Upper Extremity Division

Christopher Klifto, MD

Developed by June Kennedy, PT

ROTATOR CUFF REPAIR REHAB GUIDELINES

Critical Rehabilitation Principles:

- Healing of a rotator cuff repair is influenced by the following factors:
  - Patient age – younger patients may heal better than older, but may be more prone to stiffness
  - Tear size – smaller tears tend to heal better than larger tears
  - Tissue quality – repair of thick/healthy tendon as in acute tear, more successful than thin/frayed tissue as in chronic tear
  - Ease of tendon mobilization - tendon that is not retracted far from the footprint of insertion (crescent shaped tear) will heal more easily than one that is retracted further from the footprint
- The first 6 weeks following rotator cuff repair are critical to the success of the rehabilitation. Emphasis needs to be on protection of load across the repair so that the tendon can form a loose bridge of Type III collagen callus to bone. This bridge will be weak and will not withstand loading. Passive motion may be employed within range of motion limits to prevent stiffness and introduce very gradual loading to the healing tendon to assist in fiber organization and maturation to Type I collagen. Pressure at the end of the range limitations (stretching) and grade III and IV mobilizations should be avoided for the first 6 weeks.
- Several randomized control trials report that rotator cuff repairs with delayed PROM show superior healing at one year when assessed with imaging studies, and the incidence of recalcitrant stiffness is low (<10% at 1 year). Therefore, it is prudent in the initial stages of rehab to err on a slow progression of passive motion with careful monitoring to ensure the patient is not getting painful and stiff.
- Patients at a higher risk for stiffness include: younger patients with smaller tears (< 50 years old); prior adhesive capsulitis; diabetes and thyroid disorder, patients with these risk factors should be carefully monitored for stiffness.
- Tendon integration into bone with Sharpey's fibers is not observed until 12 weeks post – operatively therefore strengthening should be deferred until at least 12 weeks, and in the case of large/massive tears and/or poor tendon quality, perhaps as long as 16 weeks.
- Patient education at each stage of recovery about activity guidelines and exercise progression is important for successful rehabilitation.

- For further information please refer to: Thigpen C, Shaffer M, Gaunt B, Leggin B, Williams G and Wilcox R: The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following arthroscopic rotator cuff repair. Journal of Shoulder and Elbow Surgery 25(4):521-35, 2016.

SURGEON SHOULD INDICATE ON REFERRAL OR SURGERY NOTE WHETHER THE ROTATOR CUFF REPAIR SHOULD FOLLOW THE SMALL/MEDIUM OR LARGE/MASSIVE GUIDELINES.

PHASE 1 – PROTECTIVE/HEALING PHASE: Load to failure/pull out strength is 25-30% normal at 6 Wks; (post op visit-6 weeks)

PRECAUTIONS/ACTIVITY GUIDELINES

- Sling wear at all times with abduction pillow in place, including sleep. Sling may be removed for basic grooming and exercise sessions. After 2-3 weeks, sling may be removed for desk top work while arm is supported
- Sling wean: small/med – begin at 4 weeks; large/massive – begin at 6 weeks; start with removal of abduction pillow and sling off for short periods in controlled setting of home. Gradually increase time out of sling at home, and finally when out in community by end of 6-8 week period pending size of repair
- No active use of the operated UE on land; No weight bearing through the operated UE
- Avoid passive tension across repaired rotator cuff tendon(s) (eg. no cross body adduction for supraspinatus repairs)
- Avoid ROM behind the back (eg. no hand slide up spine for IR)
- **HOME EXERCISES FOR SHOULDER PROM: deferred to 2 weeks for small/med and 4 weeks for large/massive in restricted range per chart below**
- **CLINIC THERAPY VISITS: occur weekly for all patients to ensure that patients are not getting stiff and that pain is well managed. All patients should be able to achieve passive elevation to 90 and passive ER in scapular plane to 30 degrees after 2 weeks IN CLINIC with PROM performed by therapist.**
- **Isolated traumatic Subscapularis repairs should be protected to 90 deg elevation and neutral (0 deg ER) for first 3 weeks and then may go to 30 deg ER from 3-6 weeks.**

