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Return to Play Criteria Following Operative Management of Acromioclavicular Joint Separation: A Systematic Review

Richard J. Gawel

Thomas Jefferson University, richard.gawel@students.jefferson.edu

Taylor D'Amore, MD

Thomas Jefferson University, taylor.d'amore@jefferson.edu

Peters Otlans, MD


Somnath Rao

Thomas Jefferson University, somnath.rao@jefferson.edu

Steven B. Cohen, MD

Thomas Jefferson University, steven.cohen@jefferson.edu

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Authors

Richard J. Gawel; Taylor D'Amore, MD; Peters Otlans, MD; Somnath Rao; Steven B. Cohen, MD; and Michael G. Ciccotti, MD

Return to Play Criteria Following Operative Management of Acromioclavicular Joint Injuries: A Systematic Review

Richard Gawel BS, Taylor D'Amore MD, Peters Otlans MD, Somnath Rao BS, Steven B. Cohen MD, Michael G. Ciccotti MD*

(*) indicates primary project advisor

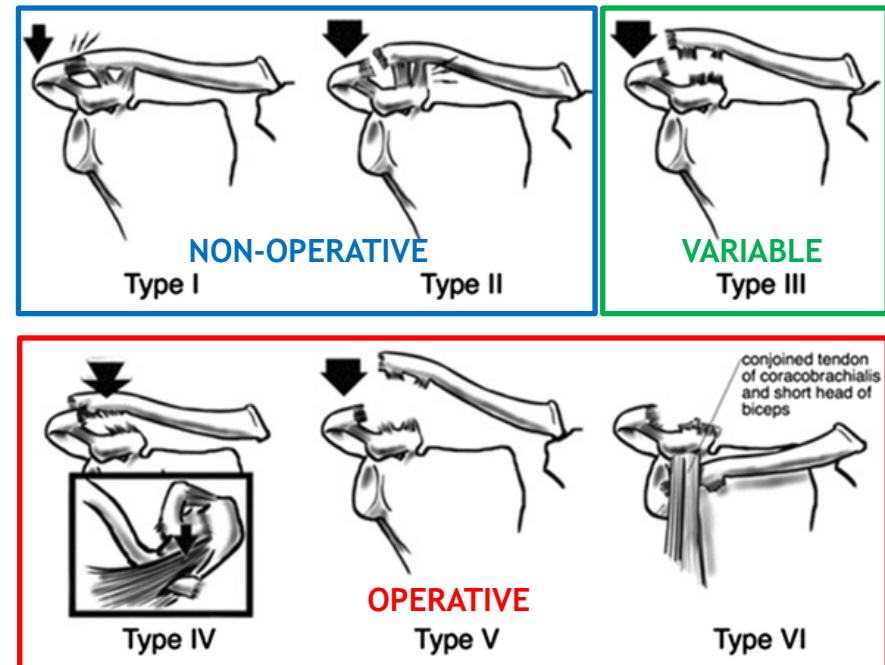
No relevant conflicts of interest to disclose.

Introduction and Objective

Acromioclavicular (AC) Joint Injuries → one of the most common shoulder pathologies among contact-sport athletes.

- Treatment based on type of injury → **Rockwood Classification**

Various techniques for surgical repair and/or non-operative rehabilitation, but **no consensus regarding athlete return to play (RTP) criteria.**



OBJECTIVE: Provide criteria to help guide surgeons as to when athletes can safely return to play following injury

Research Question & Hypothesis

Research Question:

- Based on the current literature, what **criteria can be established to help guide surgeons** and athletes as to **when it is safe to return to play** following operative management of AC joint injuries?

Hypothesis:

- More severe injuries will coincide with more conservative Return-to-Play criteria.
- Progression through therapy and ultimately **return to sport will be centered around time-based criteria.**

Literature Search Criteria

Search Query: PubMed, EMBASE, Cochrane

Date Range: January 1999 - April 2020

- | | |
|----------------------|--------------------|
| 1. Acromioclavicular | 9. Surgery |
| 2. AC joint | 10. Surgical |
| 3. [OR/1-2] | 11. Reconstruction |
| 4. Dislocation | 12. Repair |
| 5. Separation | 13. Stabilization |
| 6. Disruption | 14. Outcome |
| 7. [OR/4-6] | 15. [OR/9-15] |
| 8. [3 AND 7] | 16. [8 AND 16] |

