeutic Exercises	○ Continue with scapular strengthening ○ Continue and progress with Phase II exercises ○ Begin internal/external rotation isometrics ○ Stretch posterior capsule when arm is warmed-up
Other Suggestions	○ Modalities per PT discretion

Phase IV (3 months to 6 months following surgery)

ROM	○ Full range of motion without discomfort
Therapeutic Exercises	○ Advance strengthening as tolerated: isometrics -> therabands-> light weights (1- 5 lbs) ○ 8-12 repetitions/2-3 sets for rotator cuff, deltoid and scapular stabilizers ○ Return to sports at 6 months if approved
Other Suggestions	○ Modalities per PT discretion

***If biceps tenodesis was performed – no biceps strengthening until 8 weeks post-op

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