

ROTATOR CUFF TENDINOPATHY

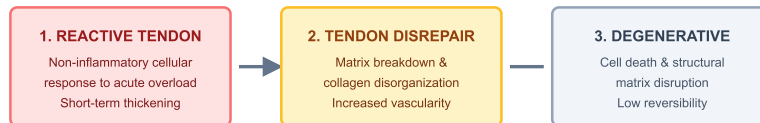
Evidence-Based Physical Therapy Rehabilitation Protocol

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Clinical Overview: Rotator cuff tendinopathy represents a continuum of tendon pathology characterized by localized pain during load-bearing, structural disorganization, and impaired shoulder mechanics. Physical therapy intervention focuses on progressive load management, mechanotherapy to stimulate tendon remodeling, kinetic chain restoration, and scapular dyskinesis correction.

1. ANATOMY & LOAD CONTINUUM MECHANICS

The rotator cuff complex—comprising the *Supraspinatus*, *Infraspinatus*, *Teres Minor*, and *Subscapularis*—functions dynamically to depress and center the humeral head within the glenoid fossa during elevation. Tendinopathy primarily affects the avascular critical zone of the supraspinatus tendon.

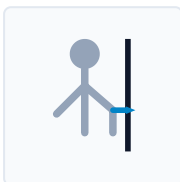


2. PHASE 1: SYMPTOM MODIFICATION & ISOMETRIC LOADING (WEEKS 1–2)

Goal: Reduce pain, preserve passive ROM, suppress motor cortex inhibition via isometric muscle contractions without exceeding tissue load tolerance threshold.

1. Isometric External Rotation

Pain Relieving



Technique: Stand beside a wall. Arm at side, elbow bent 90°. Press back of hand outwards into wall at submaximal effort (30-50%).

- **Hold:** 30–45 seconds
- **Reps:** 4–5 holds
- **Frequency:** 2–3x daily

2. Assisted Pendulum (Codman's)

Mobility



Technique: Lean forward, supporting body with uninjured arm. Allow affected arm to hang completely passive. Move torso to sway arm gently.

- **Duration:** 60–90 seconds
- **Direction:** Clockwise & Counter
- **Note:** Zero active shoulder lift

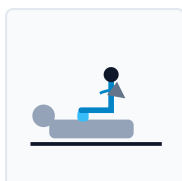
Clinical Threshold Rule (PT Ahmad Al Hariri): Pain during isometric exercises should not exceed 3/10 on the Visual Analog Scale (VAS) and must return to baseline within 24 hours post-exercise.

3. PHASE 2: RESTORATIVE DYNAMIC LOADING & SCAPULAR CONTROL (WEEKS 3–6)

Initiate dynamic isotonic loading once isometric holds are comfortable and pain is stabilized. Focus shifts toward strengthening external rotators, correcting scapular dyskinesis, and loading the tendon eccentrically.

3. Side-Lying External Rotation

Isolation

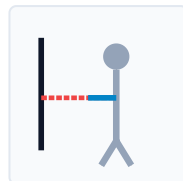


Technique: Lie on unaffected side. Place a rolled towel between affected elbow and side. Slowly raise light dumbbell (1–2kg) towards ceiling, lower slowly (3s eccentric).

- **Sets/Reps:** 3 sets of 10–12 reps
- **Focus:** Infraspinatus isolation

4. Banded Standing Internal Rotation

Anterior Cuff

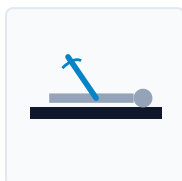


Technique: Anchor resistance band at door height. Elbow bent 90° tucked to side. Pull band across abdomen internalizing forearm against resistance.

- **Sets/Reps:** 3 sets of 12–15 reps
- **Focus:** Subscapularis dynamic load

5. Prone Scapular "Y" & "T" Raises

Scapular Dynamics

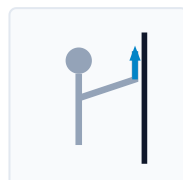


Technique: Lie prone on table/bed with arm hanging off edge. Retract scapula down and in. Lift arm at 120° angle (Y) with thumbs pointing up.

