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Coraco-Clavicular Ligament Reconstruction for Displaced Distal Clavicle Fractures Has A Lower Complication Rate Than Hook Plate But Excellent Union Rate and Comparative Functional Outcome: A Systematic Review and Meta-Analysis

M Remtulla, S Malik, M Tahir, P D'Alessandro,
RW Jordan, SS Malik

NHS
University Hospitals Birmingham
NHS Foundation Trust

ORTHOPAEDIC RESEARCH FOUNDATION
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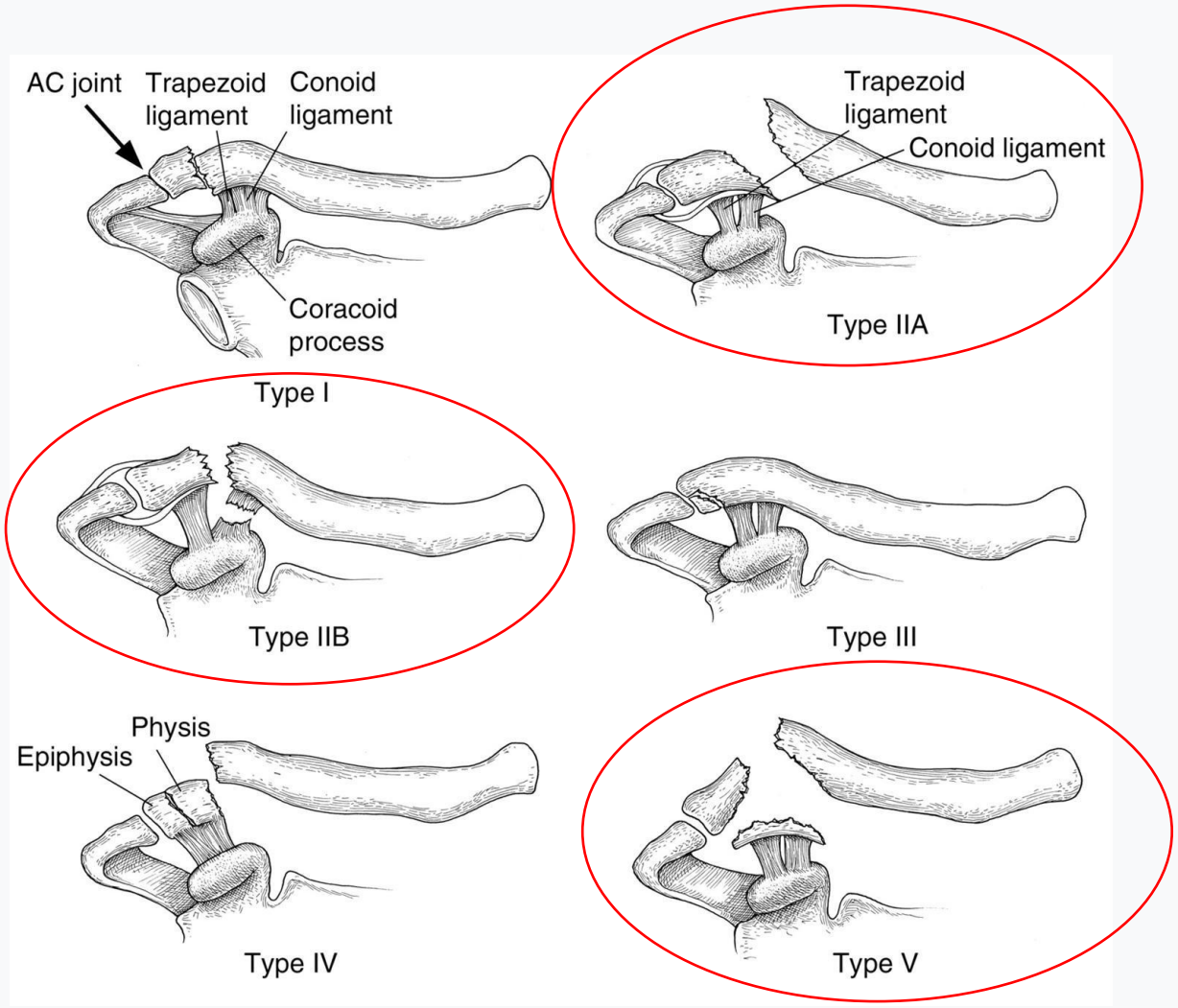
Disclosures

