PALMETTO MOTION
PHYSICAL THERAPY | PERFORMANCE | SPORTS MEDICINE

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Post-Operative Rehabilitation Protocol
"Rotator Cuff Repair"
(Supraspinatus and/or Infraspinatus Repair, Subscapularis Isolated Repair) [Small = >1cm, Medium = 1cm-3cm, Large = 3cm-5cm, Massive = >5cm]
Revised 2021

Rotator cuff (RC) tears can occur from repeated stress or trauma as very well described by Wolf et al. Most RC tears involve the supraspinatus and/or the infraspinatus. Occasionally isolated tears of the subscapularis can occur from the result of trauma where the humerus is maximally eternally rotated. In much more common occurrences, the RC may show degeneration with age and repeated long term stress. This may alone contribute to RC tears in the older population. Kuhn et al does an excellent job in explaining the classifications of RC tears. The normal thickness of the RC is between 9-12mm. Partial thickness tears start on the surface of the tendon but do not progress through the whole depth of the tendon. These can be described as either bursal or articular sided tears. Bursal sided tears may be caused by repeated impingement. Articular sided tears may be caused by repetitive internal impingement or tensile stresses related to overhead sports. Full thickness or complete tears extend all the way through the entire thickness of the tendon. Many times full thickness tears are caused by trauma or long term or chronic impingement. When the tendon is completely disrupted it may become retracted towards the muscle belly itself. When this occurs, the length of time between complete disruption and repair can have a substantial impact on the repair strength, muscle contractibility, and overall outcome. The Goutallier Classification of Muscle Atrophy has been widely accepted on helping determine muscle/fatty infiltrate ratios to assist in prognosis after RC repairs. Further reading on the above topics and classifications can be found in the below literature.

Thigpen CA, Shaffer MA, Gaunt BW, Leggin BG, Williams GR, Wilcox RB 3rd. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following arthroscopic rotator cuff repair. J Shoulder Elbow Surg. 2016 Apr;25(4):521-35.

Gaunt BW, Shaffer MA, Sauers EL, Michener LA, McCluskey GM, Thigpen C; American Society of Shoulder and Elbow Therapists. The American Society of Shoulder and Elbow Therapists' consensus rehabilitation guideline for arthroscopic anterior capsulolabral repair of the shoulder. J Orthop Sports Phys Ther. 2010 Mar;40(3):155-68.

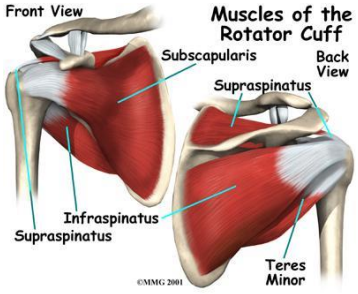
Jacobs JM, Jackson KL, Pniewski JE, Dickston ML, Abell BE, Mueller TL, Bojescul JA. Outcomes of biceps tenodesis in an active duty population. J Surg Orthop Adv. 2015 Summer;24(2):105-10.

Wolf BR, Dunn WR, Wright. Indications for repair of full-thickness rotator cuff tears. Am J Sports Med. 2007;35:1007-1016.

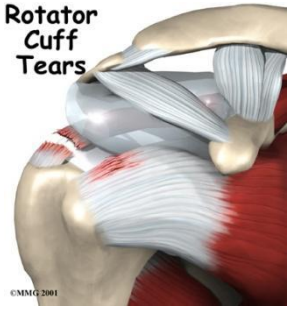
Nho SJ, Shindle MK, Sherman SL, et al. Systematic review of arthroscopic rotator repair and mini-open repair. J Bone Joint Surgery Am. 2007;10:127-136.

Kuhn JE, Dunn WR, Ma B, et al. Interobserver agreement in the classification of rotator cuff tears. Am J Sports Med. 2007;3:437-441.

