

# Large to Massive Rotator Cuff Repair Clinical Practice Guideline

Surgeon: Salvatore Frangiamore, MD, MS

## ***Background Information:***

The rotator cuff is responsible for glenohumeral stabilization or compression and active motion. Injury can occur from overuse which can lead to varying types of impairment and dysfunction. Often times a surgical rotator cuff repair is performed arthroscopically or through a mini-open procedure with the intent to restore function. Post-operative rehabilitation should consider the amount of involved tissue, the size and pattern of the tear, and the location of the injury. The included guideline is intended for post-operative rehabilitation for rotator cuff repairs with a tear size of Large (3-5 cm) to medium (> 5 cm). Please keep in mind that specific precautions may need to be utilized for each procedure and modifications should be followed as prescribed. Progression through this guideline is time dependent on soft tissue healing as well as criterion-based concerning patient demographics and clinical assessment. Please refer to the surgical note for information regarding each procedure.

***Precautions:*** the intended guidelines are used to reduce an extended inflammatory response and allow for proper tissue healing. Delayed healing could occur if the newly repaired tendon is stimulated too soon through active motion.

- Proper sling use for 6-8 weeks (discharged by physician)
- Avoid shoulder AROM before 8 weeks
- ROM should be gradual and never forced (avoid pain or pinching)

***Subscapularis Precautions:*** Please refer to if a repair to the subscapularis is performed

- No ER past 30 degrees for 12 weeks
- No cross-body adduction for 12 weeks
- No active IR or IR behind the back for 12 weeks
- No weight bearing through UE or supporting arm for 12 weeks

***Biceps Tenodesis Precautions:*** In some cases, the long head of the biceps brachii could be involved which could lead to surgical repair alongside a rotator cuff repair. In these cases, this attachment site is surgically cut and reattached to the humerus. To ensure proper healing of this tendon particular guidelines should be followed.

- Limit ER to 40 degrees with no humeral extension or horizontal adduction for 4-6 weeks
- Any biceps tension should be avoided for 6 weeks
- Avoid cross friction massage for 6 weeks  
(indirect gentle soft tissue mobilization can be utilized at 2 weeks)
- Sling use for 6 weeks
- No isolated elbow flexion, straight-arm resisted shoulder flexion, or forearm supination for 8 weeks

**Phase 1: Maximal Protection (0-6 weeks)**

**GOALS:**

- Maintain integrity of the repair
- Gradually increase passive range of motion
- Minimize shoulder pain & inflammatory response
- Ensure adequate scapular & postural function
- Minimize negative effects of immobilization

**PRECAUTIONS:**

- Proper sling use for 6-8 weeks even while sleeping (discharged by physician)
- Avoid shoulder AROM before 8 weeks
- ROM should be gradual and never forced (avoid pain or pinching)
- Limit use of UE and avoid lifting with arm.
- Towel roll placed underneath arm to avoid humeral extension for ROM

<i>Post-Operative to 4 weeks</i>	<i>Weeks 4 to 6</i>
<p><i>PROM</i></p> <ul style="list-style-type: none"> <li>▪ Progressing flexion/elevation and external rotation (per patient tolerance)</li> </ul> <p><b><u>Week 4</u></b></p> <ul style="list-style-type: none"> <li>-Shoulder ER to 30° (in scapular plane/30° abd)</li> <li>-Shoulder flexion to 90°(in scapular plane)</li> </ul> <p><i>Strengthening</i></p> <ul style="list-style-type: none"> <li>▪ Postural instructions with sling use</li> <li>▪ Scapular clocks (neutral humeral position with elbow at trunk)</li> </ul> <p><i>Elbow/wrist/hand ROM as tolerated</i> (follow precautions if biceps tenodesis performed)</p> <p><i>Modalities/cryotherapy PRN</i></p>	<p><i>PROM</i></p> <ul style="list-style-type: none"> <li>▪ Continue previous PROM</li> <li>-Shoulder ER to 60° (in scapular plane/30° abd)</li> <li>▪ Begin abduction (per patient tolerance)</li> <li>▪ Scapular mobilizations (neutral humeral position)</li> <li>▪ Glenohumeral joint mobilizations- posterior and caudal only (grade I to II)</li> <li>▪ Pectoralis minor flexibility (supine postural stretch)</li> </ul> <p><i>Strengthening</i></p> <ul style="list-style-type: none"> <li>▪ Continue scapular clocks (neutral humeral position)</li> <li>▪ Isotonic scapular retraction/protraction</li> <li>-Scapular squeezes</li> <li>-Avoid humeral AROM</li> </ul> <p><i>Elbow/wrist/hand ROM as tolerated</i> (follow precautions if biceps tenodesis performed)</p> <p><i>Modalities/cryotherapy PRN</i></p>