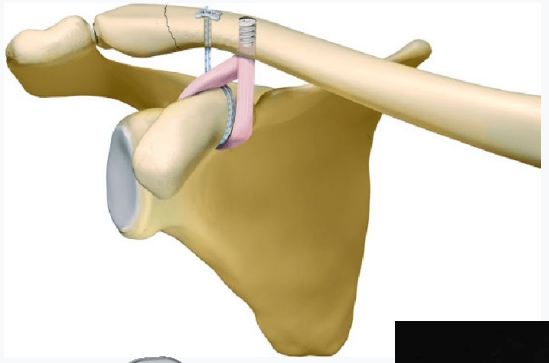
- None

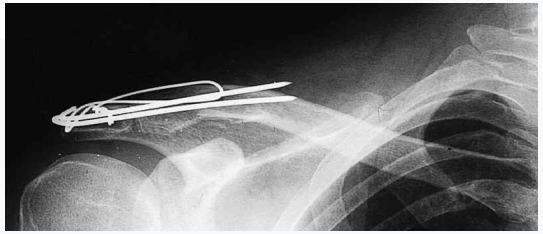
Not all distal clavicle fractures are the same..



- 67% of BESS survey responders would treat type II surgically[2]
- Type 2 fractures are most commonly displaced
- High risk of non-union in IIA and IIB fractures 28-44%[1]

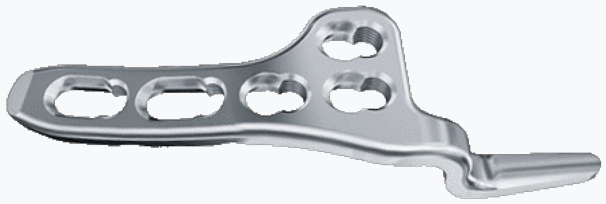
Treatment options

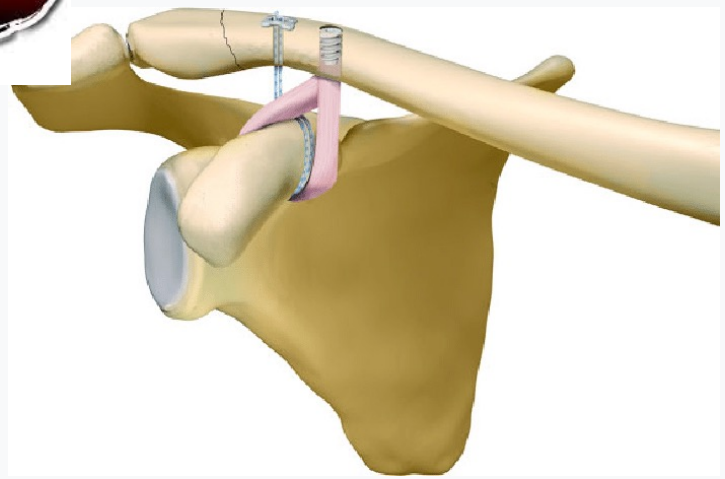




- Many described methods:
  - K-wiring
  - Tension band
  - Superior locking plates +/- buttons
  - Hook plate
  - CCLR (open/arthroscopic)
- **No consensus on treatment options**