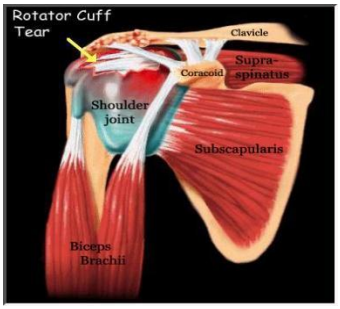
Goutallier D, Postel JM, Bermageau J, et al. Fatty muscle degeneration in cuff ruptures. Pre- and postoperative evaluation by CT scan. Clin Orthop Relat Res. 1994;3:78-83.



The Structures of the Rotator Cuff



Isolated Supraspinatus Tear



Note the proximity of the long head of the Biceps Tendon

*Please note these are examples of techniques and is to help give the physical therapist a visual perspective on the extent of the repair.

General Considerations: This rehabilitation program will vary in time and intensity based on multiple factors including the age of the patient, the extent of the repair, history of prior surgery, instability and laxity prior to surgery (as well as in the contra lateral upper extremity) and individual functional readiness in all stages. Early range of motion and progressive strengthening is valuable to prevent arthrofibrosis, promote circulation and facilitate return to prior activity level.

Physical therapy will begin immediately following surgery. The initial focus will be on regaining motion before emphasizing resistance exercises. Progression through the different phases of rehab will be individually based. A variety of factors will be considered including control of pain and inflammation, recovery of normal motion, strength, endurance and generally accepted tissue healing guidelines. In addition to activities in the physical therapy, the patient will also receive a home exercise program to complement his physical therapy plan of care.

Rotator Cuff Repair Considerations: Some repairs require 1, 2, and 3 anchors which could be accompanied by a variety of suture passing techniques. It is wise to understand the methods used by the surgeons you come in contact with. The rehabilitation evidence widely accepts the extent of the repair (size) as the guide and not so much the technique itself. The below rehabilitation protocol takes into consideration that most techniques involve some type of "bone trough" to assist in the

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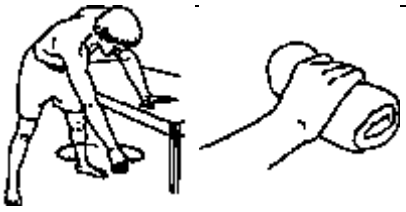
physiologic healing of the fixation. By minimizing "gapping" (between the fixated tendon and bone trough) and the anterior and posterior stress of the distal end of the repair will help give the patient the best possible chance of having a successful outcome. Further reading on the above can be found in the literature describing the DOR SWeaP.

DDEAMC DOR S.Wea.P. (Sling Weaning Philosophy): There are few procedures that would dictate sling use 24/7 for 6 weeks. If this were the case, special considerations would be made. The time frames depicted below are approximate. Patient **compliance, tolerance, level of pain, function, and physiological factors** all play a role in the sling use with a patient. The sling should be worn in high traffic areas out of the house (e.g. the mall, grocery store). When inside the house the patient can begin trials of being out of the sling in intervals depicted in the below chart. If pain goes up with these trials, the patient goes back in the sling. If the patient appears non-complaint and is at risk of rupturing the repair, the patient goes back in the sling. However, if the patient's pain is lessening over time, tolerates trials out of the sling, and is compliant, it is reasonable to continue the progression.

