

AC Joint Stabilisation

Acromioclavicular Joint Stabilisation / Reconstruction – Operative Rationale & Post- operative Rehabilitation (Evidence)

Topic scope: Post-operative rehabilitation after **acromioclavicular (AC) joint stabilisation / reconstruction** for a high-grade AC joint dislocation (Rockwood type III–V) – restoring the alignment between the clavicle and scapula with a **coracoclavicular (CC) suspensory device** (suture-button / endobutton construct), with or without a **biological tendon graft** (semitendinosus / pectoralis minor) and with or without a direct AC ligament reconstruction. This page also summarises the operative/non-operative evidence that frames the rehabilitation choices. It is the clinician-facing companion to the patient protocol.

Defining principle of the surgical rehab here – PROTECT the construct. Unlike a capsular release (where the enemy is re-stiffening and rehab is immediate aggressive ROM), AC joint stabilisation is a protect-the-repair pathway, closer in spirit to a rotator-cuff or instability repair. The reconstruction has to resist the constant downward pull of gravity on the weight of the arm – the exact deforming force that displaced the joint in the first place. A suspensory suture-button or tendon graft has no early intrinsic strength; biological healing of the CC/AC ligaments and tunnel incorporation takes weeks to months, and the dominant early complication is loss of reduction before that healing matures. So the rehab is deliberately conservative: the sling carries the weight of the arm (typically ~6 weeks), active elevation and any downward traction on the arm are avoided early, ROM is restricted (no elevation > 90°, no cross-body, no reaching behind the back) for the first 6 weeks, strengthening waits until the construct has matured (~12 weeks), and return to contact/collision sport is deferred to ~4–6 months. Motion progression and protection are the two levers; the single most important point distinguishing this protocol from the capsular-release inversion is that here, time and protection are the friends, not the enemy.

A. THE OPERATION & WHY REHAB IS PROTECTIVE

A high-grade AC dislocation tears the AC and coracoclavicular (conoid + trapezoid) ligaments, allowing the clavicle to rise relative to the acromion under the weight of the arm. Surgical stabilisation aims to **restore the CC distance** and let the ligaments heal in a reduced position. Contemporary constructs are predominantly:

- **CC suspensory fixation** – a suture-button / endobutton loop passed through clavicular and coracoid tunnels (e.g. flip-button, single- or double-tunnel). Restores vertical stability.
- + **Biological augmentation** – a free tendon graft (semitendinosus allograft/autograft, or the pectoralis minor / coracoacromial ligament in Weaver–Dunn-type procedures) to reconstruct the CC ± AC ligaments. The **anatomy of the pectoralis minor tendon** has been characterised specifically for this use [pec minor anatomy, *JSES* 2007].
- + **Direct AC reconstruction** – adding an AC-level construct to the CC reconstruction improves **horizontal** stability; combined CC + AC reconstruction gives **better radiographic reduction and lower reoperation rates** than isolated CC reconstruction in pooled data.

The **structural properties of the reconstructed CC complex** have been measured biomechanically: reconstructions restore much, but not all, of the intact ligament's stiffness and load to failure [Structural Properties, *Am J Sports Med* 2000]. This is the mechanical basis for protecting the construct early – **the graft/button is weaker than the native ligament until it heals and incorporates**.

B. EVIDENCE BY THEME

1. OPERATIVE VS NON-OPERATIVE – ONLY HIGH GRADES BENEFIT FROM SURGERY

- **Type I–II** AC injuries are managed non-operatively. **Type III** is genuinely controversial and most are treated non-operatively first; **type IV–V** are the usual operative indications [ACJ Injuries: Evidence-based Treatment, *JAAOS* 2018]. A **network meta-analysis of RCTs** for acute Rockwood III–V found **no single surgical technique clearly superior**, and that surgery's advantage over non-operative care is modest and grade-dependent [network MA, *JSES* 2023].
- **Hook-plate fixation** of acute dislocations **improved radiographic but NOT clinical outcomes** versus non-operative treatment [Hook-plate RCT, *JBJS* 2017] – a caution that radiographic reduction does not automatically translate into a better patient outcome, and a reason the hook plate (which requires removal) is not the preferred construct here.
- The **Rockwood classification** itself has only **moderate reliability** between observers [Rockwood reliability, *JSES* 2021], which is part of why type III decision-making is debated.

