Arthroscopic Coracoclavicular Stabilization with Augmentation of Acromioclavicular (AC) Ligament for Acute Severe AC Dislocation

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COI Disclosure Information

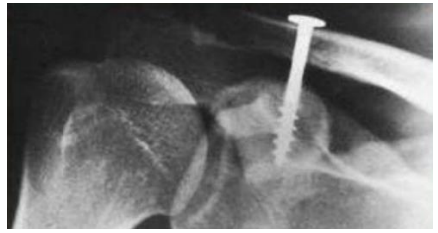
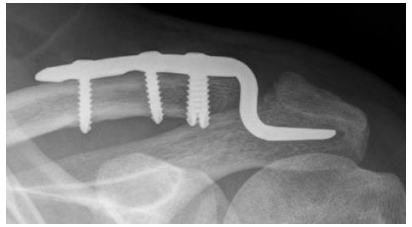
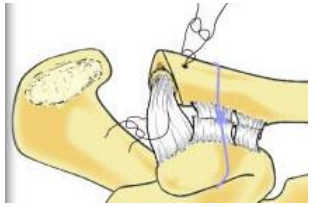
Presenter： Daichi Morikawa

I have no financial relationships to disclose.

Background
Acromioclavicular (AC) joint dislocation

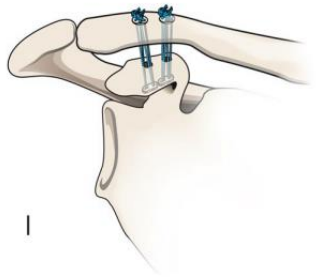
Beitzel 2013

- Numerus surgical procedure (> 160 different techniques) for AC dislocation have been published.

- The optimal surgical procedure for AC dislocation is still debated.

- Recently, coracoclavicular (CC) stabilization with suture button device were widely used.

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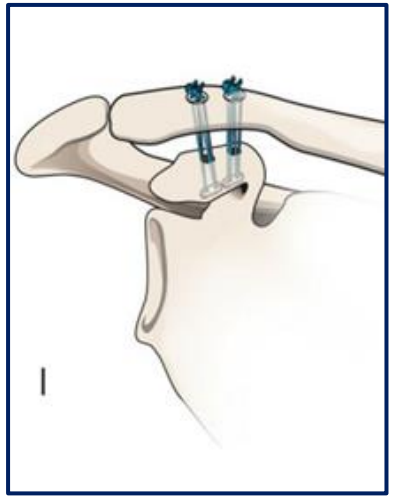
Background
Posterior instability after only CC stabilization

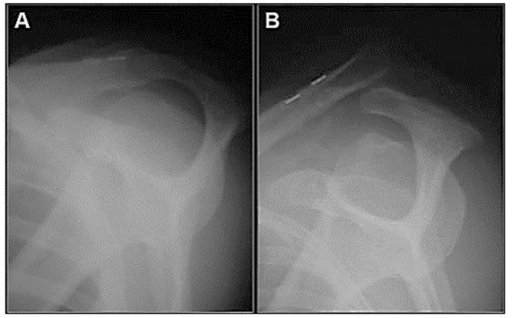
Scheibel 2011

- CC stabilization without AC stabilization for acute AC dislocation
  - 43% of patients had posterior instability 2 years after surgery.
  - Posterior instability showed significantly inferior clinical results.



Only CC stabilization

2 years



(-)	(+)
Dynamic posterior instability	

Alexander view

Posterior instability (43%)

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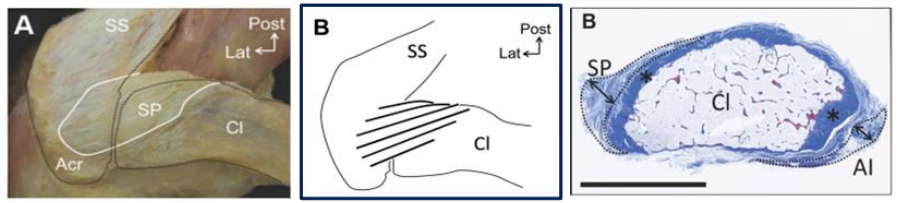
Background (our cadaveric biomechanical study)
New technique (oblique brace) and biomechanical analysis

Morikawa 2020

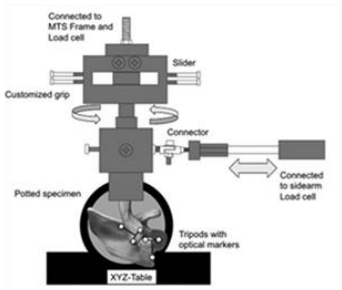
- We developed the new technique (oblique brace) putting artificial ligament to AC joint from ant. acromion to post. clavicle based on the native ACLC anatomy.
- confirmed to increase post. stability of the AC joint by cadaveric biomechanical study.

