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PHYSICAL THERAPY PROTOCOL

Superior Capsular Reconstruction

Arthroscopic SCR with Dermal Allograft — Irreparable Posterosuperior Rotator Cuff Tear

FOR THE PHYSICAL THERAPIST

Overview and Goals

This protocol governs rehabilitation following arthroscopic superior capsular reconstruction (SCR) with a dermal allograft for an irreparable posterosuperior rotator cuff tear. SCR is a joint-preserving salvage procedure: an allograft is anchored from the superior glenoid to the greater tuberosity to restore the superior capsular restraint, re-center the humeral head, and re-establish a stable fulcrum for deltoid-driven elevation.[4]

Rehabilitation is driven by graft-incorporation biology and is meaningfully more conservative than rotator cuff repair. The graft must heal to bone at both the glenoid and the tuberosity before it can be loaded, and a dermal allograft may elongate up to ~15% under physiologic load — so early pacing is deliberately slower than for autograft or for primary cuff repair. Graft failure is the most common complication of SCR (reported in roughly 5–39% depending on graft type) and is associated with progression to cuff-tear arthropathy; protecting graft incorporation is therefore the central goal of the first 16 weeks.[7]

Three principles guide rehabilitation. First, protect the graft through 6 weeks of abduction-sling immobilization and deferred loading through Week 16. Second, restore the transverse force couple: because the infraspinatus is not repaired in SCR, external rotation recovers through compensation by the posterior deltoid and teres minor, and a balanced subscapularis–teres minor couple is required to resist the superior pull of the deltoid.[5,6] Isolated supraspinatus strengthening is avoided throughout. Third, set realistic expectations: SCR is a salvage procedure, strength recovery is gradual (continuing through 1–2 years), and the goal is durable functional capacity rather than a normal shoulder.

Progression between phases is criterion-based. Time ranges represent typical windows, not gates. Given the salvage nature of the procedure and the consequences of graft failure, conservative bias is preferred over aggressive advancement.

READ BEFORE STARTING — KEY ASSUMPTIONS & CONCOMITANT PROCEDURES

This protocol applies to SCR performed with a **dermal allograft** for an irreparable posterosuperior tear, with the graft tensioned intraoperatively at 30–40° of glenohumeral abduction. Modifications below apply **in addition to** the standard protocol:

- If **concomitant subscapularis repair** was performed, see the Subscapularis Repair Modification section — subscapularis status meaningfully affects ER limits and outcomes.
- If **biceps tenodesis** was performed, apply the standard elbow-flexion restriction: no active elbow flexion × 3 weeks (AAROM permitted), AROM from Week 3, resistance from Week 12.
- If a **fascia lata autograft** was used instead, add thigh donor-site precautions and note that autograft pacing may be modestly less conservative than the allograft pacing below — confirm with Dr. Roth.
- If the cuff was found to be **reparable** and was repaired rather than reconstructed, use Dr. Roth's Rotator Cuff Repair protocol (Small–Medium or Large–Massive) instead.

