

Rehabilitation Guidelines for Rotator Cuff Repairs in Adults

About the Rotator Cuff

The rotator cuff (RTC) is comprised of four muscles that surround the shoulder joint: the supraspinatus, infraspinatus, teres minor, and subscapularis. The RTC muscles serve several purposes: 1) assist in stabilization of the shoulder joint with movement; 2) produce shoulder joint rotation and elevation.

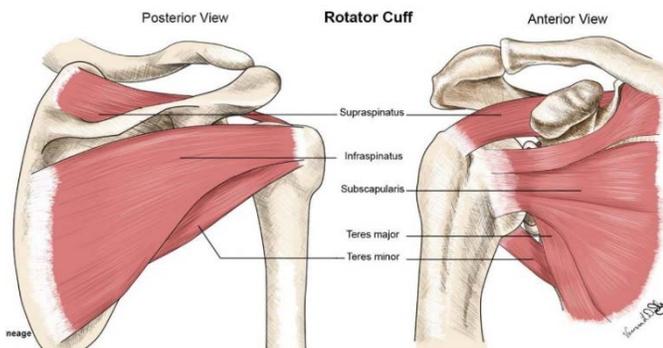


Image 1: Anatomy of the rotator cuff

Mechanism of Injury

Because of its location over the shoulder joint, the most commonly injured RTC muscle is the supraspinatus, however, all four of the RTC muscles may be involved. A RTC tear can occur from a traumatic event, such as falling on an outstretched hand, or from repetitive stress with activities involving shoulder motion.

A RTC tear commonly results in pain in the shoulder joint. However, this injury may also be relatively pain-free for long periods of time depending on the mechanism of injury. Following an injury, it may be difficult to lift or rotate the arm. Sleeping on the side of the injured shoulder may also increase symptoms. Patients often report weakness and fatigue of the involved shoulder.

Diagnosing a RTC Tear

There are several methods used to diagnose a RTC tear. Your healthcare provider will assess the shoulder through a physical exam. They will use evidence-based examination techniques to assess the performance of the RTC as well as the

function of surrounding body regions. They may also request diagnostic imaging be taken of the shoulder.

Several diagnostic imaging procedures are also used to assess the RTC. Radiographic (x-ray) images are initially used to assess the bony alignment of the shoulder complex. Magnetic resonance imaging (MRI) may often be ordered to visualize the soft tissue structures, (muscles, tendons, and ligaments) and is highly accurate in diagnosing RTC injuries. Magnetic resonance arthrography (MRA) may also be used to increase the contrast of the image to better see the RTC and shoulder complex. Diagnostic Ultrasound also provides the opportunity to visualize the muscles dynamically to see how well they may be able to contract.

A diagnostic arthroscopy, a surgical procedure performed to visualize the joint, is the most definitive method to determine a RTC tear. During a diagnostic arthroscopy, an orthopedic surgeon can confirm injury using an arthroscopic camera to assess the inside of the shoulder complex.

Treatment Options for a RTC Tear

Treatment options are individualized to the patient with consideration for age, activity level, and degree of impairment to daily function. Research shows that conservative treatment may be effective in returning you to your previous level of activity, and may include activity modification, corticosteroid injections, and functional exercise therapy prescription.

If surgery is warranted, repair of the RTC involves suturing the torn muscle tendon back to the bone. This repair is performed by placing sutures through the involved muscle tendons and securing them with anchors placed to the humerus. Factors that guide the decision for surgical repair include: 1) dimensions of the tear; 2) length of time from original injury; 3) sport/work requirements; 4) age; and 5) overall physical health.