Hire JM, Pniewski JE, Dickston ML, Jacobs JM, Mueller TL, Abell BE, Bojescul JA. A criterion based sling weaning progression (sweap) and outcomes following shoulder arthroscopic surgery in an active duty military population. Int J Sports Phys Ther. 2014 Apr;9(2):179-86.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Sport Post-op Sling 						
Rotator Cuff Repair Small-Medium (<1cm - Medium 1-3cm)	May come out of the sling for: hygiene purpose, to perform exercises. My begin 1 hour trials out of the sling if no increased pain with the above.	May begin trials out of the slings 1-2 hours at a time 5-6 x day. May need it for sleeping. Continue to wear in public places and work.	May begin trials of being out of the sling throughout the entire day in controlled environments. Continue to wear in public places/work.	Continue to wear sling while sleeping if 6-7 hours of uninterrupted sleep is not achieved.	Discharge	
Rotator Cuff Repair Medium-Large (1-3cm - Large 3-5cm)	May come out of the sling for: hygiene purpose, to perform exercises. My begin 1 hour trials out of the sling if no increased pain with the above.	May begin trials out of the slings 1-2 hours at a time 5-6 x day. May need it for sleeping. Continue to wear in public places and work.	May begin trials of being out of the sling throughout the entire day in controlled environments. Continue to wear in public places/work.	May continue to wean if pain persists out of the sling and requires the sling with sleeping.	Continue to wear sling while sleeping if 6-7 hours of uninterrupted sleep is not achieved.	Discharge
Rotator Cuff Repair Large-Massive (3-5cm - Massive >5cm)	May come out of the sling for hygiene purpose. May come out of the sling to perform exercises.	May begin trials out of the slings 1-2 hours at a time 5-6 x day. May need it for sleeping. Continue to wear in public places and work.	May begin trials of being out of the sling throughout the entire day in controlled environments. Continue to wear in public places/work.	May continue to wean if pain persists out of the sling and requires the sling with sleeping.	Continue to wear sling while sleeping if 6-7 hours of uninterrupted sleep is not achieved.	Discharge

Pre-op Instructions:

Exercises	• Instruct in Phase I post-op exercises: • Elbow PASSIVE range of motion, • Supported (With hand under elbow) pendulum and/or pendulum/Codman's • Hand squeezes with ball	

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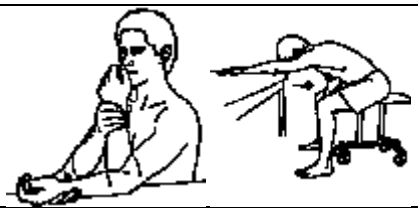
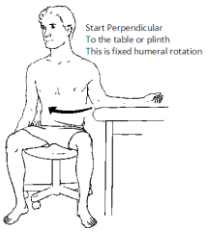
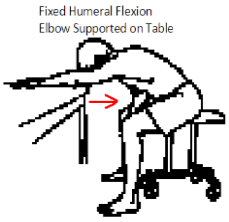
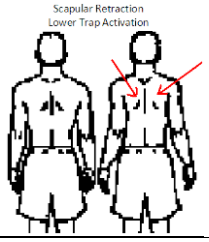
		
Sling	• Wear sling until initial visit with physical therapist • Follow DOR SWeaP	
Education	• Understand the need of compliance in rehabilitation, timelines, and goals • Educate on sleep hygiene in recliner or bed with back support • Review Precautions • Schedule follow-up appointment 3-5 days post op	

Phase I (weeks 1-4)

Precautions	• No running until 10-12 wks • No active open chained movement x 6-8 wks • No lifting anything greater than fork for 4-5 wks • Watch for signs of infection • Avoid excessive ER if subscapularis repair • May Shower after post op dressing removed by PT or Ortho (do not scrub over sutures or soak in bath) • Sling per SWeaP 1-4 wks. (Per repair size)	
Suggested Therapeutic Exercise	• HEP for 2 weeks unless pain and/PROM an issue • Begin early scar massage if wound closed • Supported and/or Unsupported Pendulums/Codman's (large-massive repairs may benefit from supported) • Fixed Humeral/Elbow Supported Flexion. May begin supine cane if tolerates after 2wks • Fixed Humeral/Elbow Supported ER May begin supine cane in scap plane after 2 wks (Limit ER if subscapularis repaired) • Scapular Retraction with depression (focus on early lower trap activation) • Soft tissue mobilization of upper trap and deltoid (if problematic for the patient) • PROM supine if unable to meet PROM goals with Supported elbow flexion • Hand/Wrist/Elbow therex	   
Modalities	• Ice (Polar Care) 3-5 times daily for 20 minutes • Other pain relieving modalities prn (e.g. TENS)	
Cardiovascular Fitness	• May do stationary or recumbent bike at own pace in sling	
Education	• Understand the need of compliance in rehabilitation, timelines, and goals • Educate on sleep hygiene in recliner or supported with pillows • Review Precautions • Posture re-education	
Rehabilitation Goals Progression Criteria	• PROM shoulder flexion between 90-120 • PROM 20-35 Degrees of ER from Neutral (limit ER if there is a subscapularis repair) • 2-4 hours of uninterrupted sleep • Decrease pain/inflammation • Maintain wrist, hand, elbow ROM	