2. LOSS OF REDUCTION IS THE DOMINANT COMPLICATION – AND IT SHAPES THE REHAB

- **Loss of reduction** (the clavicle drifting back up) is the most frequent radiographic failure after suspensory-device stabilisation. **Clavicular tunnel widening** correlates with post-operative loss of reduction in an

implant-dependent way [tunnel widening, *Arthroscopy* 2023] – i.e. the construct and tunnel position matter.

- **Radiographic failure and reoperation** rates after ACJ reconstruction are non-trivial [radiographic failure / reoperation, *Bone Joint J* 2016]; one suspensory-device series reported ~**10–11% revision** for loss of reduction / implant failure (suture fatigue, button escape, coracoid stress fracture, deep infection) [web: suspensory-device cohort].
- Adding the **AC-level reconstruction and a biological graft** improves radiographic reduction and lowers reoperation versus isolated CC suture-button [web: combined CC+AC reviews].
- **Complications after operative treatment of high-grade injuries** are well catalogued [complications, *JSES* 2023] – they include loss of reduction, coracoid/clavicle fracture, hardware problems and infection.

Rehab implication: because the early failure mode is mechanical loss of reduction under arm-weight loading, the early phase forbids active elevation, lifting, downward traction on the arm and weight-bearing through the arm – the patient protects the construct while the ligaments and tunnels heal.

3. OUTCOMES AND RETURN TO SPORT ARE GENERALLY GOOD – BUT TIMELINE IS CONSERVATIVE

- **Anatomic CC reconstruction with semitendinosus graft** for chronic dislocation gives **good clinical and radiological results** [semitendinosus reconstruction, *KSSTA* 2020].
- **Sports activity after anatomic flip-button stabilisation** is generally restored, with most athletes returning to their pre-injury sport, though return is gradual [flip-button sport, *KSSTA* 2016].
- **Delayed (chronic) reconstruction** with a modern suspensory device does **not** increase fixation failure or major complications versus acute fixation [web: delayed reconstruction].

4. THE REHAB PROTOCOL ITSELF IS CONSENSUS/EXPERT, NOT RCT-DERIVED – AND IT IS HIGHLY VARIABLE

A **systematic review of publicly available ACJ-reconstruction rehabilitation protocols** found they are **widely variable**: sling duration ranged **3–8 weeks** (the modal recommendation was **6 weeks**, in 8/18 protocols), active ROM commonly began **at ~6 weeks** (6/20 protocols), and heavy/strenuous shoulder use was typically prohibited for **a further ~6 weeks beyond the initial 6-week protection period** [Cheema et al., *Arthrosc Sports Med Rehabil* 2021]. There is **no high-level RCT defining the optimal post-op regimen** – phase timings are expert/consensus.

The patient protocol's phase boundaries (0–6 / 6–12 / 12–18 weeks, sling 6 weeks, return to contact sport ~4–6 months) sit squarely within this published range and **match the Massachusetts General Brigham / MGH Sports Medicine ACJ-reconstruction guideline** (Phase I 0–6 wk, Phase II 7–12 wk, Phase III 13–18 wk) and similar surgeon protocols (e.g. Dickens: 6-week sling, return to all activity months 4–6).

C. PHASED POST-OP TIMELINE (consistent with the patient protocol)

Phase	Window	Sling	ROM	Strengthening	Notes
I – Protecting the repair	Weeks 0–6	Yes, ~6 wk whenever up; worn for sleep weeks 0–3 (arm-weight loads the repair even lying down)	Pendulum + passive/assisted elevation to 90° max in scapular plane; assisted ER to ~30°; NO active elevation , no cross-body, no behind-the-back	Hand/wrist/elbow AROM; scapular setting; sub-maximal pain-free isometric IR/ER only	No driving while in the sling (~6 wk). No lifting > ~0.5 kg, no carrying, no leaning/pushing up on the arm, no letting the arm hang unsupported – each loads the construct
II – Restoring movement	Weeks 6–12	Wean off	Progress assisted → active ROM ; build toward full by ~12 wk (~15°/week as a guide); behind-the-back introduced gradually (to beltline)	Light elastic-band cuff + scapular work begins (rows, IR/ER, serratus punch); side-lying ER, prone row/T/Y	Lift to ~1 kg; avoid forceful push/pull, push-ups, overhead and cross-body lifting
III – Strengthening	Weeks 12–18	Off	Full ROM goal; end-range stretches (cross-body, behind-back, sleeper) now used to win final range	Progressive resistance ~0.5–2.5 kg ; wall push-ups from ~wk 12; machine weights from ~wk 16 (limited range, light load)	Construct matured; still avoid heavy overhead and forceful push/pull
IV – Return to sport / heavy work	Week 18 onward	Off	Maintain full ROM	Plyometrics, sport-specific & interval programs; occupation-specific kinetic-chain loading	Return to contact/collision sport ~4–6 months (collision athletes / some occupations longer, up to ~9 mo); criteria-based clearance; some wear a brace first season back