PHASE 1 PROM LIMITS FOR HOME EXERCISES	**ELEVATION**	**EXTERNAL ROTATION (SCAPULAR PLANE)**	**SLING**
SMALL/MEDIUM			24/7 FOR 4 WEEKS
2-4 WEEKS	0-90	0-30	
4-6 WEEKS	0-120	0-45	SLOWLY WEAN FROM SLING
LARGE/MASSIVE			24/7 FOR 6 WEEKS
4-6 WEEKS	0-90	0-30	

6-8 WEEKS	0-120	0-45	SLOWLY WEAN FROM SLING

- NO pulley or cane assisted elevation in this phase
- No driving while on narcotic pain medication; Sling must be worn if choose to drive when weaned off pain meds unless sling removal cleared by surgeon
- No bathing until after suture removal and wounds healed; may shower 5 days after surgery; suture removal post-op day 7-10
- Ice and elevation used in combination with medication for control of pain and swelling
- Return to work as determined by MD/PT dependent on work demands

GOALS

- Patient education about the nature of the surgery, associated precautions and expected rehabilitation progression
- Protect rotator cuff repair and create an environment for optimal healing
- Control pain, swelling and inflammation
- Achieve PROM limits established above
- Establish stable scapula

EXERCISES/PT INTERVENTIONS

Initial post-operative home exercises:

- Elbow, wrist and hand AROM without weight
- **PROM (opposite UE assisted) for elbow flexion and supination for first 4 weeks if concomitant biceps tenodesis/tenotomy performed**
- Posture: active seated and standing thoracic extension and scapular sets (retraction to neutral), depression and protraction, cervical ROM/upper trapezius stretch as needed
- Pendulum: small circles with arm supported by non-operative arm for first three weeks, then unsupported for the remainder of the phase for the small/medium repairs. Continue supported pendulum for large/massive tears for all 6 weeks of phase 1. Emphasize passive motion.

2 weeks for small/med tears and 4 weeks for large/massive tears home exercises:

- Passive Range of Motion – limit 10 reps held 10 seconds to prevent cyclic load to cuff repair and perform 3 times daily:
    - Elevation - seated or standing table top supported elevation in scapular plane in established PROM constraints; or supine self assisted with non-operative UE with bent elbow elevation in scapular plane
    - ER - Seated or supine self assisted or wand assisted ER in scapular plane in established PROM constraints
- Grade I/II mobilization as indicated for pain relief

- Aquatic therapy after 3-4 weeks (small/med); 6 (large/massive) with shoulders totally submerged, slow active motion within precautionary ROM with cue such as "Don't let the water ripple."
- NO ROM behind the back in this phase; No Cross body adduction past midline

CRITERIA TO PROGRESS TO PHASE 2

- Surgical repair in early healing by adhering to precautions and immobilization guidelines
- Staged PROM goals achieved
- Minimal to no pain

PHASE 2 – MOTION RECOVERY PHASE: Load to failure/pullout strength is 50-60% at end of 12 weeks: (Post-op week 6 (small/med) or 8 (large/massive) through post-op week 12)

PRECAUTIONS /ACTIVITY GUIDELINES

- Discontinue sling by the end of week 6-8 and may use arm actively at waist level with minimal weight: "nothing heavier than a coffee cup," and not at or above shoulder height until able to do so with normalized mechanics and no pain
- No supporting of body weight by hands and arms
- No excessive behind the back movement
- PROM progressed toward normal, AAROM initiated and progressed toward AROM gradually
- As AROM is restored, ensure proper biomechanics of elevation with avoidance of "scapular shrug"
- Avoid inferior glides and distraction until after 12 weeks

GOALS

- Continued protection of healing tissue with slow progression of activity (exercises and ADL's) from waist level first, and then slowly in more elevated positions
- Restore full PROM by week 12 (gradual restoration)
- Normalize AROM without overstressing healing tissue
- Minimize pain and inflammation (may ice after exercise)

EXERCISES/PT INTERVENTIONS

- Continue thoracic extension and scapular set (retraction to neutral plus depression) prior to any passive or active exercise for optimal positioning
- PROM to tolerance with gentle overpressure in all planes; may begin very gentle cross body adduction and hand slide up spine, etc, in range without muscle splinting/guarding; may begin ER at 90 deg abduction in scapular plane.
- Integrate grade 3 and 4 only in anterior/posterior direction glenohumeral mobilization as needed prior to PROM.