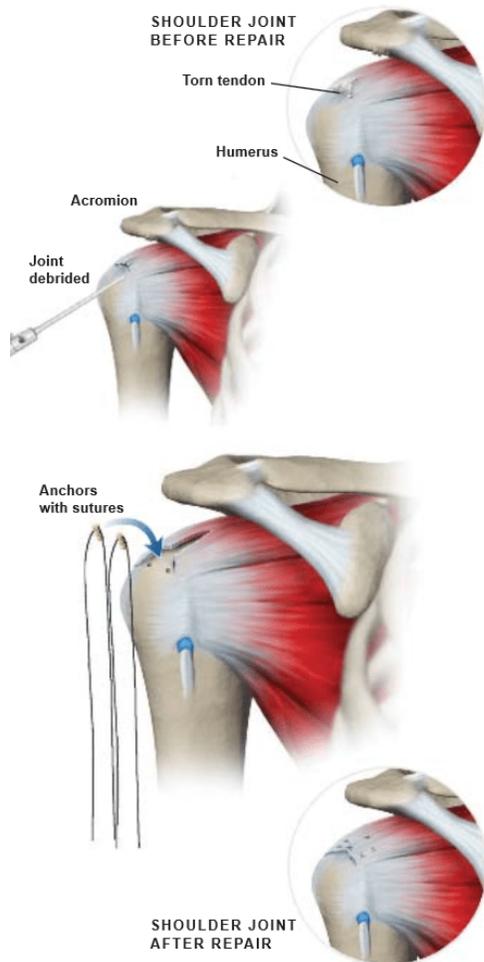


Image 2: Example of repair process

Rehabilitation Following Surgical Repair

All patients will undergo six to nine months of rehabilitation, divided into phases, focusing on slowly progressing you back to your daily activities, hobbies, and sports. The progression through these phases is dependent on factors related to the surgical procedure performed, the surgeon's preferences, and your response to surgery. Rehabilitation is affected by the quality of the tissue being repaired. Age, tear size, muscles involved, and tendon retraction (increased distance from the torn tendon to its attachment) will lengthen the progression of rehabilitation.

Larger tears (greater than 3cm) and having multiple muscles involved creates a greater area of healing tissue. Slowing the progression through rehabilitation phases will give these tissues time to heal without additional stress.

Additional precautions, like the use of a pillow between the sling and body, may be used to assist with this stress reduction. Depending on the muscles involved, there may be additional restrictions in movement in the early phases of rehabilitation to protect them from being stretched too early.

Phase I of rehabilitation focuses on developing greater range of motion through therapist-led mobility, where the shoulder is moved passively (without the patient utilizing recovering muscles). Phases II and III focus on developing full range of motion both passively and actively. During this phase, the patient is allowed to progressively assist in performing arm motion, until able to perform all motions without assistance. In phase IV, strengthening of the RTC is initiated. This strengthening is progressed with the goal of performing all activities of daily living by the end of phase V. During phase VI, the patient transitions to developing speed and power of arm movements. It is in this phase that a progressive return to throwing program and sport-specific exercises can be initiated, under guidance of your sports medicine team.

In order to safely return to sport-specific activities, a patient must first achieve certain functional goals: 1) full range of motion; 2) greater than 90% RTC and scapular strength measurements; 3) functional shoulder complex motor control; 4) no pain with activity; and 5) physician and sports medicine team approval. Once these goals have been achieved, your sports medicine team will put you through criterion-based functional tests to determine the ability to safely return to sport. After satisfactory performance on these tests, you will progress through a return-to-sport program in order to return to pre-injury levels of performance. A referral to a strength and conditioning specialist may also be made to assist in returning you to pre-injury performance levels. Progression to pre-injury activity is time and criterion-based, and is dependent on soft tissue healing, patient demographics, and clinician evaluation.