1,253
unique published articles

Inclusion Criteria

1. Written in **English Language**
2. Study **Mean Age >18 years-old**
3. **Primary** Operative Treatment
4. Minimum **12-months follow-up**

Exclusion Criteria

Review Articles & Case Reports

Biomechanical/Cadaveric/Laboratory Studies

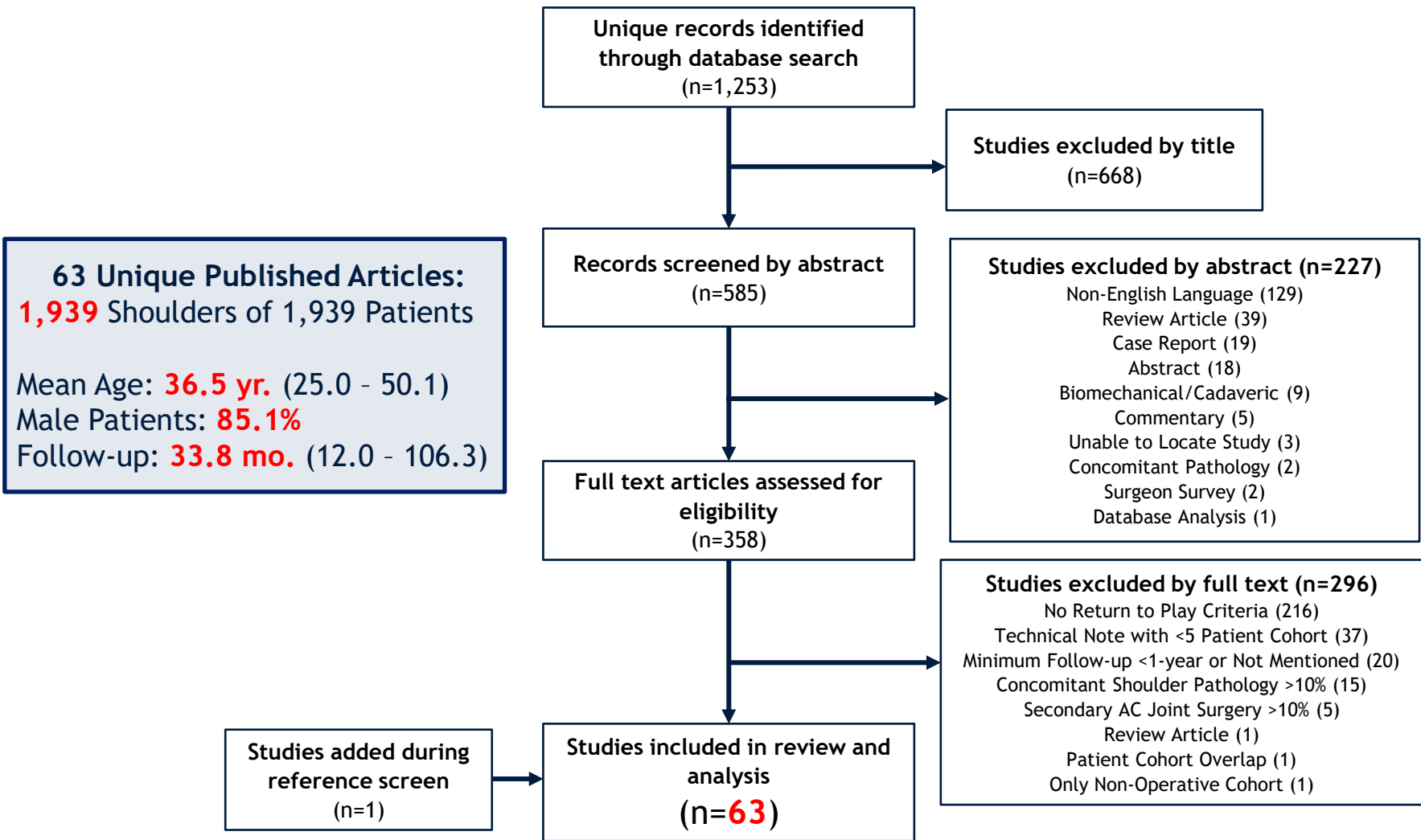
Technical Notes with <5 patient outcomes reported

>10% of patients with ipsilateral concomitant injury

>10% of patients with 2° surgery s/p previous failed surgery

PRISMA Flowchart

Preferred Reporting Items for Systematic Reviews and Meta-Analyses



63 Unique Published Articles:
1,939 Shoulders of 1,939 Patients

Mean Age: **36.5 yr.** (25.0 - 50.1)
 Male Patients: **85.1%**
 Follow-up: **33.8 mo.** (12.0 - 106.3)