**MILESTONES TO PROGRESS TO PHASE 2:**

1. PROM shoulder forward elevation to at least 125 degrees, ER to beyond 30 degrees in scapular plane, and 90 degrees abduction
2. Normalized scapular mobility and postural awareness with sling use
3. Decrease in pain & inflammatory response with above PROM
4. Sleeping through the night

**Phase 2: Minimal Protection (6-12 weeks)**

**GOALS:**

- Allow healing of soft tissue/repair
- Do not overstress healing tissue
- Gradually restore full PROM & initiate AROM
- Minimize shoulder pain & inflammatory response
- Reestablish dynamic shoulder stability



**Towel-Assisted Flexion**



**Towel self-assisted slides with trunk flex**

**PRECAUTIONS:**

- Proper sling use for 6-8 weeks even while sleeping (discharged by physician)
- Avoid shoulder AROM before 8 weeks
- ROM should be gradual and never forced (avoid pain or pinching)
- Limit use of UE and avoid lifting with arm (computer use with supported arm, avoid activation)
- Driving can be performed at 6-8 weeks with modifications
- Towel roll placed underneath arm to avoid humeral extension for ROM

<i>Post-Operative 6 to 8 weeks</i>	<i>Weeks 8 to 10</i>	<i>Weeks 10 to 12</i>
<p><b>PROM</b></p> <ul style="list-style-type: none"> <li>▪ Continue previous PROM with emphasis on terminal ROM (avoid pain)</li> <li>▪ Begin shoulder IR mobility -Perform initially in scapular plane/30° abd -No aggressive stretching</li> </ul> <p><b>AAROM</b></p> <ul style="list-style-type: none"> <li>▪ Unweighted pendulums</li> <li>▪ Towel slides on table- flexion with trunk flex</li> <li>▪ Self-assisted <u>supine</u> -Towel assisted flex press to 90° (hands close together) -Progress into overhead flex -wand (flex, abd, ER &amp; IR)</li> </ul> <p><b>Strengthening (<u>week 7</u>)</b></p> <ul style="list-style-type: none"> <li>▪ Initiate submax shoulder ISOM: flexion, extension, abduction, ER, IR -Neutral humeral position within scapular plane -Initially at 25% then 50-75%</li> <li>▪ If biceps tenodesis- avoid biceps contraction with arm supported on arm rest &amp; wrist in neutral</li> <li>▪ Closed chain stability- elbow ext with hand on ball on table using oscillations (<u>Avoid WB</u>)</li> <li>▪ Progress scapular neuromuscular control</li> </ul>	<p><b>AAROM &amp; PROM</b></p> <ul style="list-style-type: none"> <li>▪ Progress into PROM gentle IR at 90° abduction (no aggressive stretching)</li> <li>▪ Continue previous ROM with emphasis on terminal ROM (avoid pain)</li> <li>▪ Low-load long-duration stretching -Cross-body stretch (horizontal adduction) -ER at 90° abduction</li> <li>▪ Assisted pulley flexion (≥ 9 weeks, pain-free)</li> </ul> <p><b>AROM</b></p> <ul style="list-style-type: none"> <li>▪ Initiate in gravity eliminated positions then progress into gravity resisted position -IR, ER, forward elevation/scaption (ex: Lawn chair progression) -Per patient tolerance -Avoiding scapular substitution</li> </ul> <p><b>Strengthening</b></p> <ul style="list-style-type: none"> <li>▪ UBE with light resistance</li> <li>▪ Begin prone isotonic AROM -Shoulder extension and rows -Gravity resistance only -Below shoulder level</li> <li>▪ UE CKC activity -Initiate in standing -Towel slides on wall (horizontal, diagonal, or vertical) -Serratus punches</li> </ul>	<p><b>ROM</b></p> <ul style="list-style-type: none"> <li>▪ Previous ROM PRN with emphasis on terminal ROM (avoid pain)</li> <li>▪ Low-load long-duration stretching</li> </ul> <p><b>Strengthening</b></p> <ul style="list-style-type: none"> <li>▪ UBE moderate resistance</li> <li>▪ Continue shoulder ISOM</li> <li>▪ Dynamic ISOM (ER &amp; IR walkouts)</li> <li>▪ Progress prone isotonic scapular program (isotonic AROM, gravity resistance only) -Rows and shoulder extension</li> <li>▪ Progress UE CKC activity -Quadruped weight shifts</li> </ul> <p><b>Neuromuscular Reeducation</b></p> <ul style="list-style-type: none"> <li>▪ Supine ABCs (flexion at 90°)</li> <li>▪ Ball on Wall</li> </ul>