References

1. Battista C. Medbullets Step 2/3. <https://step2.medbullets.com/orthopedics/120532/rotator-cuff-injury>. Accessed March 16, 2020. Edwards PK,
2. Edwards, PK, Ebert JR, Littlewood C, Ackland T, Wang A. A Systematic Review of Electromyography Studies in Normal Shoulders to Inform Postoperative Rehabilitation Following Rotator Cuff Repair. *Journal of Orthopaedic & Sports Physical Therapy*. 2017;47(12):931-944. doi:10.2519/jospt.2017.7271
3. Gallagher BP, Bishop ME, Tjoumakaris FP, Freedman KB. Early versus delayed rehabilitation following arthroscopic rotator cuff repair: A systematic review. *The Physician and Sportsmedicine*. 2015;43(2):178-187. doi:10.1080/00913847.2015.1025683
4. Jancuska J, Matthews J, Miller T, Kluczynski MA, Bisson LJ. A Systematic Summary of Systematic Reviews on the Topic of the Rotator Cuff. *Orthopaedic Journal of Sports Medicine*. 2018;6(9):232596711879789. doi:10.1177/2325967118797891
5. Jung C, Tepohl L, Tholen R, et al. Rehabilitation following rotator cuff repair. *Obere Extremität*. 2018;13(1):45-61. doi:10.1007/s11678-018-0448-2
6. Klouche S, Lefevre N, Herman S, Gerometta A, Bohu Y. Return to Sport After Rotator Cuff Tear Repair. *The American Journal of Sports Medicine*. 2015;44(7):1877-1887. doi:10.1177/0363546515598995
7. Mini-Open Rotator Cuff Repair. Central Coast Orthopedic Medical Group. <https://centralcoastortho.com/patient-education/mini-open-rotator-cuff-repair>. Published July 27, 2017. Accessed March 16, 2020.
8. Nikolaidou O, Migkou S, Karampalis C. Rehabilitation after Rotator Cuff Repair. *The Open Orthopaedics Journal*. 2017;11(1):154-162. doi:10.2174/1874325001711010154
9. Osborne JD, Gowda AL, Wiater B, Wiater JM. Rotator cuff rehabilitation: current theories and practice. *The Physician and Sportsmedicine*. 2015;44(1):85-92. doi:10.1080/00913847.2016.1108883
10. Sgroi TA, Cilenti M. Rotator cuff repair: post-operative rehabilitation concepts. *Current Reviews in Musculoskeletal Medicine*. 2018;11(1):86-91. doi:10.1007/s12178-018-9462-7
11. Shaffer B, Huttman D. Rotator Cuff Tears in the Throwing Athlete. *Sports Medicine and Arthroscopy Review*. 2014;22(2):101-109. doi:10.1097/jsa.0000000000000022
12. Thigpen CA, Shaffer MA, Gaunt BW, Leggin BG, Williams GR, Wilcox RB. The American Society of Shoulder and Elbow Therapists consensus statement on rehabilitation following arthroscopic rotator cuff repair. *Journal of Shoulder and Elbow Surgery*. 2016;25(4):521-535. doi:10.1016/j.jse.2015.12.018

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Rehabilitation Guideline

Rotator cuff repairs (RCR) are commonly performed following a rotator cuff tear. The protocol outlined in this document is designed for the rehabilitation of general RCR. When there are additional structures involved, or poor tissue quality, rehabilitation following surgery will need to be adjusted. Several common findings and adjustments to the rehabilitation protocol are included for consideration.

Phase I: 0-4 weeks post-surgery	
Appointments	Surgeon/Physician Assistant follow-up: 7-10 days Start physical therapy at: 7-10 days post-surgery, visits 1-2 visits per week
Rehabilitation Goals	<ul style="list-style-type: none"> ▪ Protect surgical repair ▪ Minimize inflammation and pain ▪ Progress passive range of motion (ROM) in flexion and external rotation (ER)
Precautions	<p><u>Slings</u>: Worn at all times outside of treatment and performance of home exercises</p> <p><u>Mobility</u>: No active ROM, lifting, or aggressive passive ROM Limit passive ROM to flexion and external rotation</p>
Range of Motion	<p>Passive</p> <ul style="list-style-type: none"> • Flexion to 120° • External rotation to 30°
Therapeutic Interventions	<ul style="list-style-type: none"> ▪ Education on post-operative care <ul style="list-style-type: none"> - Sleeping positions while immobilized in sling: on back, with a pillow propped underneath the upper arm. Recliner chair may be recommended - Precautions with surgical repair: no active movement of arm, no removal of sling except for prescribed exercises, no sudden movements - Clarify points of rehabilitation timeline ▪ Ice: up to 6x/day or as needed for pain ▪ ROM <ul style="list-style-type: none"> - Passive ROM performed by PT in flexion and external rotation - At 2 weeks: introduce patient-led mobility with forward bows ▪ Scapular activation and mobility
Criteria for Progression to Next Rehabilitation Phase	<ul style="list-style-type: none"> • Achieve passive ROM goals: flexion- 120°; ER- 30° • Decreasing pain level
Special Considerations	<p><u>Large/Massive Tear</u>: Advance passive ROM slowly, allowing 8 weeks to advance to phase II</p> <p><u>Long Head Biceps Tendon Tenodesis</u>: No straight-arm extension or horizontal abduction behind body. No loaded elbow flexion or supination for 6 weeks.</p> <p><u>Subscapularis Repair</u>: Limit external rotation ROM to neutral. No stretching into abduction</p>