Phase I notes on exercise intervention:

- Progression should be based on the size of the repair and patient tolerance.
- Repetitions of PROM should be based on quality, not quantity (10-15 reps per day if PROM progresses daily)
- Overactive upper trapezius and deltoid (trap/delt hike) can be problematic when progressing PROM AAROM AROM
- Particular attention needs to be directed on proper scapularhumeral rhythm.

Phase II (weeks 4-8)

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Precautions	• No running until 10-12 wks • No active open chained movement x 6-8 wks • Avoid excessive ER if subscapularis repair • Sling per SWeaP 4-6 wks. Per repair size • Limit the use of IR towel stretch if supraspinatus repair	
Suggested Therapeutic Exercise	• Continue Phase I exercises as needed • AAROM (pain free ROM) Finger ladder (no trap/delt hike) Weighted Bar in supine into shoulder flexion Pulleys (no trap/delt hike) • A/AROM in all shoulder planes • Light Pec stretching (if appropriate) • Supine rhythmic stabilization • Hand up the back slowly progress as tolerated • Shoulder Isometrics sub-maximal [(2 sec phase in 2 sec maintain 2 sec phase out @ 60%-80% max) no IR if subscapularis repair] • Closed chain weight shifting • Closed chain isometric lower trap strengthening • After 6 weeks for a small-medium repairs may begin eccentric strengthening if the patient tolerates	
Modalities	• Ice (Polar Care) PRN • Other pain relieving modalities prn (e.g. TENS) • Joint mobilizations I-II per the PT	
Cardiovascular Fitness	• May do stationary or recumbent bike at own pace in sling as long as pain continues to decrease • May walk at own pace and distance in sling as long as pain continues to decrease	
Education	• Understand the need of compliance in rehabilitation, timelines, and goals • Assess Sleep Hygiene • Review Precautions	
Rehabilitation Goals Progression Criteria	• PROM 120-Full Forward flexion • AROM 120° Forward flexion • 6-7 hours of sleep in bed or recliner or normal for patient • ADL's below elbow height pain free or 0-2/10 • Decrease pain and inflammation • Minimize shoulder atrophy and deconditioning	

Phase II notes on exercise intervention:

- Sling should be discharged within this phase depending on size of the repair, tolerance of the patient, and pain regression.
- The next phase will focus on strengthening with proper scapular placement therefore attention should be paid towards proper early scapular stabilization.

Phase III (Weeks 8-12)

Precautions	• No running until 10-12 wks • No unsupervised strengthening of the involved shoulder unless instructed by PT for HEP	
Suggested Therapeutic Exercise	• Continue Phase II exercises as needed • UBE Light resistance progress to forward and retro in 246 minute intervals (each interval split between forward and retro) • Pec stretching (doorway supine small foam roll large foam roll) • IR Towel Stretch vs. Sleeper stretch • Supine Rhythmic Stabilization with arm at 90° (Scap Stab) • Serratus Anterior Punches (Scap Stab) • Begin light RTC Therex below 90° [(See Citations) none above 60° shoulder abd) • Shoulder height proprioceptive/endurance training: Wall ball dribble/drawing Body blade Ball toss with arm at side • Prone Scapular Stabilization W's, T's, Y's • Open chain lower trap strengthening • Active Duty: Sit ups with arms on chest	
Modalities	• Other pain relieving modalities prn (e.g. TENS)	
Cardiovascular Fitness	• May do stationary/recumbent bike or elliptical at own pace as long as pain continues to decrease • May walk at own pace and distance as long as pain continues to decrease	
Education	• Emphasis on high reps low weight with all therex	