Literature Quality

Coleman Methodology Scoring (CMS), Study Level of Evidence

| CMS Rating | Score |
|-------------|--------|
| “Excellent” | 85-100 |
| “Good” | 70-84 |
| “Fair” | 55-69 |
| “Poor” | <55 |

| CMS Quality Metric (maximum score) | Score (\pm SD) |
|--|----------------------------------|
| Study Size (10) | 2.4 \pm 2.6 |
| Average Follow-Up (10) | 5.4 \pm 2.1 |
| No. Different Procedures (10) | 8.9 \pm 2.4 |
| Type of Study (15) | 2.2 \pm 4.7 |
| Diagnostic Certainty (5) | 4.8 \pm 0.9 |
| Description of Surgical Technique (10) | 9.5 \pm 1.5 |
| Description Post-Op Rehab (5) | 5.0 \pm 0.0 |
| Outcome Criteria (10) | 6.9 \pm 1.5 |
| Assessment of Clinical Outcome (15) | 11.9 \pm 2.8 |
| Patient Selection Process (10) | 7.8 \pm 2.8 |
| Total Score (100) | 64.8 \pm 9.5 |

| Study Level of Evidence | | No. Studies |
|-------------------------|------------------------------|-------------|
| Level I | Randomized Controlled Trial | 2 |
| Level II | Prospective Cohort | 3 |
| Level III | Case Control (Retrospective) | 4 |
| Level IV | Case Series, Technical Note | 54 |
| Level V | Commentary, Expert Opinion | 0 |

Overall Literature Quality: Fair

Majority of Published Reports Describing Return to Play Criteria following AC Joint Separation are Retrospective Case Series

Wright *et al.* *J Bone Jt Surgery.* 2003;85:1-3.
Coleman *et al.* *Scand J Med Sci Sports.* 2000;10:2-11.

Return to Play Criteria

8 Return to Play Criteria

1. Time From Surgery
2. Shoulder Range of Motion
3. Strength
4. Clinical Stability of AC Joint
5. Radiographic Stability of AC Joint
6. Functional Assessment
7. Safety Assessment
8. Hardware Removal

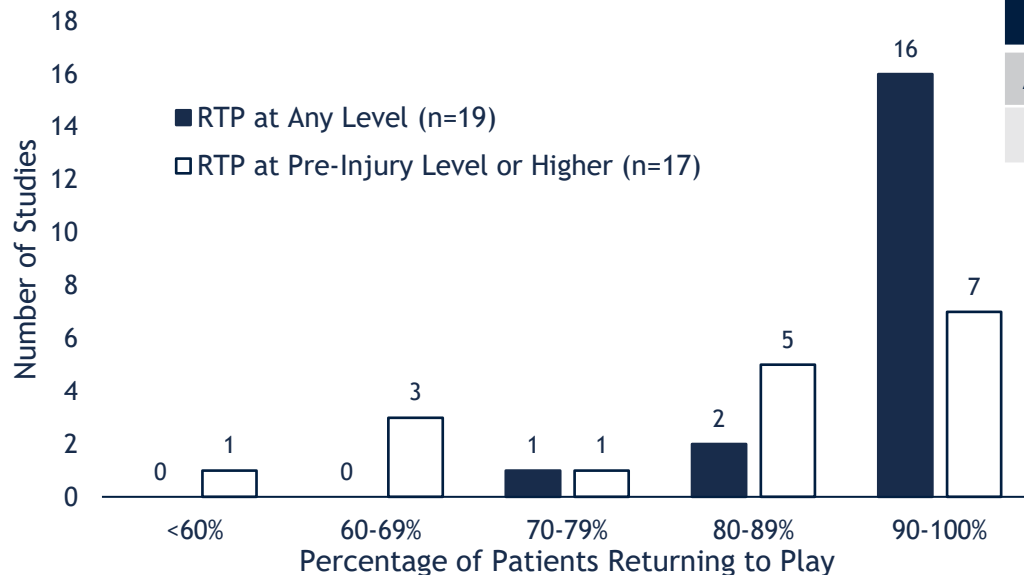
Most studies used **ONLY time-based Return-to-Play criteria** → most common time points are **6 months** and **3 months** after surgery

