Anatomic Ligament Reconstruction on the Treatment of Chronic Acromio-Clavicular Dislocation

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AC joint dislocation

- 3-12% of all shoulder injuries (direct/indirect trauma)
- Up to 40-50% of contact sports injuries
- Highest prevalence:
  - 2°-4° decades of life
  - Male sex
- Low grade: 90%

Pallis 2012, Chillemi 2013, Cook 2013, Nordin 2020, Skjaker 2020

Rockwood AC dislocation Classification

Low degree

Structure	I	II	III
Acromioclavicular ligament	Sprained	Complete tear	Complete tear*
Acromioclavicular Joint	Intact	Disrupted; widened in the transverse plane	Dislocated; clavicle displaced superiorly relative to the acromion
Coracoclavicular ligaments	Intact	Sprained; slight widening of interval	Disrupted; interval widened up to 100%*
Deltoid and trapezius muscles	Intact	Possible partial detachment	High probability of detachment from distal clavicle

High degree

Structure	IV	V	VI
Acromioclavicular ligaments	Complete disruption	Complete disruption	Complete disruption
Acromioclavicular joint	Dislocated; clavicle displaced posteriorly into or through the trapezius muscle	Dislocated; extreme vertical incongruity between lateral clavicle and acromion.	Dislocated; clavicle displaced inferior relative to the acromion*
Coracoclavicular ligaments	Partial or complete disruption with change in interval orientation	Complete disruption; interval widened 100% to 300%	Intact; interval is decreased or reversed*
Deltoid and trapezius muscles	High probability of detachment from distal clavicle	High probability of detachment from distal clavicle	Intact, partial, or complete detachment

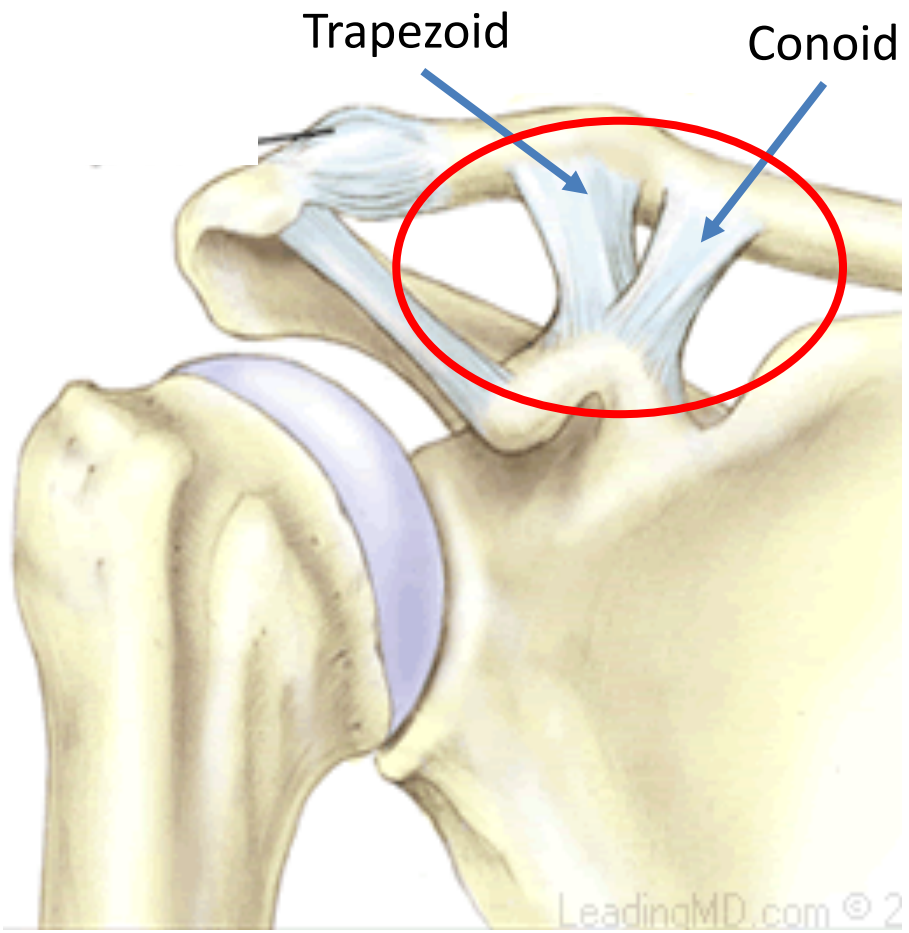
Anatomy

STATIC STABILIZER

Coraco-clavicular ligaments:

- Trapezoid
- Conoid

VERTICAL stability



DYNAMIC STABILIZER

- Anterior deltoid
- Trapezius

Dyrna 2018, Frank 2019

Anatomy

STATIC STABILIZER

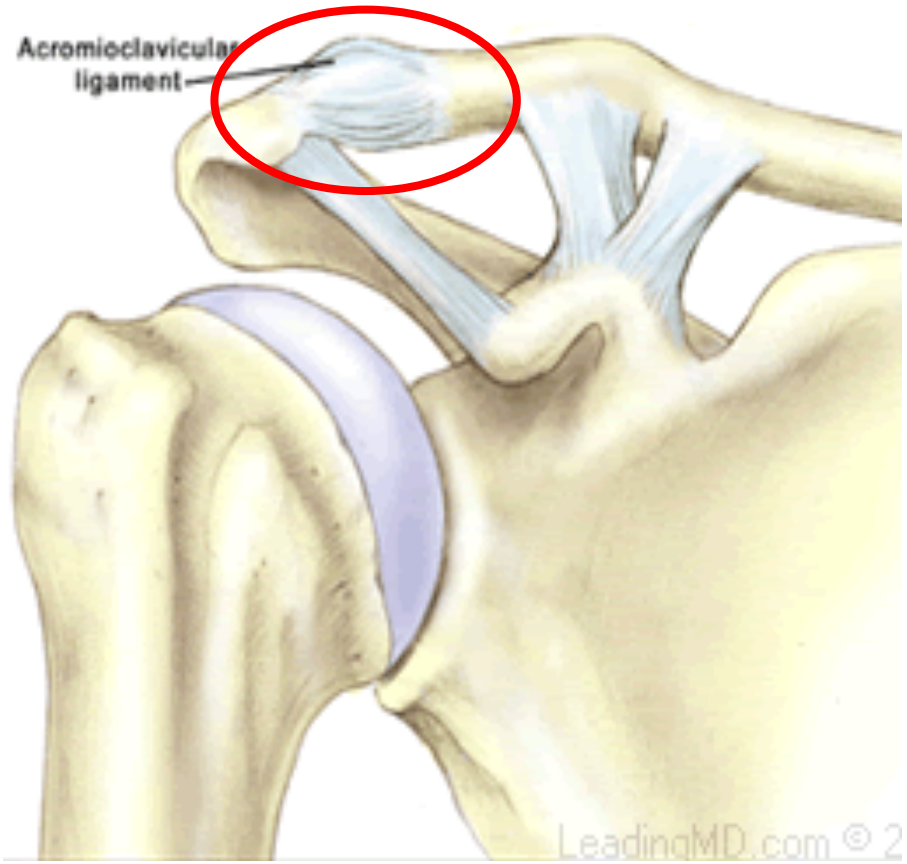
Acromio-clavicular ligaments and capsule:

- Superior
- Inferior
- Anterior
- Posterior

HORIZONTAL stability

«Gliding motion»

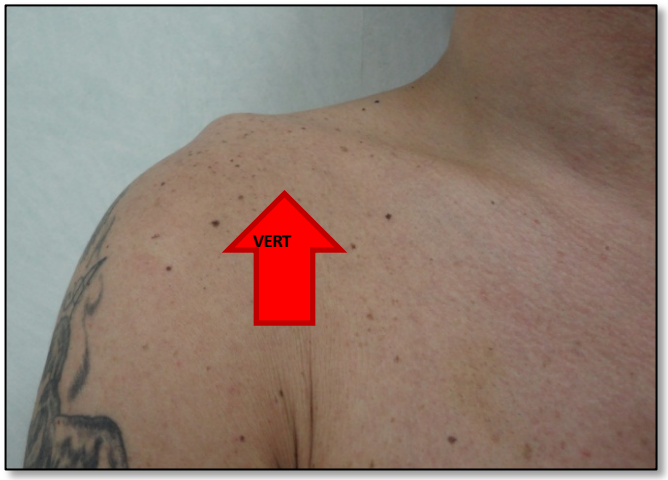
Clavicle rotates 8° through the AC during shoulder elevation