- AAROM: cane assisted forward elevation in supine - begin with bent elbow, progress to straight as able to control the short lever arm through the range without pain; progress to inclined table top AROM (bent then straight elbow); progress to vertical supported on wall (bent then straight elbow); then vertical unsupported
- AROM: ER in sidelying; prone extension to hip (not past 20 degrees extension) with end range scapular retraction; supine serratus punches; supine long lever arm motion in controlled range from balanced position
- Aquatic: no range restrictions; may add cross body adduction and may progress speed as directed by PT/MD
- Submaximal isometrics for ER; IR; abduction; flexion; extension as indicated if not tolerating active motion progression
- Rhythmic stabilization in balanced position (90 degrees elevation in supine) with submaximal force. Gradually increase force and move out of balanced position: 60, 120, 150 degree positions of elevation
- Sidelying manually resisted scapular protraction and retraction

CRITERIA TO PROGRESS TO PHASE 3

- Full passive range of motion
- AROM with normalized mechanics for elevation without scapular shrug or other substitution patterns
- Pain level less than 2/10 with exercise and ADL

Phase 3- STRENGTH/FUNCTION RECOVERY PHASE: Load to failure/pullout strength is 80% at 6 months: (Post-op month 3 through Post-op month 6)

PRECAUTIONS/ACTIVITY GUIDELINES

- Use of the arm at and above shoulder level may occur with light weight, as long as mechanics for elevation remain normalized. Lifting up to 10 lbs below shoulder level is allowed
- Normalization of ADL's, work and recreational activity - gradual return, particularly for repetitive and overhead activities
- Gradual progression of exercises to restore strength, endurance, and work/sport specific movement
- **Resistance exercises should only be initiated when there is Full AROM with normalized mechanics**

GOALS

- Full AROM with normalized mechanics in all planes
- Normalized muscle strength in the rotator cuff, scapular stabilizers, and shoulder primary movers
- Return to ADL's, work and recreational activities without pain or disability

EXERCISES/PT INTERVENTION

- UBE for active warm up
- Continued end range stretching and mobilizations as needed, particularly posterior capsule (cross body adduction, sleeper stretch with scapula stabilized, ER > 90 degrees for throwers/tennis). Rotator cuff strengthening: "full can" scaption, initially to 90, then throughout range, no weight, to max 3-5 lb. resistance; ER and IR strengthening with hand weights or theraband, initially below shoulder level, progressing to above shoulder level as needed for work or sport. Emphasize high repetitions (30-50) with low resistance (1-5 lbs); progress in increments of one pound when 30-50 repetitions are easy and painless
- Scapular stabilization exercises: Extension to hip and horizontal abduction with ER, either prone with hand weights, or standing with theraband; serratus presses in supine with hand weight; serratus wall presses with shoulder in neutral and in ER, then progress to weight bearing on incline when well controlled without scapular winging.
- **May begin biceps curls with weight at this point if a biceps tenodesis was performed in addition to the RCR**
- Deltoid: forward raises and lateral raises with bent elbow to 90 degrees with light hand weight
- Use of weight lifting machines (chest press, lat pull downs, seated row...) only anterior the plane of the body; incorporate scapular work to end range; low resistance and high reps
- Combined muscle patterns: PNF diagonals progressing from supine to standing, seated on ball for core added, progressing resistance from none to theraband or hand weight
- Aquatics: may do full motion for all exercises, with cupped hand, progressing to use of gloves or paddle for added resistance and then increasing speed of movement
- Advanced strengthening activities (not needed for all patients - must have 4/5 in cuff and scapular mm and be closer to end stage rehab) useful for overhead athletes or heavy laborers:
  plyoball chest passes on minitramp; body blade ER neutral, 90 deg elevation in scapular plane; sports specific arm movement simulation with theraband or Body blade (eg. tennis swing)

CRITERIA FOR RETURN TO WORK/SPORT

- Clearance from physician
- Painfree at rest and minimal pain with the work or sport specific activity simulation
- Sufficient ROM and strength with normalized mechanics for the activity