

PHYSICAL THERAPY PROTOCOL

# Coracoclavicular Ligament Reconstruction

*Graft Reconstruction of the Coracoclavicular Ligaments for High-Grade Acromioclavicular Joint Separation or Distal Clavicle Fracture with CC Ligament Disruption*

FOR THE PHYSICAL THERAPIST

## Overview and Goals

This protocol governs rehabilitation following coracoclavicular (CC) ligament reconstruction for a high-grade acromioclavicular (AC) joint separation (typically Rockwood types III–V) or a distal clavicle fracture with coracoclavicular ligament disruption; the rehabilitation is the same for both indications. The reconstruction restores the vertical restraint between the coracoid and the clavicle — most commonly with a tendon graft, often augmented by a cortical-button or suture construct — re-establishing the anatomic relationship of the AC joint and off-loading the healing graft while it incorporates.

Rehabilitation is driven by graft-incorporation biology. The graft must revascularize and integrate to bone before it can bear load; biologic incorporation takes approximately 12–16 weeks, and the protocol is deliberately paced to protect the reconstruction and the reduction during that window.<sup>1,2</sup> This is the central point of difference from routine arthroscopic shoulder rehabilitation: the structure being protected is not the rotator cuff but the CC restraint, and the force that threatens it most is the downward pull of the arm's own weight on the clavicle.

Two principles guide rehabilitation. First, protect the graft and the reduction: support the arm to avoid downward traction on the clavicle, defer loading, and avoid cross-body (horizontal) adduction — the motion that most directly stresses the AC joint and the CC graft — through the first 12 weeks.<sup>3,4</sup> Second, permit early protected passive motion to prevent stiffness without loading the construct. Complication rates for anatomic CC reconstruction range from roughly 13% to 27% and include graft failure, loss of reduction, and clavicle or coracoid fracture through bone tunnels, which is why adherence to the early precautions matters.<sup>5,6,7</sup>

Progression between phases is criterion-based. Time ranges represent typical windows, not gates. Patients who do not meet criteria should remain in the current phase regardless of elapsed time. Given the consequences of graft failure or loss of reduction, conservative bias is preferred over aggressive advancement.

### READ BEFORE STARTING — SCOPE, INDIVIDUALIZATION & KEY PRECAUTIONS

This protocol applies to graft-based CC ligament reconstruction (open or arthroscopically-assisted) for high-grade AC joint separation or a distal clavicle fracture with CC ligament disruption. It should be individualized to the surgical technique, graft type, and fixation — confirm with Dr. Roth where his construct differs from the ranges below.

- If a **concomitant distal clavicle excision** was performed, this protocol applies unchanged — the reconstruction still governs pacing.
- If a **hook plate or primary AC/CC fixation without graft reconstruction** was performed instead, or an acute primary ligament repair, confirm the plan with Dr. Roth — hardware-dependent constructs and non-graft repairs may follow a different course (and hook plates require a removal timeline).
- Throughout the early phases: **do not let the operative arm hang unsupported**, do not carry anything in the operative hand, and avoid cross-body adduction — each loads the

reconstruction. The weight of the arm alone creates downward traction that can stress the repair.