(Phase boundaries from the MGH/Mass General Brigham ACJ-reconstruction guideline; return-to-sport windows from the flip-button sport series and surgeon protocols; all within the variability documented by Cheema et al. 2021.)

D. KEY CONTROVERSIES / EVIDENCE QUALITY

1. **Type III – operate or not?** The most-debated grade; most are trialled non-operatively first. No clear winner in RCT-level data, compounded by only-moderate reliability of the Rockwood grade itself. *Moderate / conflicting.*
2. **Which construct?** Network MA shows **no single technique clearly superior** for acute III–V. Combined CC + AC reconstruction (\pm graft) gives better radiographic reduction and lower reoperation than isolated CC suture-button, but at the cost of complexity. Hook plates improve radiographs but not clinical scores and need removal. *Moderate.*
3. **Loss of reduction vs clinical outcome.** Radiographic loss of reduction is common yet often **clinically well-tolerated** – radiographic and patient-reported outcomes diverge. This tempers how aggressively reduction should be chased. *Moderate.*
4. **The rehab protocol is consensus, not trial-derived**, and published protocols vary widely (sling 3–8 wk; Cheema 2021). The patient page’s timings are typical, not RCT-validated. *Weak / consensus.*

E. EVIDENCE-STRENGTH FLAGS (summary)

- **STRONG (RCT / SR-MA):** hook-plate improves radiographic but **not** clinical outcomes vs non-operative (RCT, *JBS* 2017); network meta-analysis of RCTs for acute III–V shows no clearly superior technique (*JSES* 2023).
- **MODERATE (cohorts / biomechanical / SR):** anatomic semitendinosus CC reconstruction outcomes (*KSSA* 2020); sports return after flip-button stabilisation (*KSSA* 2016); loss-of-reduction / tunnel-widening drivers (*Arthroscopy* 2023; *Bone Joint J* 2016); complications of high-grade operative treatment (*JSES* 2023); reconstructed-CC biomechanics (*AJSM* 2000); combined CC+AC > isolated CC for reduction/reoperation; delayed reconstruction safety.
- **WEAK / CONSENSUS ONLY:** the **post-operative rehabilitation protocol itself** – no defining RCT; protocols are expert/consensus and **highly variable** (Cheema 2021; sling 3–8 wk). Rockwood classification reliability only moderate (*JSES* 2021).

CITATIONS

RAG CORPUS (180,000+ ORTHOPAEDIC ARTICLES)