- **Sets/Reps:** 3 sets of 10 reps
- **Focus:** Lower Trapezius activation

6. Serratus Wall Slides with Band

Scapular Protraction



Technique: Loop resistance band around wrists. Forearms against wall. Maintain outward tension while sliding forearms up wall in a 'V' trajectory.

- **Sets/Reps:** 3 sets of 10 slides
- **Focus:** Serratus Anterior & Scapular Upward Rotation

4. PROGRESSIVE LOAD DOSIMETRY TABLE

REHAB PHASE	TARGET TISSUE	CONTRACTION / VELOCITY	DOSAGE / REST	CLINICAL PROGRESSION METRIC
Phase 1: Acute	Supraspinatus / Infraspinatus	Isometric (30–50% MVIC)	5 x 45s holds, 60s rest	NRS Pain < 3/10 during load
Phase 2: Subacute	Rotator Cuff + Scapula	Slow Isotonic (3s ecc / 2s con)	3 x 10–12 reps, 90s rest	Symmetrical scapular rhythm
Phase 3: Remodeling	Full Kinetic Chain	Dynamic / Moderate Speed	3 x 15 reps, 60s rest	Equal ER strength (>85% LSI)
Phase 4: Return	High Load / Plyometric	Fast Stretch-Shortening Cycle	4 x 8–10 reps, 2 min rest	Pain-free overhead function

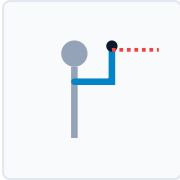
5. PHASE 3 & 4: HEAVY SLOW RESISTANCE (HSR) & DYNAMIC FUNCTIONAL RETURN

Advanced tendon remodeling requires high mechanical tension via Heavy Slow Resistance (HSR) training to increase collagen cross-linking and tensile stiffness without triggering tendon degradation.

7. High-Cable External Rotation

90/90

Advanced Loading



Technique: Stand with shoulder abducted to 90° and elbow bent 90°. Rotate arm backward into full external rotation pulling dynamic resistance.

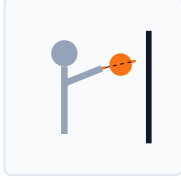
- Sets/Reps:** 4 sets of 6–8 reps (HSR load)
- Tempo:** 4s concentric / 4s eccentric

8. Plyometric Medicine Ball Rebounds

Functional SSC

Technique: Stand 2–3 feet from wall. Perform rapid single-arm chest or overhead chest passes against a rebounder wall to train stretch-shortening cycle.

- Sets/Reps:** 3 sets of 15–20 rapid throws
- Goal:** Dynamic power & rate of force development



6. KINETIC CHAIN INTEGRATION MECHANICS

Overhead force production relies heavily on lower extremity and core energy transfer. Physical therapy must integrate leg drive and trunk rotation into late-stage shoulder rehabilitation to reduce local tendon stress:

Kinetic Energy Equation in Overhead Motion:

$$E_{total} = E_{legs/trunk} (60-75\%) + E_{shoulder} (20-25\%) + E_{elbow/wrist} (10-15\%)$$

*Failure in kinetic chain transfer causes compensatory hyper-activation of the rotator cuff, accelerating micro-trauma.

7. DISCHARGE CRITERIA & RETURN-TO-SPORT BENCHMARKS

Patients may be cleared for full unrestricted activity, sport, or heavy overhead labor upon meeting all of the following objective criteria established by **PT Ahmad Al Hariri**:

ASSESSMENT TEST	OBJECTIVE TARGET BENCHMARK	CLINICAL SIGNIFICANCE
Handheld Dynamometry (HHD)	LSI (Limb Symmetry Index) $\geq 90\%$ for ER/IR strength	Ensures strength symmetry between limbs
ER / IR Strength Ratio	External rotation strength $\geq 65-75\%$ of Internal rotation	Restores dynamic glenohumeral balance
CKCUEST Test	≥ 21 touches in 15 seconds (Closed Kinetic Chain)	Validates dynamic upper extremity stability
WORC Index / DASH Score	DASH score < 10 points or WORC index $> 85\%$	Confirms patient self-reported functional recovery