Aims

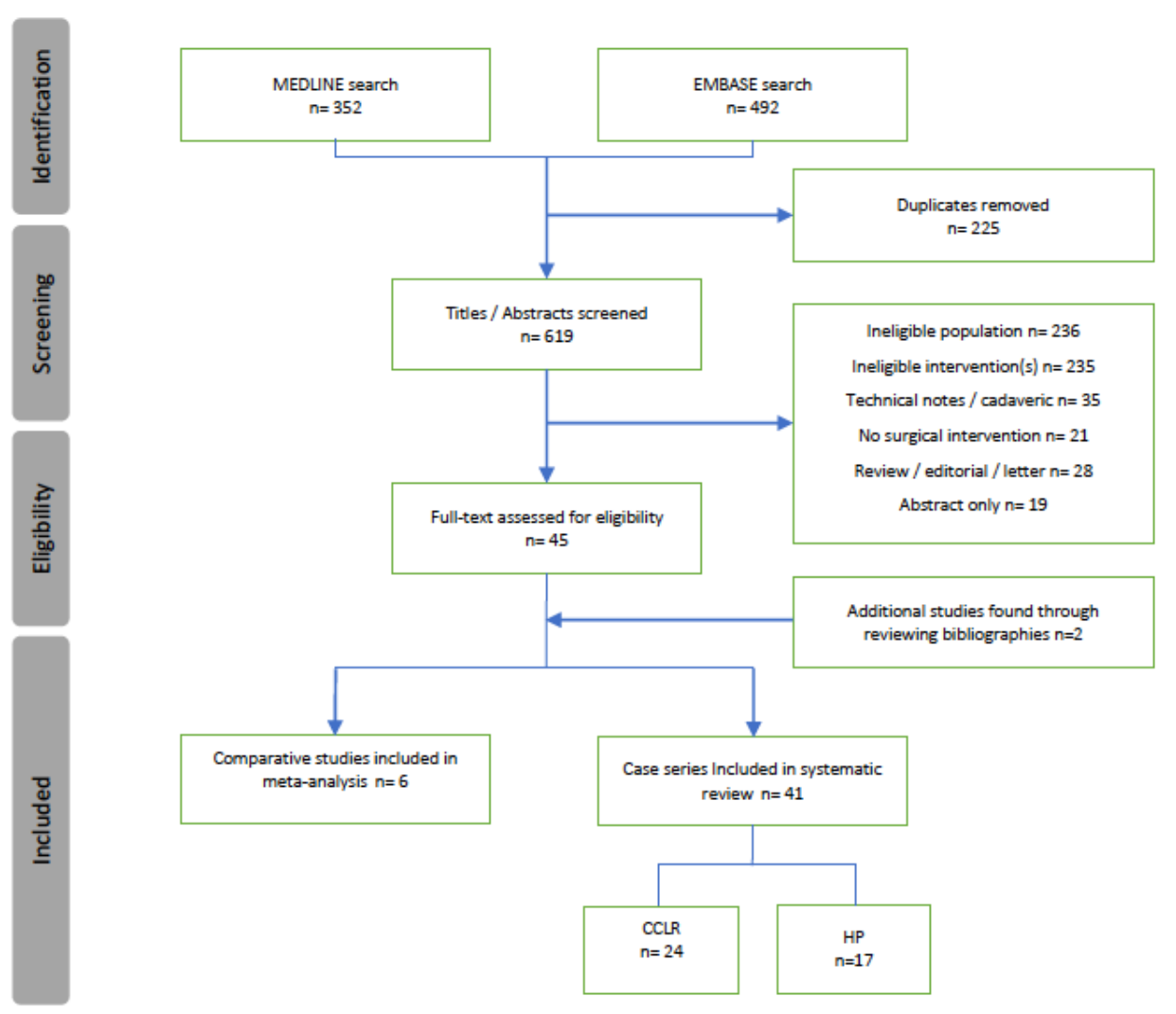




- **P** : All displaced distal clavicle fractures
- **I**: CCLR (CC ligament reconstruction)
- **C**: Hook plate
- **O**:
  1. Union
  2. Patient reported outcomes
  3. Complications

- Exclusions: Rigid fixations

Methodology

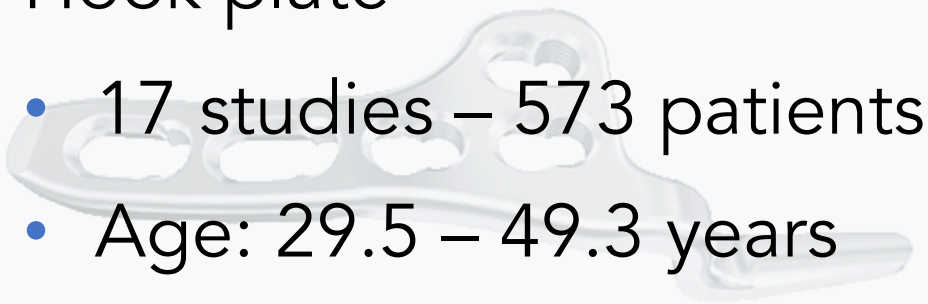


- Eligibility criteria:
  - English
  - HP and/or non-rigid CCLR for distal clavicle #s
  - reported union rates, functional outcome and complications
- Appraisal:
  - CONSORT checklist: RCTs
  - MINORS tool: All others