## Rehabilitation Phases

| PHASE                                                                                             | SLING                                                                                                                                                                                                                                                                                                                                                                                    | RESTRICTIONS                                                                                                                                                                                                                                                                                                                                                                                         | ROM GOALS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EXERCISES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CRITERIA TO ADVANCE                                                                                                                                                                                                                                                                                                            |
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| <b>PHASE 1</b><br>Weeks 0–6<br><i>Maximum protection &amp; graft incorporation</i>                | <ul style="list-style-type: none"> <li>Sling at all times for the full 6 weeks, including at night.<sup>1,3</sup></li> <li>A shoulder abduction orthosis at ~30° may be used per Dr. Roth's preference.</li> <li>Support the arm; do not let it hang. Remove only for prescribed PT and hygiene.</li> <li>Use a pillow under the forearm at rest to reduce downward traction.</li> </ul> | <ul style="list-style-type: none"> <li>No active shoulder motion.</li> <li>No lifting, pushing, pulling, or carrying with the operative arm.</li> <li>No weight-bearing through the operative arm.</li> <li>No cross-body (horizontal) adduction.</li> <li>No behind-the-back internal rotation.</li> <li>Do not let the arm hang unsupported (downward traction stresses the reduction).</li> </ul> | <ul style="list-style-type: none"> <li>Passive ROM only, within pain-free limits:<sup>1</sup></li> </ul> <b>Weeks 0–2:</b> <ul style="list-style-type: none"> <li>Pendulum (Codman) only — gentle, gravity-assisted (may be deferred to Week 2–3 per Dr. Roth).</li> </ul> <b>Weeks 2–6:</b> <ul style="list-style-type: none"> <li>Passive forward elevation in the scapular plane, progress 0–90°.</li> <li>Passive ER at 0° abduction, progress 0–30°.</li> </ul> <b>Restricted:</b> <ul style="list-style-type: none"> <li>No PROM into cross-body adduction. No behind-the-back IR.</li> </ul> <b>Elbow / wrist / hand:</b> <ul style="list-style-type: none"> <li>Full active ROM as tolerated</li> </ul>                                       | <b>Pain &amp; edema control:</b> <ul style="list-style-type: none"> <li>Cryotherapy; gentle scar mobilization once incisions healed</li> </ul> <b>Permitted exercises:</b> <ul style="list-style-type: none"> <li>Elbow, wrist, and hand AROM; grip / ball squeezes; wrist curls</li> <li>Cervical ROM and postural awareness</li> <li>Scapular retraction and depression isometrics — submaximal, no shoulder motion</li> <li>Supine PROM forward elevation in the scapular plane with therapist or contralateral-arm assistance (Weeks 2–6, within limits)</li> <li>Supine PROM ER with a wand at 0° abduction within limits</li> </ul> <b>Avoid:</b> <ul style="list-style-type: none"> <li>Active shoulder motion of any kind</li> <li>Resisted exercises</li> <li>Cross-body adduction</li> <li>Letting the arm hang / carrying with the operative hand</li> <li>Sling-off ambulation in public spaces (fall risk; a reflex arm-out reaction strains the reconstruction)</li> </ul>                  | <ul style="list-style-type: none"> <li>Pain controlled at rest and with prescribed PROM</li> <li>Incisions healed without concern</li> <li>PROM forward elevation ≥ 90° in scapular plane</li> <li>PROM ER ≥ 30° at 0° abduction</li> <li>Tolerates sling weaning at end of Week 6</li> <li>Minimum 6 weeks elapsed</li> </ul> |
| <b>PHASE 2</b><br>Weeks 6–12<br><i>Sling weaning, motion completion &amp; early strengthening</i> | <ul style="list-style-type: none"> <li>Discontinue sling at end of Week 6.<sup>1</sup></li> <li>May continue use for comfort during long days or crowded environments through ~Week 8.</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>No cross-body adduction until Week 12.</li> <li>No lifting more than 5 lb with the operative arm.</li> <li>No heavy pushing, pulling, or overhead loading.</li> <li>Progress behind-the-back IR gradually, not forced.</li> </ul>                                                                                                                             | <ul style="list-style-type: none"> <li>Complete PROM and introduce active motion:<sup>1,2</sup></li> </ul> <b>Forward elevation:</b> <ul style="list-style-type: none"> <li>Progress PROM → full; AROM against gravity introduced Weeks 6–8</li> </ul> <b>ER at 0° abduction:</b> <ul style="list-style-type: none"> <li>30° → 45°, then full</li> </ul> <b>ER at 90° abduction:</b> <ul style="list-style-type: none"> <li>Introduce gradually from Week 8</li> </ul> <b>Internal rotation:</b> <ul style="list-style-type: none"> <li>Hand to lumbar spine; progress hand-behind-back cautiously after Week 8</li> </ul> <b>AAROM → AROM:</b> <ul style="list-style-type: none"> <li>Pulley, cane/wand, table slides — smooth, scapular-</li> </ul> | <b>ROM:</b> <ul style="list-style-type: none"> <li>Continue Phase 1 PROM to full range</li> <li>Pulley and wand-assisted elevation, ER, and IR within limits</li> <li>Gravity-eliminated → against-gravity active elevation</li> </ul> <b>Isometrics (from Week 6):</b> <ul style="list-style-type: none"> <li>Submaximal shoulder isometrics in neutral — flexion, abduction, IR, ER</li> </ul> <b>Light isotonic (from Week 8, 1–2 lb):</b> <ul style="list-style-type: none"> <li>Rotator cuff — side-lying ER, prone horizontal abduction, prone extension</li> <li>Scapular — rows (low load), low-trap raises, serratus wall slides</li> </ul> <b>Closed chain:</b> <ul style="list-style-type: none"> <li>Wall push-ups progressing to table push-ups (late phase)</li> </ul> <b>Adjunct:</b> <ul style="list-style-type: none"> <li>Postural strengthening and thoracic-spine mobility</li> </ul> <b>Avoid:</b> <ul style="list-style-type: none"> <li>Cross-body adduction, end-range</li> </ul> | <ul style="list-style-type: none"> <li>Sling discontinued without arm guarding</li> <li>Full or near-full pain-free AROM in all planes</li> <li>Pain ≤ 2/10 with prescribed exercises</li> <li>Smooth scapulohumeral rhythm without compensation</li> <li>Minimum 12 weeks elapsed</li> </ul>                                  |