Dyrna 2018, Frank 2019

Physical Exam

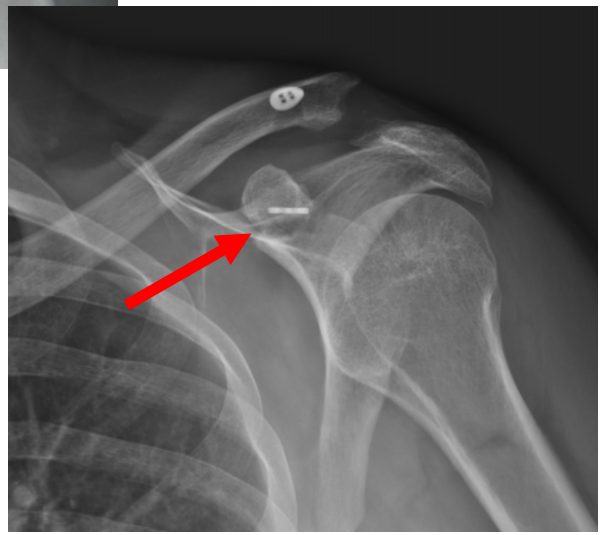
- AC joint tenderness, abnormal contour («bump»)
- Cross-body adduction test
- Active compression test (O'Brien test)
- Testing horizontal stability/reduction



Chronopoulos 2004, Willimon 2011, Beitzel 2014, Frank 2019

Imaging

- Bilateral AP view
- Zanca view: 10-15° cephaled
- Axillary view



Some fractures mimic AC dislocation:

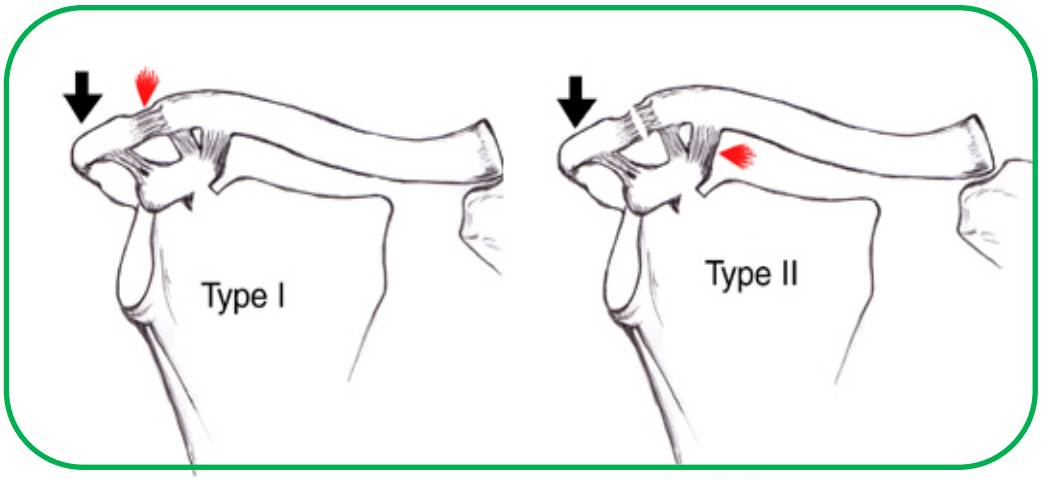
- *Fracture of coracoid (normal CC distance)*
- *Distal clavicle fracture*

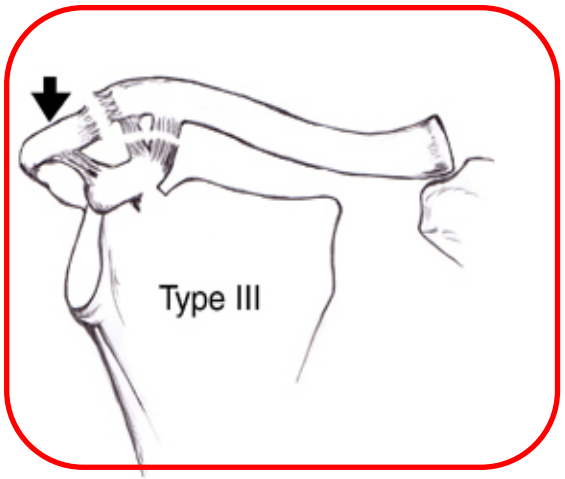
Saccomanno 2014, Frank 2019, Minkus 2020