Results – Demographics

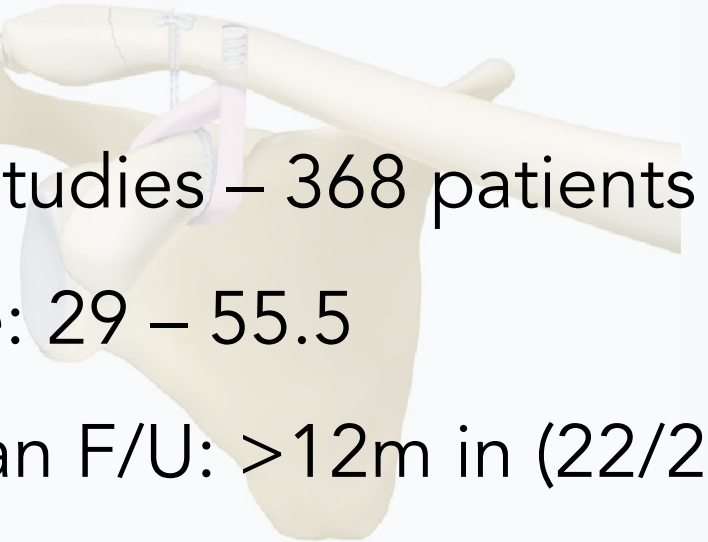
Hook plate

- 17 studies – 573 patients
- Age: 29.5 – 49.3 years
- Mean follow-up >12m (16/17)



CCLR

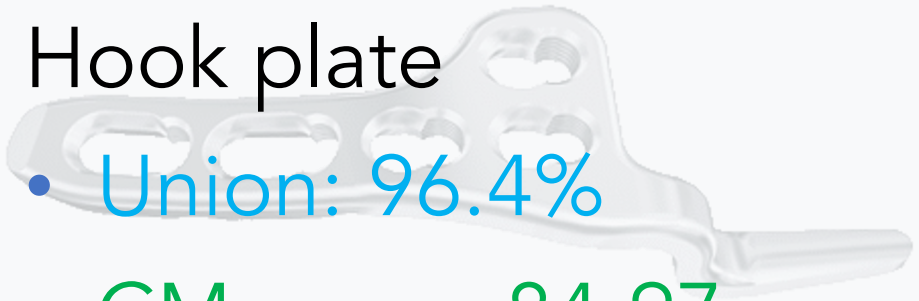
- 24 studies – 368 patients
- Age: 29 – 55.5
- Mean F/U: >12m in (22/24)



Results – Union & Functional outcome

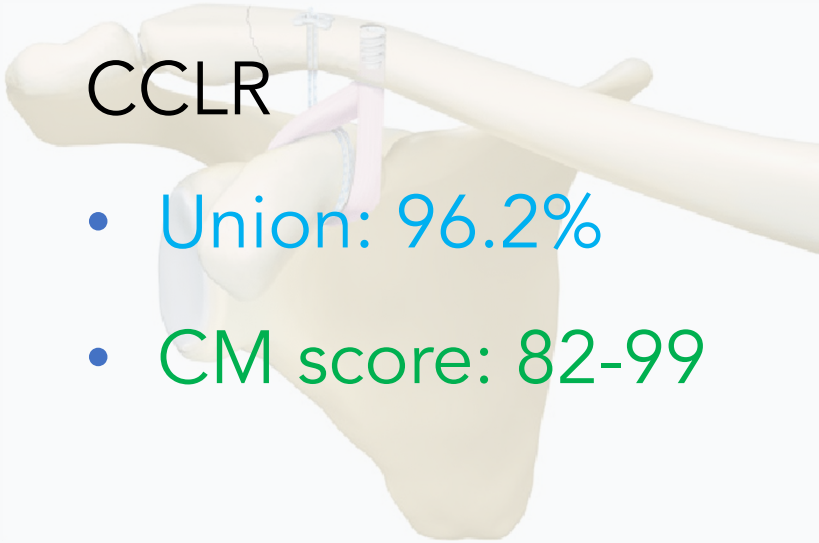
Hook plate

- Union: 96.4%
- CM score: 84-97



CCLR

- Union: 96.2%
- CM score: 82-99



Results – Complications

- HP: n=573 **(24.3%)**
  - Acromial osteolysis (66)
  - peri-prosthetic# (16)
  - Shoulder stiffness (9)
  - Impingement (9)
  - Rotator cuff tear (2)
- *ROM: Mean- 5.7 (2-33 months)*

- CCLR: n=368 **(12.2%)**
  - Infection (11)
  - Osteolysis (11)
  - Hardware related issues (7)
  - coracoid # (4)
  - Stiffness (6)

Meta-analysis results

	Hook plate	CCLR	
Patients included (n)	158	154	
Union rates	95.7%	96.2%	OR: 1.57 (p=0.477)
Constant Murley	87.9 – 97.2	93-97.6	Mean difference: 3.68 (p=0.125, MCID=8)
Complications	21.9%	9.0%	OR:3.89 (p=0.002)