**MILESTONES TO PROGRESS TO PHASE 3:**

1. Full AROM without scapular substitution/compensation (80-90% minimum bilateral comparison)
2. No reactive inflammation with AROM
3. Able to perform ADLs without complaints of pain

### Phase 3: Initial Resistance Strengthening & Proprioception (12-16 weeks)

#### GOALS:

- Maintenance of full ROM (continue gradual progression PRN)
- Gradual restoration of shoulder strength
- Enhance dynamic shoulder stability
- Gradual return to everyday activities

#### PRECAUTIONS:

- Avoid lifting with arm and limit overhead activity
- Emphasize proper scapulohumeral rhythm with all below activity
- Towel roll placed underneath arm to avoid humeral extension for ROM

#### *Post-Operative 12 to 16 weeks*

##### *ROM*

- Previous ROM PRN with emphasis on terminal ROM (avoid pain)
- Low-load long-duration stretching

##### *Strengthening*

- UBE moderate resistance
- Light t-band/weight exercises
  - Shoulder ER/IR
  - Shoulder Horizontal abduction/adduction
- Progress prone isotonic scapular program
  - Rows and shoulder extension (light dumbbell)
- Progress UE CKC activity
  - Initiate prone positioning (start with static holds)
  - Progress to push-up plus
    - fixed distal segment, no elbow flex
    - initiate modified 1<sup>st</sup> and/or at table
  - Late stage progression: plank on BOSU ball with weight shifts (flat side)

##### *Neuromuscular Reeducation*

- Supine rhythmic stabilization (alt ISOM)
  - Initiate at 90° flexion
  - ER & IR in scapular plane
  - Progress to sidelying neutral
  - Progress to overhead at 120° flex & 20° abd

##### *Trunk and lower extremity strengthening*

*(avoid behind the head positions and holding excessive loads)*

#### MILESTONES TO PROGRESS TO PHASE 4:

1. Full AROM without scapular substitution/compensation
2. Able to perform above strengthening without pain
3. Adequate strength of scapular stabilizers & rotator cuff: MMT 4+/5 to 5/5 (70-80% bilateral comparison with handheld dynamometer)
4. Involved extremity ER to IR ratio >66% (isokinetic or handheld dynamometry testing)

#### Phase 4: Advanced Strengthening & Proprioception (4-6 months)

##### GOALS:

- Maintenance of full non-painful ROM
- Improve muscular strength, endurance and power
- Enhance functional use of upper extremity
- Gradual return to functional activities and/or sport

##### PRECAUTIONS:

- Do not increase stress to shoulder in a short period or uncontrolled manner
- Do not progress into activity-specific training until full ROM and strength are achieved
- Avoid weight lifting exercises that places undue stress to shoulder (e.g. lat pulldowns behind the head, tricep dips)
- If patient does not perform velocity dependent tasks during work/sport/ADLs do not perform plyometrics