Rehabilitation Phases

PHASE	SLING	RESTRICTIONS	ROM GOALS	EXERCISES	CRITERIA TO ADVANCE
PHASE 1 Weeks 0–6 *Maximum protection & graft incorporation*	• Abduction sling with pillow supporting the arm in the scapular plane, at all times for the full 6 weeks, including at night.[1,3] • Remove only for hygiene and prescribed PT. • Six weeks of immobilization protects graft-to-bone incorporation at the glenoid and tuberosity.	• No active shoulder elevation, abduction, or rotation. • No internal rotation behind the back. • No lifting, pushing, pulling, or reaching with the operative arm. • No support of body weight through the operative arm.	• Passive ROM only, within pain-free limits:[1,2] **Forward elevation:** • Scapular plane, progress 0–120° over Weeks 0–6 **ER at 0° abduction:** • Limited to 20–30° (protects the graft and any subscapularis repair) **Internal rotation:** • No IR behind the back **Elbow / wrist / hand:** • Full active ROM as tolerated (with biceps tenodesis caveat if applicable)	**Pain & edema control:** • Cryotherapy, NSAIDs per Dr. Roth's instructions, gentle scar mobilization once incisions healed **Permitted exercises:** • Pendulum (Codman) — gentle, gravity-assisted • Cervical ROM, postural awareness • Scapular retraction and depression isometrics (no shoulder motion) • Supine PROM forward elevation in scapular plane with therapist or contralateral-arm assistance • Supine PROM ER with wand at 0° abduction within phase limits • Distal extremity: elbow, wrist, hand AROM; ball squeezes **Avoid:** • Active shoulder motion of any kind • Resisted exercises • Internal rotation behind the back • End-range PROM beyond phase limits • Sling-off ambulation in public spaces (fall risk; reflex arm-out reaction strains the graft)	• Pain controlled at rest and with prescribed PROM • No effusion or inflammation around incision sites • PROM forward elevation ≥ 120° in scapular plane • PROM ER ≥ 30° at 0° abduction • Tolerates sling weaning at end of Week 6 • Minimum 6 weeks elapsed
PHASE 2 Weeks 6–12 *Sling weaning, PROM completion & AAROM*	• Discontinue sling at end of Week 6.[1] • May continue use for comfort during long days or crowded environments through Week 8.	• No AROM against gravity until late in this phase (gravity-eliminated only). • No resisted shoulder exercises. • No lifting more than coffee-cup weight.	• Progressive PROM toward full range:[2,4] **Forward elevation:** • 120° → 150–160° **ER at 0° abduction:** • 30° → 40–45° **ER at 90° abduction:** • Introduce gradually **Internal rotation:** • Hand to lumbar spine **AAROM introduced:** • Pulley, cane/wand, table slides — gravity-eliminated, smooth scapular-controlled motion **Gravity-eliminated AROM:** • Supine active elevation introduced ~Week 8	**PROM and AAROM:** • Continue all Phase 1 PROM with progressive range • Pulley exercises for forward elevation • Cane/wand-assisted ER and IR • Supine (gravity-eliminated) active elevation from ~Week 8 **Scapular stabilization (progress):** • Prone scapular retraction • Serratus anterior activation • Postural strengthening **Manual therapy:** • Gentle joint mobilization (Grade I–II) and soft-tissue mobilization to scapular / periscapular musculature; avoid aggressive glenohumeral mobilization at end-range **Aquatic therapy:** • Once incisions fully healed, pool-based PROM and AAROM offload the graft while supporting motion recovery	• Sling discontinued without arm guarding • Full or near-full pain-free PROM • Pain ≤ 2/10 with all prescribed exercises • Gravity-eliminated active elevation without scapular hike • Minimum 12 weeks elapsed
PHASE 3 Weeks 12–16 *Active motion & early*	• None.	• No isolated supraspinatus strengthening at any point.[5,6] • No resisted overhead motion.	Full active ROM in all planes is the goal. Active elevation and rotation against gravity; target full, symmetric, pain-free AROM by ~Week 16.	**AROM progression (gravity-eliminated → against gravity):** • Side-lying supported active elevation[4] • Supine washcloth press-up, supine press-up • Reclined wedge press-up —	• Full or near-full pain-free AROM • No scapular hike with active forward elevation • Smooth scapulohumeral