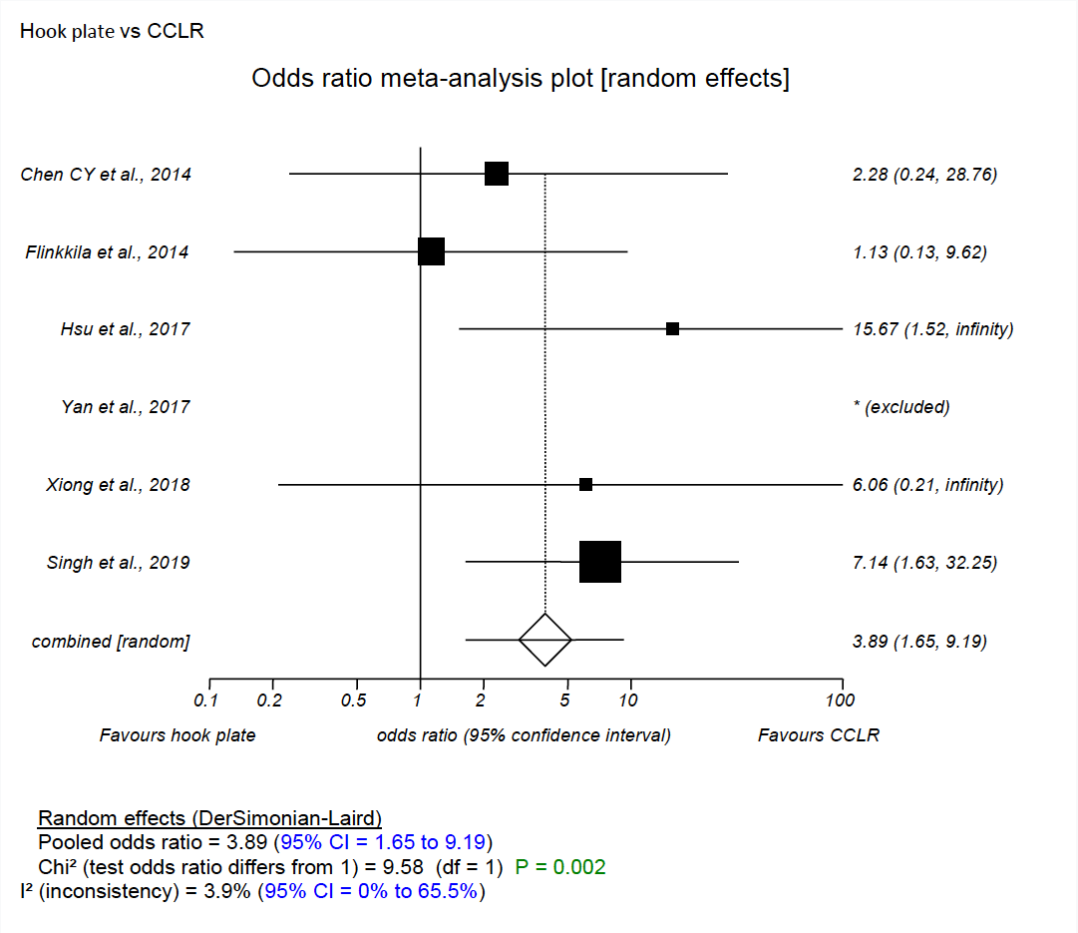


Figure 1: Forest plot demonstrating HP vs CCLR complications

Limitations

- Review of level III + IV evidence
- Common themes:
  - Lack of control group
  - Sub-classification of Type II fracture not always present- therefore grouped together
  - Heterogeneity in surgical techniques for HP + CCLR
  - Heterogenous rehabilitation protocol

Conclusions

- Comprehensive review of 47 studies – 1253 patients
- No current gold standard treatment for type II fractures

- **Take home message:**
  1. Union: HP = CCLR
  2. PROMs: HP = CCLR
  3. Complications: HP < CCLR (OR: 3.89, P=0.002)

References

1. Banerjee R, Waterman B, Padalecki J, Robertson W. Management of distal clavicle fractures. J Am Acad Orthop Surg. 2011 Jul;19(7):392-401. doi: 10.5435/00124635-201107000-00002. PMID: 21724918.
2. Sharma V, Modi A, Armstrong A, Pandey R, Sharma D, Singh H. The Management of Distal Clavicle Fractures - A Survey of UK Shoulder and Elbow Surgeons. Cureus. 2021;13(8):e17305. Published 2021 Aug 19. doi:10.7759/cureus.17305