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	• Understand the need of compliance in rehabilitation, timelines, and goals	
Rehabilitation Goals Progression Criteria	• 90% - Full AROM when compared to contralateral UE • ADL's below shoulder height pain free or 0-2/10 • RTC Strengthening all directions 30 reps with T-Band • 30 Wall pushups	

Phase III notes on exercise intervention:

- Proper form during rotator cuff strengthening with scapulas set in retracted depressed state.
- If the patient does not have the available A/PROM to accommodate prone scapular stabilization regress to standing.
- There should be reports of nil-minimal pain with exercise and any pain post exercise should subside within 2-3 hours post cool down.

Phase IV (Months 3-4)

Precautions	• May begin walk to jog progression as tolerated • No contact sports x 6 months	
Suggested Therapeutic Exercise	• Continue Phase III exercises as needed • Joint Mobilizations as directed by PT as necessary • 90/90 active ER/IR stretching (See Citations) • Progressive RTC Therex (See Citations) • Ball toss at rebounder (lightest ball) with arm at side shoulder height 90/90 • Progress supine rhythmic stabilization standing (see image to right) • Quad ped stabilization on Bosu/Fitter/Foam • Active Duty: Sit up and Push up progression	
Modalities	• Pain relieving modalities PRN	
Cardiovascular Fitness	• May do Stairmaster, elliptical, treadmill at own pace and distance in	
Education	• Caution patient on progressing extracurricular activities too quickly	
Rehabilitation Goals Progression Criteria	• Full AROM WNL • RTC Strength WFL, 4+/5 MMT • 30 table pushups (30^0 incline) w/o increasing c/o pain or 0-2/10 • Can complete higher than phase 5 walk to jog w/o increasing c/o pain or 0-2/10	

Phase IV notes on exercise intervention:

- 90/90 active ER/IR strengthening shoulder scapulas set in retracted depressed state.
- There should be reports of nil-minimal pain with exercise and any pain post exercise should subside within 2-3 hours post cool down.

Phase V (Months 4-6)

Precautions	• No contact sports x 6 months • No Pull-ups/Dips x 6-9 months	
Suggested Therapeutic Exercise	• Continue Phase IV exercises as needed • Plyometric therex (pushup stepping clap, bosu, stair climbing, fitter on hands, MI etc) • Gravitron (limited weight < body) pull-ups with wide grip • Sport Specific Training drills (pitching, batting, shooting, etc.) • May begin independent transition back into gym	
Modalities	• Pain relieving modalities PRN	
Cardiovascular Fitness	• APFT Run training or alternate event	
Education	• Caution patient on progressing extracurricular activities too quickly	
Rehabilitation Goals Progression Criteria	• AROM Symmetrical • Resume all introduction back to sport/job • Pass APFT at 6 months	

Phase V notes on exercise intervention:

- Exercise prescription should focus on endurance with above shoulder height activities.
- Specific job/sport related therex should be completed with proper form and endurance intervals for higher repetitions.

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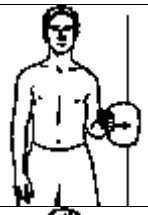
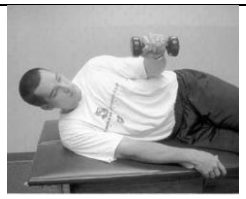
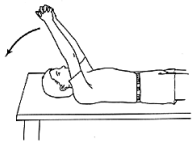
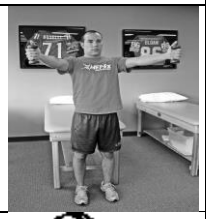
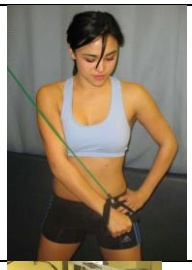
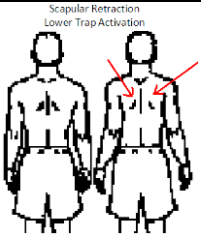
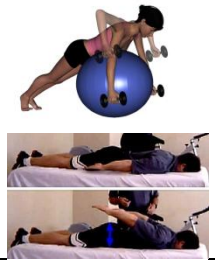
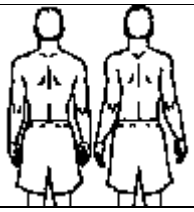
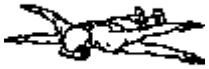
Rotator Cuff and Scapular Stabilization Exercise Progression"
Muscle fiber initiation to progressive EMG activity
Progression from isometrics to open chain advanced