| Combinations of RTP Criteria (n=63) | Studies, n (%) |
|--|----------------|
| Time | 59 (93.7) |
| Time, Range of Motion, Strength | 1 (1.6) |
| Clinical Stability, Radiographic Stability | 1 (1.6) |
| Strength, Functional Assessment, Safety Assessment | 1 (1.6) |
| Hardware Removal | 1 (1.6) |

| Return to Play Timeline (n=60) | Studies, n (%) |
|--------------------------------|----------------|
| 2 months | 1 (1.7) |
| 3 months | 18 (30.0) |
| 4 months | 5 (8.3) |
| 4-5 months | 2 (3.3) |
| 5 months | 2 (3.3) |
| 4-6 months | 5 (8.3) |
| 5-6 months | 1 (1.7) |
| 6 months | 23 (38.3) |
| 6-8 months | 1 (1.7) |
| 10 months | 1 (1.7) |
| 12 months | 1 (1.7) |

Return to Play Outcomes

23 Studies Reported Number of Athletes (594)
 24 Studies Reported Sports-Related Mechanism of Injury (281)
 16 Studies did NOT mention Number of Athletes



Rate of RTP Reported (19 Studies)

| Return to Play: | % of Subjects |
|----------------------------|--------------------|
| Any Level | 94.2% (72.4 - 100) |
| Pre-Injury Level or Higher | 81.1% (50 - 100) |

Rates of Return to Play among this cohort of studies **consistent with the literature: >90%**

Kay et al. *Arthrosc J Arthrosc Relat Surg*. 2018;34:2910-2924.
 Verstift et al. *Knee Surg Sports Traumatol Arthrosc*. 2019;27:3803-3812.

Limitations

Heterogeneity in Reporting of Outcomes: meta-analysis not performed

Variability in Reporting of RTP Criteria:

- Only included explicitly mentioned RTP criteria in analysis
- Authors may have had criteria, but did not report them in manuscript

Variation in Surgical Technique:

- 52 Studies (82.5%) → 1 Surgical Technique
 - 9 Studies (14.3%) → 2 Surgical Techniques
 - 2 Studies (3.2%) → 3 or more Techniques
- 21 Studies (33.3%) → Arthroscopic Technique
- 11 Modes of Primary Stabilization:
- 9 reconstructed/repared CC ligaments
 - 2 reconstructed/repared AC ligament
- 5 Modes of Auxiliary AC Stabilization
- 15 Combined AC & CC Stabilization

| Technique | Studies | Technique | Studies |
|---|---------|--------------------------------------|---------|
| Primary Stabilization Method | | Number of Techniques Described | |
| Suture Button Construct | 28 | 1 | 52 |
| Suture Only Construct | 8 | 2 | 9 |
| Soft Tissue Graft Reconstruction | 8 | ≥3 | 2 |
| Synthetic Graft | 8 | | |
| Clavicular Hook Plate | 7 | Open Surgical Approach | 44 |
| Suture Anchor | 4 | Arthroscopic Assistance | 21 |
| Weaver-Dunn Procedure | 2 | | |
| Combined Soft Tissue Graft and Suture Button | 3 | Use of Distal Clavicle Excision | |
| Coracoclavicular Screw | 3 | No | 58 |
| Combined Weaver-Dunn and Soft Tissue Graft Augmentation | 2 | Yes/Sometimes | 7 |
| Acromioclavicular Pinning | 1 | Weaver-Dunn | 3 |
| Auxiliary Acromioclavicular Stabilization | | Free Soft Tissue Graft Utilization | |
| None | 37 | None | 55 |
| Reconstruction with Soft Tissue Graft | 8 | Autograft | 6 |
| Suture Repair | 8 | Allograft | 3 |
| Pinning | 7 | Both or Unclear Source | 2 |
| Suture Reconstruction | 6 | | |
| Reconstruction with Artificial Graft | 1 | No Coracoclavicular Ligaments Repair | 58 |
| | | Coracoclavicular Ligaments Repaired | 9 |

*Due to the number of studies describing multiple techniques, values exceed the number of included studies.

Conclusions/Future Directions

Return to Play criteria following AC joint separation **remains insufficiently defined**

Majority of published studies report exclusively **time-based criteria (principally, 3 months & 6 months)**; no studies offered detailed functional return to play guidelines

First systematic review evaluating return to play criteria following AC joint separation

Results help provide foundation for developing a **comprehensive return to play checklist**

Thank you!



Jefferson

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