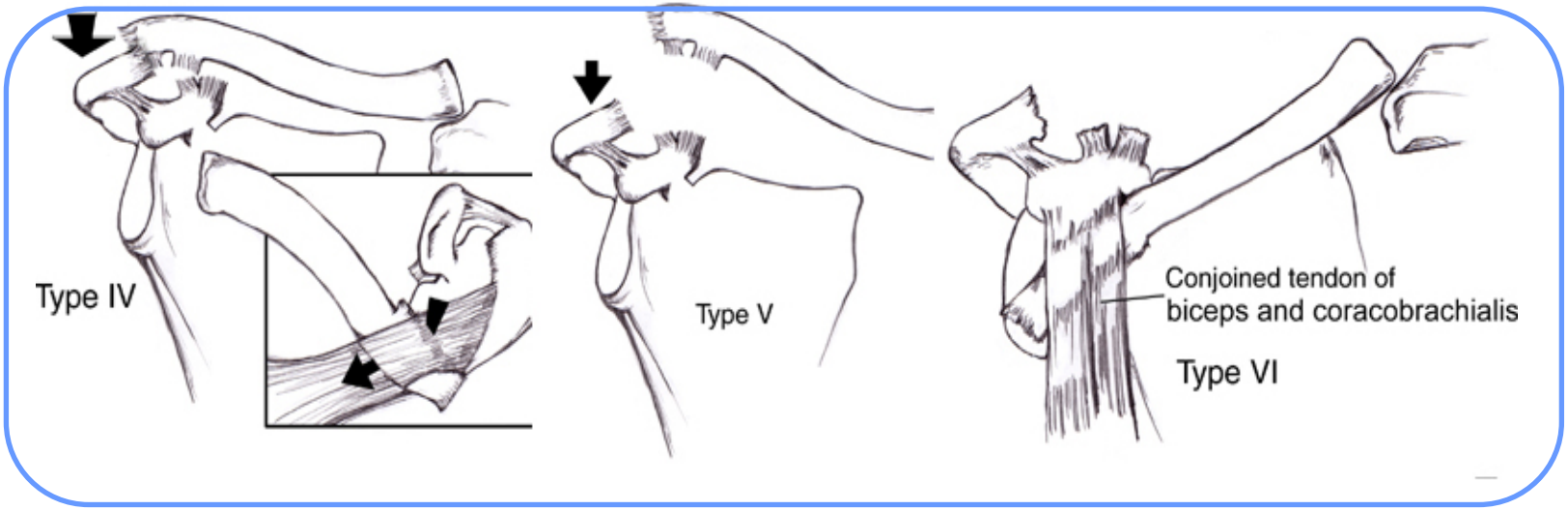
Classification

Conservative

?????





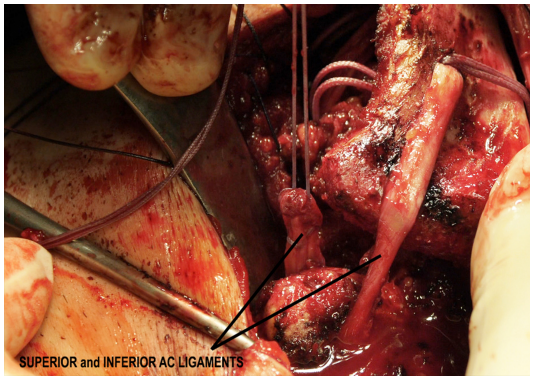


Surgical

Rockwood 1984

Treatment

- Acute operative management
  - Rockwood type IV-VI
  - Rockwood type III: *under debate*
- Chronic operative management
  - Painful type III-V
  - Failed conservative treatment
- Surgical techniques: wide range of options



Gowd 2018, Moatshe 2018

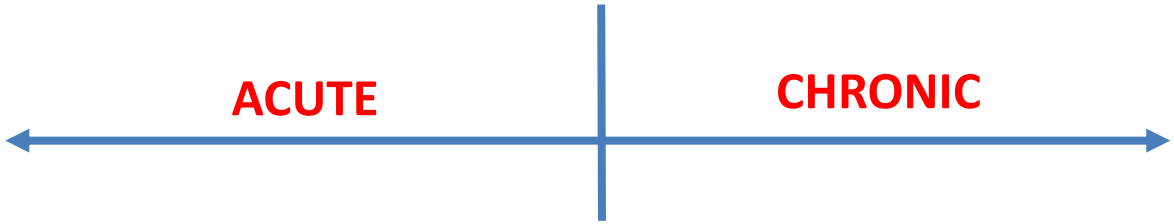
Acute vs Chronic

Ligament/capsule healing?