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Phase II: 5-6 weeks post-surgery	
Appointments	Physical therapy 1-2 visits per week Surgeon follow-up at 6 weeks
Rehabilitation Goals	<ul style="list-style-type: none"> ▪ Progress passive ROM in flexion and ER ▪ Continue periscapular activation ▪ Wean from sling support
Precautions	<p><u>Sling</u>: gradual weaning from sling in controlled environments</p> <p><u>Mobility</u>: No active ROM over shoulder height, lifting greater than 2lbs (large water bottle), or repetitive lifting of the arm Limit ROM exercises to flexion and external rotation</p>
Range of Motion	<p>Passive</p> <ul style="list-style-type: none"> • Flexion to 120° • External rotation to 30°
Therapeutic Exercises	<ul style="list-style-type: none"> ▪ Continue passive ROM and scapular activation exercises ▪ Sling weaning: <ul style="list-style-type: none"> - Begin with 1 hour in home environment daily, progressing to 4-6 hours at end of week 5. - increase out of sling activity to include ADLs and light activity with the shoulder below 30° flexion at week 6.
Criteria for Discontinuation of Sling	<ul style="list-style-type: none"> • No sooner than 5 weeks. • No pain with arm resting at side • Ability to maintain mobility restrictions without sling • Tolerate out of sling activity without pain
Criteria for Progression to Next Rehabilitation Phase	<ul style="list-style-type: none"> • Achieve passive ROM goals: flexion- 120°; ER- 30° • Out of sling full-time
Special Considerations	<p><u>Large/Massive Tear</u>: Progress from sling following 8 weeks</p> <p><u>Long Head Biceps Tendon Tenodesis</u>: No straight-arm extension or horizontal abduction behind body. No loaded elbow flexion or supination for 6 weeks</p> <p><u>Subscapularis Repair</u>: Limit external rotation ROM to neutral. No stretching into abduction</p>

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Phase III: 7-11 weeks post-surgery	
Appointments	Physical therapy 1 visit per week
Rehabilitation Goals	<ul style="list-style-type: none"> ▪ Progress to full passive ROM and increase active-assisted ROM and active ROM in flexion and ER ▪ Promote healing of soft tissue ▪ Initiate active ROM exercises
Precautions	<p><u>Mobility</u>: No sudden lifting, jerking or pulling motions</p> <p><u>Strength</u>: No bodyweight support through involved arm. No lifting greater than 2lbs (large water bottle)</p>
Range of Motion	<p>Passive</p> <ul style="list-style-type: none"> • Full ROM in all planes <p>Active-assisted</p> <ul style="list-style-type: none"> • Flexion to full available ROM • External rotation to full available ROM <p>Active</p> <ul style="list-style-type: none"> • Flexion to at or above 120° • External rotation to at or greater than 30°
Therapeutic Exercises	<ul style="list-style-type: none"> ▪ Passive ROM <ul style="list-style-type: none"> - Full ROM in all planes ▪ Active-assisted ROM <ul style="list-style-type: none"> - Dowel stretches, pulleys, band-assisted flexion and external rotation ▪ Scapular mobility <ul style="list-style-type: none"> - Scapular Proprioceptive Neuromuscular Facilitation; serratus anterior and lower trapezius activation - Pectoral minor and latissimus dorsi flexibility ▪ Active ROM <ul style="list-style-type: none"> - Flexion performed with elbow bent; external rotation, internal rotation at side and in 90° abduction ▪ Rotator cuff activation <ul style="list-style-type: none"> - Introduce ER and IR exercise at submaximal level (~25% MVIC) (see Edwards et al, 2017, Journal of Orthopaedic & Sports Physical Therapy for details on appropriate interventions)
Criteria for Progression to Next Rehabilitation Phase	<ul style="list-style-type: none"> • Achieve ROM goals <ul style="list-style-type: none"> - Passive ROM: full range in all planes - Active-assisted ROM: full flexion and ER - Active ROM: flexion- 120°, ER- 30°
Special Considerations	<p><u>Large/Massive Tear</u>: No active ROM prior to 12 weeks. Active-assisted ROM performed pain-free. Progress to next phase with achievement of the criteria outlined above (timeframe will vary)</p> <p><u>Long Head Biceps Tendon Tenodesis</u>: Initiate light-resisted elbow flexion, resisted forearm supination at 8 weeks. No resisted straight-arm elevation</p> <p><u>Subscapularis Repair</u>: Initiate stretching into external rotation: achieve greater than 30° passive ROM. No resisted internal rotation until week 12. Progress to next phase with achievement of all other criteria outlined above</p>