PHASE	SLING	RESTRICTIONS	ROM GOALS	EXERCISES	CRITERIA TO ADVANCE
strengthening		• Keep resistance loads below shoulder level. • No lifting more than 2–3 lbs with the operative arm.		progressive incline • Standing AROM forward elevation — initially no weight, progress to short lever (elbow bent) • Wall walks / wall slides • Aquatic AROM at slow speeds **Light isometrics (from Week 12):** • Submaximal deltoid isometrics • Periscapular isometrics **Light isotonic (from Week 14–16, bands / 1–2 lb):** • Scapular stabilizers — lower trapezius, serratus anterior, rhomboids[5] • Subscapularis (gentle IR) and teres minor (gentle ER) — the force couple • Submaximal deltoid • Closed-chain wall push-ups (late phase) **Avoid:** • Isolated supraspinatus (empty-can) loading • Resisted overhead motion	rhythm • Pain ≤ 1/10 with AROM and isometrics • Tolerates light isotonic loading • Minimum 16 weeks elapsed
PHASE 4 Weeks 16–24+ *Progressive strengthening & return to function*	• None.	• Resistance progresses gradually, loads below shoulder level initially. • Advance to overhead strengthening after ~Week 20 as tolerated. • Conservative load progression given the graft and the salvage nature of the procedure.	• Full pain-free AROM.	**Progressive resistance (Weeks 16+):** • Below-shoulder strengthening first; overhead after ~Week 20[4] • Continue the force couple: subscapularis (IR), teres minor and posterior deltoid (ER compensators) • Progressive scapular strengthening — rows, prone Y/T/W (light), reverse flys • Side-lying dumbbell ER (start 1 lb), band ER/IR progressions **Functional:** • Sport- or job-specific simulation at progressive intensity • Core and lower-extremity conditioning • Aquatic strengthening as adjunct **Avoid:** • Isolated supraspinatus loading at any stage **Maintenance:** • Establish an indefinite home maintenance program — strength continues to improve through 1–2 years	*See Return-to-Activity Criteria section below.* • Recreational sport typically ~6–9 months; contact/overhead sport and heavy physical work ~9–12 months, with clearance by Dr. Roth.[3]

Procedure-Specific Considerations

Why SCR Rehabilitation Differs From Rotator Cuff Repair

SCR is a salvage procedure for an irreparable tear — there is no native tendon repair to protect, but there is a capsular graft that must incorporate to bone at two fixation sites before it can bear load. Because a dermal allograft can elongate up to ~15% under physiologic load, early loading risks graft attenuation and recurrence of superior translation. Pacing is therefore deliberately conservative: 6 weeks of sling immobilization, passive motion only through Week 6, gravity-eliminated active motion through Week 12, and no meaningful strengthening before Week 12–14. The intraoperative graft

tension (set at 30–40° of glenohumeral abduction) optimizes the biomechanical restraint, and rehabilitation should not undermine it with premature load.[9]

The Force Couple — Why ER and Stability Recover Without an Infraspinatus Repair

In SCR the infraspinatus is not repaired, yet external rotation and a stable fulcrum still recover. A 2024 muscle-volume study identified the posterior deltoid and teres minor as the external-rotation compensators after SCR, hypertrophying to restore ER strength.[6] Functionally, the deltoid pulls the humeral head superiorly; a balanced transverse force couple — subscapularis anteriorly and teres minor posteriorly — is required to keep the head centered against that pull. Teres minor development is a key determinant of ultimate overhead strength. Rehabilitation should therefore prioritize balanced subscapularis–teres minor strengthening and posterior-deltoid activation, and should avoid isolated supraspinatus strengthening, which neither contributes to the reconstructed restraint nor exists as healthy tissue to load.[5]

Realistic Strength Recovery — A Two-Year Trajectory

Strength recovery after SCR is slow and incomplete relative to a normal shoulder. Scaption and external-rotation strength reach roughly 60% of the uninvolved side at two years, with the most significant gains occurring between 6 months and 1 year.[5] Most patients reach a clinically meaningful improvement around one year. Patients should be counseled at the outset that meaningful function — not a normal shoulder — is the goal, and that progress is measured over many months.