# KEVIN M. ROTH, MD

## ORTHOPAEDIC SPORTS MEDICINE

| PHASE                                                                                        | SLING   | RESTRICTIONS                                                                                                                                                                                                                                                                                    | ROM GOALS                                                                                                                                            | EXERCISES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CRITERIA TO ADVANCE                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                              |         |                                                                                                                                                                                                                                                                                                 | controlled motion.<br>Goal: full AROM in all planes by Weeks 8–10.<br><b>Still restricted:</b><br>• No cross-body adduction stretching until Week 12 | overhead loading, resisted lifting > 5 lb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                              |
| <b>PHASE 3</b><br>Weeks 12–20<br><i>Progressive strengthening &amp; motion normalization</i> | • None. | <ul style="list-style-type: none"> <li>Cross-body adduction now permitted — introduce and progress gently.<sup>3,4</sup></li> <li>Progress lifting beyond 5 lb; heavy lifting (&gt; 25 lb) advanced gradually from Week 12.</li> <li>No contact / collision activity or plyometrics.</li> </ul> | Full, pain-free AROM in all planes.<br><b>Stretching:</b><br>• Address any residual deficits, including cross-body adduction and end-range IR        | <p><b>Progressive resistance:</b></p> <ul style="list-style-type: none"> <li>Deltoid, rotator cuff, and periscapular strengthening — advance load as tolerated<sup>1</sup></li> <li>Progress isotonic ER/IR (band → dumbbell), forward punch, scaption</li> </ul> <p><b>Overhead strengthening (from Weeks 12–14):</b></p> <ul style="list-style-type: none"> <li>Begin once full pain-free AROM is achieved — dumbbell press, lat pull-downs (front, not behind neck)</li> </ul> <p><b>Compound / functional:</b></p> <ul style="list-style-type: none"> <li>Push-ups on the floor, progressive rows</li> <li>Begin sport- or job-specific functional training</li> </ul> <p><b>Proprioception &amp; neuromuscular control:</b></p> <ul style="list-style-type: none"> <li>Rhythmic stabilization drills; perturbation training in progressive shoulder positions</li> </ul> <p><b>Avoid:</b></p> <ul style="list-style-type: none"> <li>Contact, collision, and plyometric loading until Phase 4</li> </ul> | <ul style="list-style-type: none"> <li>Full, pain-free AROM</li> <li>Strength ≥ 80% of the contralateral side</li> <li>No pain with resisted testing</li> <li>No apprehension with AC-joint provocative testing</li> <li>Minimum 20 weeks elapsed</li> </ul> |
| <b>PHASE 4</b><br>Weeks 20–24+<br><i>Advanced strengthening &amp; neuromuscular control</i>  | • None. | <ul style="list-style-type: none"> <li>Contact, collision, and plyometric loading introduced progressively only when Phase 3 criteria are met.</li> <li>Sport-specific demands advanced gradually.</li> </ul>                                                                                   | Full, symmetric, pain-free ROM.                                                                                                                      | <p><b>Progressive resistance training:</b></p> <ul style="list-style-type: none"> <li>Full-intensity deltoid, rotator cuff, and periscapular strengthening</li> <li>Closed- and open-chain exercises at end-range</li> </ul> <p><b>Power &amp; plyometrics:</b></p> <ul style="list-style-type: none"> <li>Medicine-ball chest pass and overhead throws, plyometric push-ups (progressive)</li> <li>Rhythmic stabilization at 90° flexion and 90° abduction</li> </ul> <p><b>Sport-specific progression:</b></p> <ul style="list-style-type: none"> <li>Job- or sport-specific drills at progressive intensity</li> <li>Throwing athletes: interval throwing program beginning ~month 4–5 (see Return-to-Activity)</li> </ul> <p><b>Maintenance:</b></p> <ul style="list-style-type: none"> <li>Establish a home maintenance program for ongoing strength and ROM</li> </ul>                                                                                                                                  | <p>See <i>Return-to-Activity Criteria</i> section below.</p> <ul style="list-style-type: none"> <li>Most patients return to unrestricted activity, including sport, at ~6 months; overhead athletes may require up to ~9 months.<sup>8,9,13</sup></li> </ul> |
| <b>PHASE 5</b><br>Months 5–6+<br><i>Return to sport / full</i>                               | • None. | <ul style="list-style-type: none"> <li>Contact / collision sport deferred until criteria are met and Dr. Roth has cleared the</li> </ul>                                                                                                                                                        | Full, symmetric ROM.                                                                                                                                 | <p><b>Criteria-based return (see table below):</b></p> <ul style="list-style-type: none"> <li>Full symmetric ROM; strength ≥ 90% of the contralateral side; negative apprehension and AC-joint provocative tests; radiographic maintenance of reduction (surgeon</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>See <i>Return-to-Activity Criteria</i> section below.</p> <ul style="list-style-type: none"> <li>Return to preinjury activity level is reported in ~89–95% of patients</li> </ul>                                                                         |