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Phase IV: 12-16 weeks post-surgery	
Appointments	Physical therapy 1 visit every 1-2 weeks Surgeon follow-up at 12 weeks
Rehabilitation Goals	<ul style="list-style-type: none"> ▪ Progress to full active-assisted ROM and increase active ROM in flexion and ER ▪ Begin rotator cuff strengthening exercises ▪ Develop proper scapular stabilization through ROM
Precautions	<p><u>Mobility</u>: no sudden lifting, jerking, or pushing activities</p> <p><u>Strength</u>: No lifting greater than 10-15lbs.</p>
Range of Motion	<p>Active-assisted ROM</p> <ul style="list-style-type: none"> • All planes to full available ROM <p>Active ROM</p> <ul style="list-style-type: none"> • Flexion to full available ROM • External rotation to full available ROM
Therapeutic Exercises	<ul style="list-style-type: none"> ▪ Resisted external rotation, flexion in the plane of the scapula, internal rotation, and horizontal abduction. Progressing from short-lever exercises to full available length ▪ Increase scapular upward rotation strengthening
Criteria for Progression to Next Rehabilitation Phase	<ul style="list-style-type: none"> • Achieve ROM goals (full Active-assisted ROM; Active ROM: full flexion and ER) • Active ROM performed with minimal pain • Appropriate scapular positioning statically and dynamically
Special Considerations	<p><u>Large/Massive Tear</u>: Initiate resisted exercise below pain threshold (<25% MVIC). Progress to next phase upon achievement of the criteria outlined above (timeframe will vary)</p> <p><u>Long Head Biceps Tendon Tenodesis</u>: Progress forearm and elbow resistance exercise as tolerated to max resistance</p> <p><u>Subscapularis Repair</u>: Initiate resisted internal rotation. Progress ER stretching to full ROM. Progress all other aspects of rehabilitation as outlined above</p>

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Phase V: 17-23 weeks post-surgery	
Appointments	Physical therapy 1 visit every 2-3 weeks
Rehabilitation Goals	<ul style="list-style-type: none"> ▪ Progress to full active ROM in all planes ▪ Return to ADLs, work and recreational activities that do not involve heavy lifting or powerful movement ▪ Restore shoulder strength and endurance
Precautions	<p><u>Mobility</u>: No uncontrolled movements</p> <p><u>Strength</u>: No lifting greater than 15-20lbs. No overhead lifting</p>
Range of Motion	<p>Active</p> <ul style="list-style-type: none"> • All planes to full available motion
Therapeutic Exercises	<ul style="list-style-type: none"> ▪ Increase cuff strengthening as appropriate ▪ Neuromuscular re-education: <ul style="list-style-type: none"> - Dynamic stabilization - Proprioceptive Neuromuscular Facilitation
Criteria for Progression to Next Rehabilitation Phase	<ul style="list-style-type: none"> • MMT of 4+/5 or greater • Pain-free ADL performance • Proper scapulohumeral activation with resisted motion
Special Considerations	<p><u>Large/Massive Tear</u>: Progress rehabilitation as outlined above (timeframe will vary)</p> <p><u>Long Head Biceps Tendon</u>: Progress rehabilitation as outlined above</p> <p><u>Subscapularis Repair</u>: Progress rehabilitation as outlined above</p>

Phase VI: 24 weeks and beyond post-surgery	
Appointments	Physical therapy 1 visit every 2-3 weeks Surgeon follow-up at 6 months
Rehabilitation Goals	<ul style="list-style-type: none"> ▪ Normalize shoulder muscular strength and power (greater than 90% LSI) ▪ Progressive return to functional activities involving greater resistance ▪ Complete return-to-sport training
Precautions	<p><u>Strength</u>: Avoid activities that create substitution patterns for muscle activation</p> <p><u>Functional training</u>: No sudden or significant increases in muscular control or load</p>
Therapeutic Exercises	<ul style="list-style-type: none"> ▪ UE plyometrics ▪ UE and trunk coordination
Criteria for Return to Sport	<ul style="list-style-type: none"> • Mobility and strength symmetrical with opposite side • Normal scapulohumeral movement • Performance at or above normative values on UE functional tests <ul style="list-style-type: none"> - Upper Quarter Y-balance: within 90% of non-operative shoulder - Closed Kinetic Chain UE Stability: males- 20; females- 18 - Seated Shot-Put: within normative values for age/gender • No pain at rest or during activity • Physician, physical therapist, and athletic trainer clearance