Literature Variability in Cronicity Definition

From 3 weeks to 6 months

Xarà-Leite 2019, Borbas 2019, Sircana 2021



3 WEEKS

ESA-ESSKA members consensous 2021

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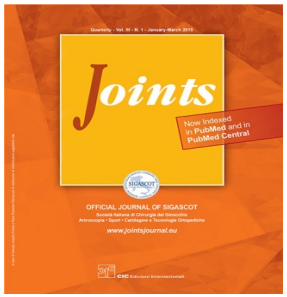
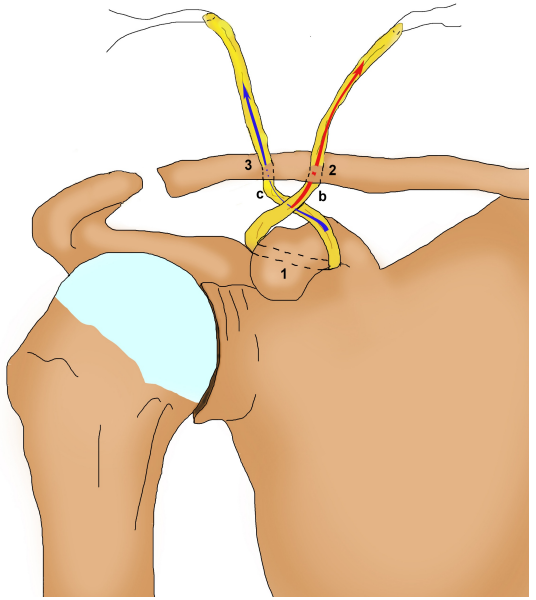
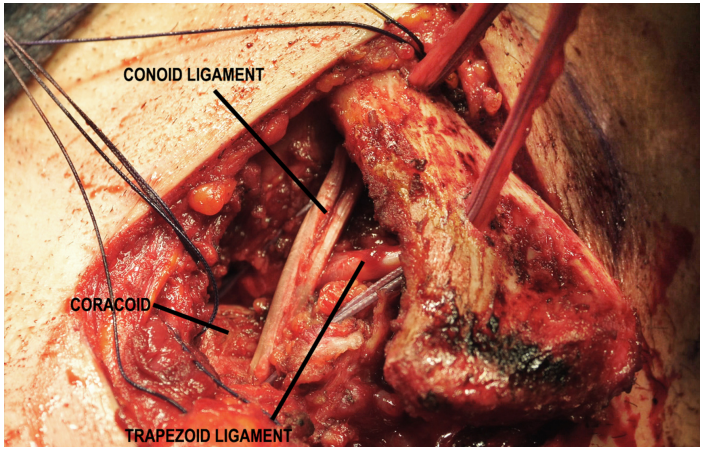
Joints. 2014 May 8;2(1):6-14

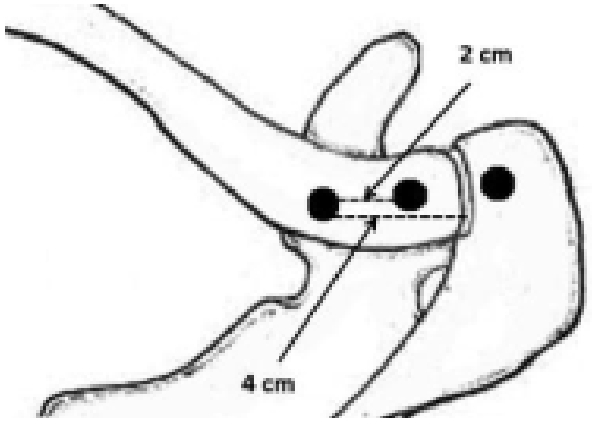


Surgical technique

- Clavicle: Double tunnel
- Graft passage under the coracoid (figure-of-eight): CC ligament