- Anatomy of the pectoralis minor tendon and its use in acromioclavicular joint reconstruction. *J Shoulder Elbow Surg.* 2007. DOI: 10.1016/j.jse.2006.09.007
- Clavicular tunnel widening after acromioclavicular stabilization shows implant-dependent correlation with postoperative loss of reduction. *Arthroscopy.* 2023. DOI: 10.1016/j.arthro.2023.05.014
- Acromioclavicular joint injuries: evidence-based treatment. *J Am Acad Orthop Surg.* 2018. DOI: 10.5435/jaaos-d-17-00105
- Review of Weaver and Dunn on treatment of acromioclavicular injuries, especially complete acromioclavicular separation. *J ISAKOS.* 2019. DOI: 10.1136/jisakos-2019-000299
- Structural properties of the intact and the reconstructed coracoclavicular ligament complex. *Am J Sports Med.* 2000. DOI: 10.1177/03635465000280010201
- Complications after operative treatment of high-grade acromioclavicular injuries. *J Shoulder Elbow Surg.* 2023. DOI: 10.1016/j.jse.2023.03.019
- Sports activity after anatomic acromioclavicular joint stabilisation with flip-button technique. *Knee Surg Sports Traumatol Arthrosc.* 2016. DOI: 10.1007/s00167-016-4287-7
- Anatomic reconstruction of the coracoclavicular and acromioclavicular ligaments with semitendinosus tendon graft for the treatment of chronic acromioclavicular joint dislocation provides good clinical and radiological results. *Knee Surg Sports Traumatol Arthrosc.* 2020. DOI: 10.1007/s00167-020-06285-x
- Hook-plate fixation in patients with acute acromioclavicular joint dislocation improved radiographic but not clinical outcomes compared with nonoperative treatment. *J Bone Joint Surg Am.* 2017. DOI: 10.2106/jbjs.16.00582
- Radiographic failure and rates of re-operation after acromioclavicular joint reconstruction. *Bone Joint J.* 2016. DOI: 10.1302/0301-620x.98b4.35935
- Treatment options for acute Rockwood type III–V acromioclavicular dislocations: a network meta-analysis of randomized controlled trials. *J Shoulder Elbow Surg.* 2023. DOI: 10.1016/j.jse.2023.01.039
- A relook at the reliability of Rockwood classification for acromioclavicular joint injuries. *J Shoulder Elbow Surg.* 2021. DOI: 10.1016/j.jse.2021.01.016

LITERATURE (URLS)

- Cheema SG, Hermanns C, Coda RG, et al. Publicly accessible rehabilitation protocols for acromioclavicular joint reconstruction are widely variable. *Arthrosc Sports Med Rehabil.* 2021;3(2):e427–e433. <https://doi.org/10.1016/j.asmr.2020.10.007> (sling 3–8 wk, modal 6 wk; active ROM ~6 wk; further ~6 wk before heavy use)
- Acromioclavicular joint injuries: effective rehabilitation (review). PMC. <https://pmc.ncbi.nlm.nih.gov/articles/PMC8169819/>

CQ HAND + UPPER LIMB

- Delayed acromioclavicular joint reconstruction using a modern tunnelled suspensory device does not increase the risk of fixation failure or major complications. PubMed. <https://pubmed.ncbi.nlm.nih.gov/35781084/>
- Low rate of substantial loss of reduction immediately after hardware removal following ACJ stabilization using a suspensory fixation system. *KSSSTA*. <https://link.springer.com/article/10.1007/s00167-022-06978-5>
- Minimum 10-year outcomes after arthroscopically assisted anatomic coracoclavicular ligament reconstruction for type III and V AC joint injuries. *ScienceDirect*. <https://www.sciencedirect.com/science/article/pii/S2666638325001835>

PUBLISHED REHAB PROTOCOLS (URLS – BASIS FOR THE PHASE STRUCTURE)

- Massachusetts General Brigham Sports Medicine. Rehabilitation guideline for acromioclavicular joint reconstruction (including coracoclavicular ligament reconstruction). <https://www.massgeneral.org/assets/MGH/pdf/orthopaedics/sports-medicine/physical-therapy/rehabilitation-protocol-for-acromioclavicular-joint-reconstruction.pdf> (Phase I 0–6 wk sling, Phase II 7–12 wk, Phase III 13–18 wk)
- Dickens JD. AC joint reconstruction protocol (Duke Sports Medicine). <https://www.jondickensmd.com/pdf/ac-joint-reconstruction-protocol.pdf> (6-week sling worn for sleep; return to all activity months 4–6)
- Chamblor A. ACJ stabilisation rehabilitation guidelines. <https://www.andrewchamblor.com/post/acj-stabilisation-rehabilitation-guidelines>
- North Tees and Hartlepool NHS Foundation Trust. Acromioclavicular joint stabilisation – LockDown/Weaver Dunn procedure. <https://www.nth.nhs.uk/resources/acromioclavicular-joint-stabilisation-lockdown-weaver-dunn-procedure/>
- Stone Clinic. Acromioclavicular (AC) joint reconstruction rehab protocol. <https://www.stoneclinic.com/Acromioclavicular-AC-joint-reconstruction-rehab-protocol>