RC/Scapular Stabilization Exercise Progression	Early Phase (Isometrics) Sub Max (2 sec phase in 2 sec maintain 2 sec phase out @ 60%-80% max	Early-Mid Phase	Mid-Late Phase	Late Phase	Advanced
	Lowest	Low	Mid-Level	High	Highest
Infraspinatus/ Teres Minor					
Supraspinatus					
Subscapularis					
Serratus Anterior					
Lower Trapezius					
Rhomboids					

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Condensed RTCR Rehabilitation Guideline

Standard Rotator Cuff Repair Rehabilitation Guidelines (small-medium, good quality tissue)

Phase	Time Period	Immobilization*	Shoulder ROM**	Goals ROM**	Exercises**
Phase I Maximum Protection	0-2 Weeks	All time day and night except for hygiene and HEP	<15% EMG Level Therex • Dosed to reach PROM goal • Do not exceed 10 reps daily • If goal met with 1 rep, then 1 rep • PROM is documented in reps not time	Flexion • Goal: 60°-90° at POW 2 External Rotation (at 20° ABD) • Goal: 0°-20° at POW 2	Elbow/Wrist/Hand Thoracic Mobility closed Chained Flexion (forward bow/Table slides on stool) Small Correct Pendulums
	2-4 Weeks	Can sleep without sling propped Can come out of sling seated Begin trials 1 hour on/off in controlled environments	Same as above Add: • IR to abdomen • ER to 30 degrees (closed chained)	No change	Same as above Add: closed chained ER on stool Scapular retractions
	4-6 Weeks	Can progress to full time off in controlled environments (home) Wear outside the house until 6 weeks	Same as above	Flexion • Goal: 90°-120° at POW 6 External Rotation (at 20° ABD) • Goal: 20°-30° at POW 6	Same as above Add: Therapist Assisted PROM Flexion/ER if needed
Phase II Regaining Motion	6-12 Weeks	None	16%-29% EMG Level Therex • Begin AAROM • Progress to AROM	Flexion • Goal: 130°-155° at POW 9 External Rotation (at 20° ABD) • Goal: 30°-45° at POW 9 External Rotation (at 90° ABD) • Goal: 45°-60° at POW 9 • Goal: 75°-WNL at POW 12	AAROM with stick Dusting horizontal/forward Beach chair Progression AROM Supine Press up Progress as tolerated to low resistance banded activities to tolerance
Phase III Building Strength	12-18 Weeks	None	30%-49% EMG Level Therex Endurance	Full	Elastic Resistance ER/IR/Punches Dynamic Scapular training Can putt/chip
Phase IV Back to Life/Sport	6-9 Months	None		Continue to progress as needed	Aggressive Cuff/Scap Stabilization Early throwing and racquet training Full return to golf Staged return to sport training between 9-12 months

It is highly suggested these citations be used as reference to marked sections:

*Hsire JM, Pniewski JE, Dickston ML, Jacobs JM, Mueller TL, Abell BE, Bojescul JA. *A Criterion Based Sling Weaning Progression (SWEAP) and Outcomes Following Shoulder Arthroscopic Surgery in an Active-Duty Population.* IJSPT 2014;9:179-186.

**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.* J Shoulder Elbow Surg 2016;25:521-535.

Updated 9/2019: Stephan Parada, MD, Josh Pniewski, DPT

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