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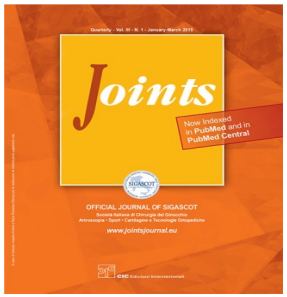
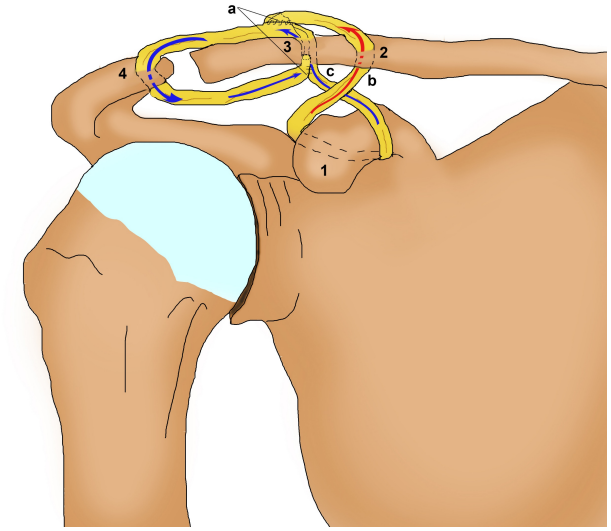
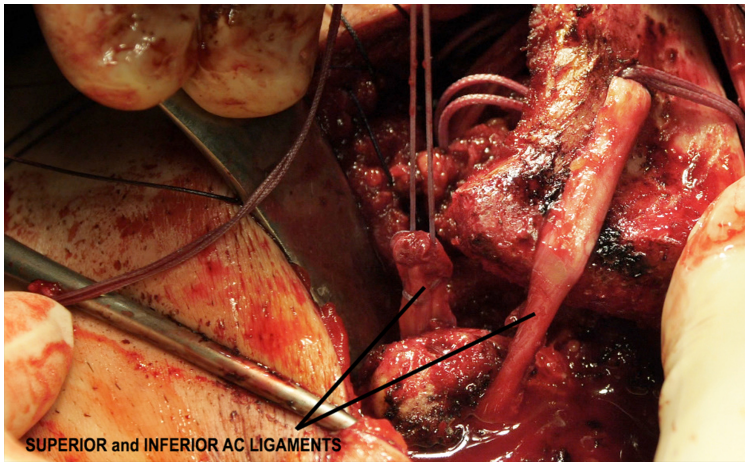


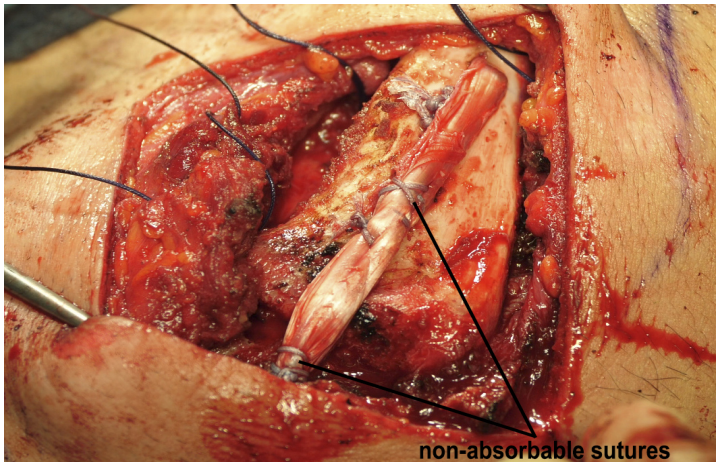
Surgical technique

- Acromial tunnel
- Loop around the AC joint:

AC ligaments



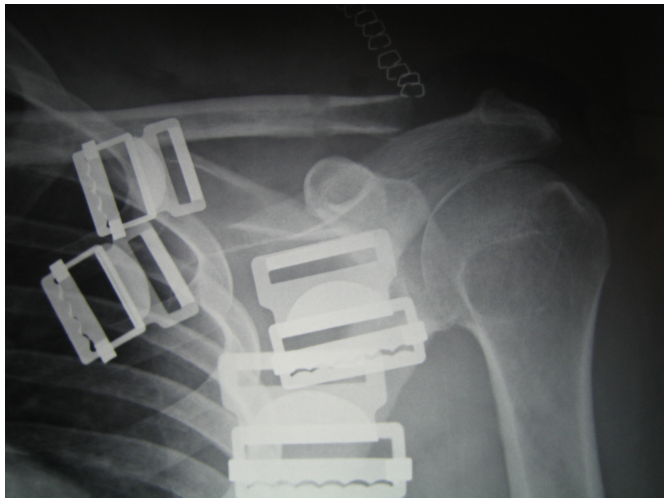




Surgical Technique

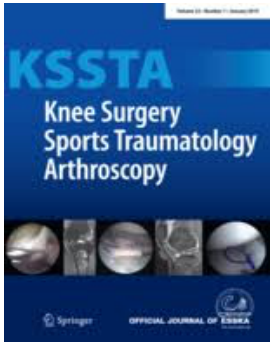
Post-Operative Regimen

- Kenny-Howard sling (6 wks)
- 7th - 10th week:
  - ROM exercises (passive, active assisted)
  - Water exercises
- 11th – 14th week:
  - ROM exercises (active)
  - Strengthening and proprioceptive exercises
- 16th week:
  - Return to sports (at risk activities)



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

Maristella F. Saccomanno, Giacomo Marchi, Fabrizio Mocini, Valeria Vismara, Vincenzo Campana, Andrea G. Salvi, Alessandra Scaini & Giuseppe Milano



Study population: 30 pts

- ✓ M:F=28:2
- ✓ Mean age: 28.9 ± 8
- ✓ Mean time elapsed from injury to surgery
  - ➢ 12.8 ± 10 months
- ✓ Mean fu: 89.6 ± 3.8 months

Rockwood type	N pts
III	13
IV	7
V	10

- **Primary outcome:**
  - ✓ Constant score (normalized for sex and age)
- **Secondary outcomes:**
  - ✓ DASH score
  - ✓ Imaging (x-rays): Recurrence, ACJ OA

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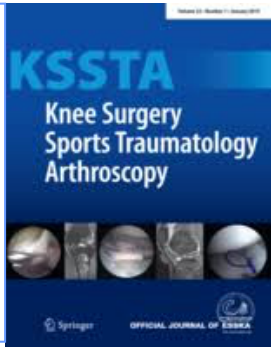

Outcome	Pre-op	Post-op	*P*
Constant	61.3 ± 7.9	95.3 ± 3.8	***<0.0001***
DASH	71.4 ± 10.6	8.2 ± 6.7	***<0.0001***
Work-DASH	69 ± 14.2	8.6 ± 6.9	***<0.0001***
Sport-DASH	72.8 ± 6.3	8.1 ± 7.5	***<0.001***

- Partial loss of reduction: 4 pts (13.3%)
- No signs of OA

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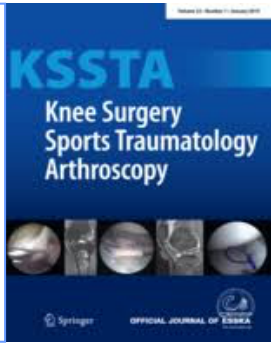
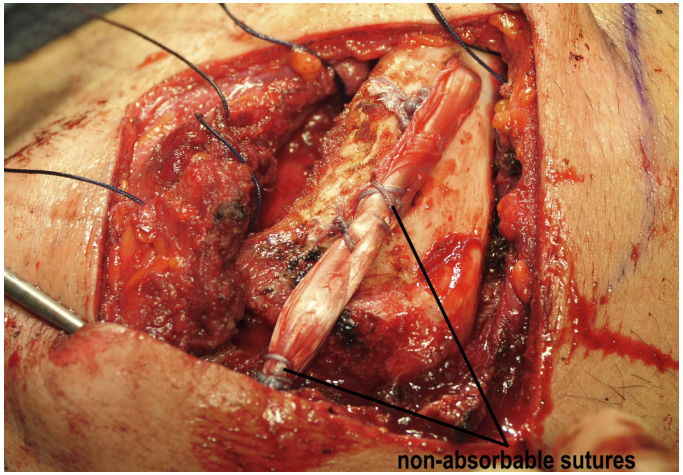


Discussion

- **Effective technique:**
  - ✓ Address horizontal and vertical stability
  - ✓ No need for distal clavicle excision



- **Cost-saving: no fixation devices are required**
- **No risk of hardware failure or clavicle fractures**

Study Weakness

- Lack of control group
- Lack of AC joint functional scores
- Lack of horizontal instability X-ray assessment
- Lack of performed based assessment measures
- Lack of clinical evaluation of scapular dyskinesia