REALISTIC EXPECTATIONS — SCR IS A SALVAGE PROCEDURE

SCR is performed when the cuff is irreparable; patients should not expect to regain normal strength or motion. Counsel them that the goal is a stable, centered, functional shoulder and durable pain relief. The outcome data are encouraging when expectations are set correctly: Mihata reported 100% return to recreational sport and 92% return to physical work at 5-year follow-up, maintained at 90% and 88% respectively at 10 years.[1,2,3] Graft failure is the most common complication and is associated with arthropathy progression, which is why graft protection through the first 16 weeks is non-negotiable.[7] Persistent pain, weakness, or loss of motion should prompt re-evaluation by Dr. Roth.

Concomitant Subscapularis Repair Modification

Subscapularis status meaningfully influences SCR outcomes — patients with an irreparable subscapularis have poorer postoperative elevation and worse scores.[8] If concomitant subscapularis repair was performed, the modifications below apply **in addition to** the standard protocol above.

CONCOMITANT SUBSCAPULARIS REPAIR — READ BEFORE STARTING

Sling: No change — 6 weeks per standard protocol.

External rotation restriction (tighter, longer):

- Passive ER limited to ≤ 20° at 0° abduction × 6 weeks
- No PER at 90° abduction until Week 8
- From Week 8: progress ER gradually, monitoring for anterior shoulder pain suggesting excessive subscapularis strain

Internal rotation strengthening: Defer active IR strengthening until Week 16. When introduced, begin with isometric IR in neutral, then light theraband IR before adding load. Avoid belly-press and bear-hug positions through Week 20.

RTS timeline: Standard SCR timeline applies. No accelerated return.

Return-to-Activity Criteria

Return to activity after SCR is criterion-based, with progression matched to the demands of the target activity and tempered by the salvage nature of the procedure. Strength benchmarks are interpreted against SCR-specific norms — symmetry continues to improve through 1–2 years and may plateau below the uninvolved side.[3,5]

Activity Tier	Criteria & Timing
Activities of daily living (ADLs)	Full pain-free PROM and symptom-free gravity-eliminated AROM. Typically by Week 16–22; light lifting (up to ~5 lbs) at this point.
Light recreational (walking, cycling, golf, non-overhead swim)	Pain-free AROM, building strength with no scapular compensation, smooth deltoid-driven elevation. Typically ~6–9 months.
Weight training, manual labor, basketball, skiing	Pain-free overhead motion, no apprehension, strength symmetry building (interpreted against SCR norms — may remain below the uninvolved side). Typically ~9–12 months.
Contact / overhead sport, heavy physical work	Sport- or job-specific progression complete, pain-free overhead motion, no apprehension. Typically ~9–12+ months. Clearance by Dr. Roth required.
Strength & ROM benchmarks	Full pain-free AROM matching functional demand; smooth scapulohumeral rhythm; no apprehension overhead. Note: scaption and ER strength typically reach ~60% of the uninvolved side by 2 years — set expectations accordingly.

REALISTIC EXPECTATIONS FOR STRENGTH RECOVERY

Strength after SCR continues to improve through 1–2 years, with the most significant gains between 6 months and 1 year. A degree of residual weakness relative to the uninvolved side is expected and is not a sign of failed rehabilitation. The goal is functional capacity for the patient's target activities and durable pain relief. Persistent pain, weakness, or loss of motion after 12 months should prompt re-evaluation by Dr. Roth.

References

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Glossary

AAROM — Active-assisted range of motion; the patient initiates motion with assistance from gravity, pulley, wand, or therapist.

ADL — Activities of daily living.

AROM — Active range of motion; the patient moves the joint independently against gravity.

ASES — American Shoulder and Elbow Surgeons score; a validated shoulder outcome measure.

ER — External rotation.

IR — Internal rotation.

MCID — Minimal clinically important difference; the smallest change a patient perceives as meaningful.

PROM — Passive range of motion; the therapist or contralateral limb moves the joint while the patient stays relaxed.

ROM — Range of motion.

RTC — Rotator cuff.

SCR — Superior capsular reconstruction; a graft anchored from the superior glenoid to the greater tuberosity to restore superior restraint in an irreparable cuff tear.

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