| PHASE    | SLING | RESTRICTIONS | ROM GOALS | EXERCISES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | CRITERIA TO ADVANCE                        |
|----------|-------|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| activity |       | athlete.     |           | assessment)<br><b>Sport-specific progression:</b> <ul style="list-style-type: none"> <li>• Throwing athletes: interval throwing program from ~month 4–5<sup>6</sup></li> <li>• Contact / collision athletes: sport-specific drills → controlled contact at ~month 5–6</li> <li>• Overhead athletes may require longer rehabilitation (up to ~9 months)</li> </ul> <b>Maintenance:</b> <ul style="list-style-type: none"> <li>• Continue rotator cuff, scapular, and periscapular maintenance program</li> </ul> | across published series. <sup>8,9,12</sup> |

## Procedure-Specific Considerations

### Protect the Reduction from Downward Traction — the Weight of the Arm

The reconstruction re-establishes the vertical restraint that holds the clavicle down onto the coracoid. The single most important early-protection concept is that the unsupported weight of the arm applies continuous downward traction across the healing graft. This is why the sling is worn full-time for six weeks, why the arm should never hang freely, and why the operative hand should not carry even light objects during the early phases.<sup>3,4</sup> A pillow under the forearm at rest and vigilance about sling-off ambulation in crowds (where a reflexive arm-out reaction can jerk the construct) are practical safeguards.

### Cross-Body Adduction Is the Protected Motion

Horizontal (cross-body) adduction compresses and shears the AC joint and directly loads the CC graft. It is avoided entirely through the first 12 weeks, then reintroduced gradually in Phase 3 — first as active motion within comfort, then as a stretch to address residual posterior tightness.<sup>3,4</sup> Behind-the-back internal rotation is likewise progressed cautiously rather than forced. New pain over the AC joint or a sense of prominence returning with cross-body progression should prompt re-evaluation by Dr. Roth.

### Graft Incorporation Governs the Strengthening Timeline

Biologic incorporation of the graft to bone takes approximately 12–16 weeks.<sup>1,2</sup> Isometric and light isotonic loading (Phase 2) build foundational strength without stressing the construct, but progressive resistance, overhead loading, and heavy lifting are staged into Phases 3 and 4 accordingly. Clavicle or coracoid fracture through the bone tunnels is a recognized complication of aggressive early loading, so load is advanced deliberately and heavy lifting (> 25 lb) is deferred until at least 12 weeks.<sup>5,6,7</sup>

### Counsel Realistically About Radiographic Loss of Reduction

Some radiographic loss of reduction is not uncommon after CC reconstruction and does not necessarily correlate with a poor functional result; return to preinjury activity level is often the more clinically meaningful measure.<sup>9</sup> Patients should be counseled to this effect so that a change on a follow-up radiograph is interpreted in the context of function rather than as an automatic failure. Persistent pain, weakness, or a sense of instability, however, warrants re-evaluation.