##### CRITERIA FOR PLYOMETRIC TRAINING

1. Adequate strength of scapular stabilizers & rotator cuff: MMT 4+/5 (70-80% bilateral comparison with handheld dynamometer)
2. Involved extremity ER to IR ratio >66% (isokinetic or handheld dynamometry testing)
3. Pain-free ADLs and with previous strengthening
4. Minimum 3 weeks of multi-plane activity at increased speed of movement

<p><b><i>Post-Operative 4 to 6 Months</i></b></p> <p><b><i>ROM</i></b></p> <ul style="list-style-type: none"><li>▪ Previous ROM PRN with emphasis on terminal ROM (avoid pain)</li><li>▪ Low-load long-duration stretching</li></ul> <p><b><i>Strengthening</i></b></p> <ul style="list-style-type: none"><li>▪ Progress dumbbell isotonic PREs<ul style="list-style-type: none"><li>-Rotator cuff (ER, scaption)</li><li>-Diagonal PNF patterns of motion</li><li>-prone scapular program</li><li>-Prone retraction with ER</li><li>-Horizontal abduction (T exercise initiate with gravity resistance &amp; progress into dumbbell)</li><li>-Lower trapezius (Y exercise initiate with gravity resistance &amp; progress into dumbbell)</li></ul></li><li>▪ Progress UE CKC activity<ul style="list-style-type: none"><li>-push-up plus with elbow flexion</li><li>-stability ball exercises</li></ul></li></ul> <p><b><i>Neuromuscular Reeducation (see above criteria for plyometric training)</i></b></p> <ul style="list-style-type: none"><li>▪ Progress alt ISOM to further overhead positions &amp; 90° abd</li><li>▪ Manual resistance with dynamic PNF patterns of motion</li><li>▪ Late stage: Initiate plyometric progression with double-arm plyometric<ul style="list-style-type: none"><li>○ 2 handed drills; initiate at chest height</li></ul></li><li>▪ Late Stage: Progress into single-arm plyometrics: Ball catch/toss drills (90 degrees abd)</li></ul> <p><b><i>Functional Activity</i></b></p> <ul style="list-style-type: none"><li>▪ May begin interval sports progression program once below criteria met</li><li>▪ <b><i>Time frames should be discussed with surgeon</i></b></li><li>▪ Delayed time frame pending procedure and sport of interest</li></ul> <p><b><i>Trunk and lower extremity strengthening</i></b> <b><i>(avoid behind the head positions and holding excessive loads)</i></b></p>
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**MILESTONES TO INITIATE INTERVAL PROGRESSION PROGRAMS (e.g. throwing)**

1. Clearance from physician
2. Muscular strength >80% bilateral comparison for rotator cuff & scapular stabilizers (MMT 5/5)
3. Involved extremity ER to IR ratio  $\geq 75\%$  (isokinetic or handheld dynamometry testing)
4. Full functional ROM with appropriate scapulohumeral rhythm (overhead athlete see appendix)
5. Able to complete an UE plyometric progression program

**CRITERIA TO DISCHARGE FOR RETURN TO FULL SPORT ACTIVITY**

1. Physician clearance
2. Normal arthrokinematics of the glenohumeral & scapulothoracic joints (overhead athlete see appendix)
3. Muscular strength >90% bilateral comparison for rotator cuff & scapular stabilizers
4. Involved extremity ER to IR ratio  $\geq 75\%$  (isokinetic or handheld dynamometry testing)
5. Completion of an interval sport progression program

***Appendix:***

<b>The Overhead Athlete:</b>	<b>Side to side differences (throwing arm vs non-dominant arm)</b>
Total rotational ROM at 90° abd (ER plus IR)	< 5 degrees
Shoulder flexion	$\leq 5$ degrees
Shoulder ER	5 degrees more
Horizontal Adduction	<15 degrees

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**Author:** Ryan Monti, PT, DPT, SCS  
**Physioforce, LLC**  
Sports Physical Therapy  
6285 Promler St NW  
North Canton, OH 44720

[www.thewarehousecanton.com](http://www.thewarehousecanton.com)  
(330) 307-8648  
[Rmonti07@jcu.edu](mailto:Rmonti07@jcu.edu)

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