#### REALISTIC EXPECTATIONS — STRONG OUTCOMES WITH ADHERENCE

Published series consistently report excellent functional outcomes after anatomic CC reconstruction — mean ASES scores of roughly 92–96, Constant–Murley scores of roughly 94–

96, and high patient satisfaction — with return to preinjury activity in approximately 89–95% of patients at mid-term follow-up.<sup>8,9,10,11,12</sup> A 10-year military cohort maintained 89.5% return to sport. These outcomes depend on respecting the early precautions: the reconstruction is durable once incorporated, but the incorporation window is when it is most vulnerable.

## Return-to-Activity Criteria

Return to activity after CC ligament reconstruction is criterion-based, matched to the demands of the target activity. Most patients return to unrestricted activity, including sport, at approximately 6 months; overhead and throwing athletes may require up to 9 months. All criteria for a given tier should be met, with final clearance for contact and overhead sport by Dr. Roth.<sup>8,9,13</sup>

| Activity Tier                                                  | Criteria & Timing                                                                                                                                                                                                                                              |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Activities of daily living (ADLs)</b>                       | Full pain-free AROM, sling discontinued, no cross-body adduction restriction remaining. Light lifting (up to ~5 lb) permitted from ~Week 6–8, progressing thereafter. Typically comfortable with ADLs by Weeks 12–16.                                          |
| <b>Light recreational (walking, cycling, low-load fitness)</b> | Pain-free AROM, strength approaching the contralateral side, no AC-joint pain with activity. Typically ~3–4 months.                                                                                                                                            |
| <b>Weight training, manual labor, non-overhead sport</b>       | Strength ≥ 80–90% of the contralateral side, pain-free resisted testing, heavy lifting (> 25 lb) progressed. Typically ~4–6 months.                                                                                                                            |
| <b>Overhead / throwing sport</b>                               | Full symmetric ROM, strength ≥ 90% (isokinetic if available), negative apprehension and AC provocative tests, interval throwing program (from ~month 4–5) complete. Typically ~6–9 months. Clearance by Dr. Roth required.                                     |
| <b>Contact / collision sport</b>                               | Full symmetric ROM, strength ≥ 90%, negative provocative testing, radiographic maintenance of reduction, completed sport-specific and controlled-contact progression. Typically ~5–6 months (later for high-demand collision). Clearance by Dr. Roth required. |
| <b>Strength &amp; ROM benchmarks</b>                           | Strength ≥ 90% limb symmetry; full pain-free symmetric ROM including cross-body adduction; no apprehension or pain with AC-joint provocative testing; radiographic reduction maintained per surgeon assessment.                                                |

### INDIVIDUALIZE TO THE SURGICAL TECHNIQUE

Published CC-reconstruction rehabilitation is variable across institutions, and the timeline should be tailored to the specific technique (open vs. arthroscopically-assisted), graft type, fixation method, and any concomitant procedure. Close communication between the surgeon and physical therapist — particularly regarding ROM restrictions and strengthening timelines — is essential. When Dr. Roth’s written instruction differs from the ranges above, follow his instruction.<sup>1,2</sup>

## References

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## Glossary

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

**AC joint** — Acromioclavicular joint; the joint between the acromion of the scapula and the distal clavicle.

**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 (0–100, higher is better).

**CC ligaments** — Coracoclavicular ligaments (conoid and trapezoid); the primary vertical restraint suspending the clavicle from the coracoid, reconstructed in this procedure.

**Constant–Murley score** — A validated shoulder outcome measure combining pain, function, ROM, and strength.

**Cross-body adduction** — Horizontal adduction — bringing the arm across the front of the body; the motion that most directly loads the AC joint and CC graft, protected through Week 12.

**ER / IR** — External rotation / internal rotation.

**LSI** — Limb Symmetry Index; the operative limb's strength as a percentage of the contralateral limb (operative ÷ contralateral × 100).

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

**ROM** — Range of motion.

**Rockwood classification** — The grading system for AC joint separations (types I–VI); high-grade injuries (III–V) are those typically reconstructed.



### Kevin M. Roth, MD

Board-Certified Orthopaedic Surgeon · Subspecialty Certification in Sports Medicine

Dr. Roth completed his orthopaedic surgery residency at Harvard Medical School and his sports medicine fellowship at the Kerlan-Jobe Orthopaedic Clinic in Los Angeles. In practice since 2013, he specializes in advanced arthroscopic techniques and sports medicine procedures, and sees patients at Palo Alto Medical Foundation's Palo Alto and Dublin offices. He welcomes calls from physical therapists about his patients or this protocol.

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