Acromioclavicular ligament complex (ACLC)



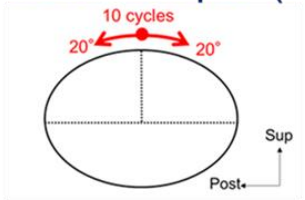
Nakazawa
Nimura 2016

28 fresh-frozen cadaver (N:7/group)

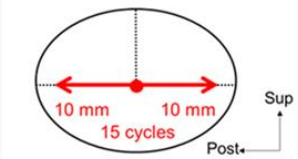


Posterior stability

- Rotational torque (N·m)



- Translational force (N)



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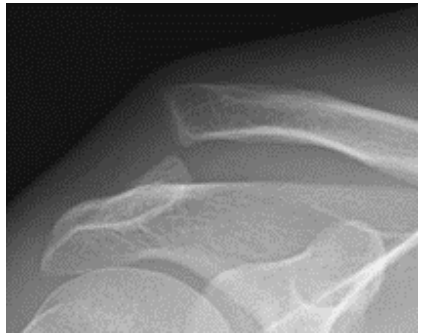
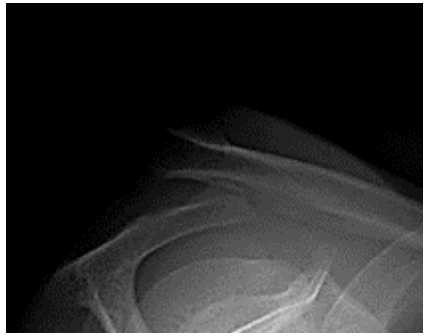
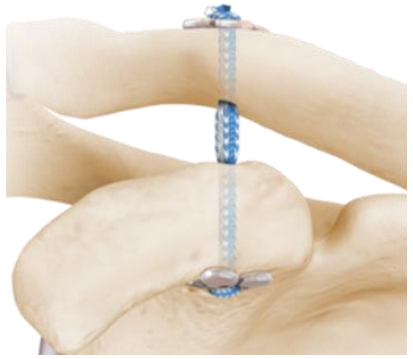
Background

CC (suture button device) and AC stabilization (oblique brace) for acute AC dislocation with posterior instability (2018-)

acute AC dislocation with posterior instability
Rockwood type 5 or 3B


CC stabilization
(AS assisted)



AC Dog Bone Button
Fiber Tape (Arthrex)

+

AC stabilization
(Oblique brace)

InternalBrace
(Arthrex)

Purpose

To analyze the radiologic and clinical outcomes of CC and AC stabilization for acute AC dislocation

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Methods

- Patient population (N:8, Age: 50.9±13.6, Male:8, R/L:6/2)
  - acute AC dislocation with post. instability
    - Rockwood type 5 : 6 cases
    - Rockwood type 3B : 2 cases
  - minimum follow up: 12 months

- Clinical outcomes (pre, 6M and 12M after surgery)
  - active ROMs (forward elevation, external/internal rotation)
  - AC functional score (Acromioclavicular Joint Instability Score: ACJI score)

- Radiologic analysis (pre, 6M and 12M after surgery)
  - Coracoclavicular distance (%CCD)
  - Posterior instability (complete dislocation/partial/none)

- Complications (12M after surgery)
  - Infection, Neurovascular injury, fracture of clavicle, coracoid, and acromion

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Results-1_active ROMs

Active ROM	pre	6M after OR	12M after OR
forward elevation (FE)	112.5±32.5	170.0±10.7 *p=0.04*	177.5±4.6 *p=0.04*
external rotation (ER)	24.2±12.0	49.4±16.6 *p=0.06*	61.3±13.6 *p=0.04*
internal rotation (IR)	L3.6±1.9	Th7.8±3.1 *p=0.04*	Th8.1±3.2 *p=0.04*

Active ROMs were significantly improved in forward elevation and internal rotation at 6 and 12 months and external rotation at 12 months after surgery compared to preoperative ROMs.

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Result-2_AC functional score (ACJI score)


+


functional score	pre	6M after OR	12M after OR
ACJI score	18.6±8.9	81.6±8.0 *p=0.02*	86.3±7.4 *p=0.04*

ACJI score were significantly improved at 6 and 12 months after surgery compared to preoperative scores.

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Result-3_radiologic analysis and complications

Coracoclavicular distance	pre	6M after OR	12M after OR
%CCD	211.7±109.0	123.8±25.7 *(p=0.04)*	126.0±23.4 *(p=0.04)*

%CCD were significantly decreased at 6 and 12 months after surgery compered to preoperative distance.

Dynamic posterior instability	pre	6M after OR	12M after OR
instability	complete: 5 partial : 3 normal : 0	complete: 0 partial : 4 normal : 4	complete: 0 partial : 4 normal : 4

Dynamic posterior instability was improved from 5 complete and 3 partial horizontal translation to 4 none and 4 partial horizontal translation.

No complication was observed within 12 months, such as infection, neurovascular injury, fracture of clavicle, coracoid, and acromion.

Discussion：

In this study, CC and AC stabilization for acute AC dislocation with post. instability showed acceptable clinical results, however, some cases still showed superior and posterior instabilities of AC joint.

Maziak
Scheibel

Factors predicting outcomes after AC surgery	superior stability	posterior stability
Over-reduced AC joint	positive	positive
Aging (＞50 years old)	negative	negative

We need to consider over-reduction of AC joint and patient’s age which may influence healing capacity of the CC and AC ligaments.

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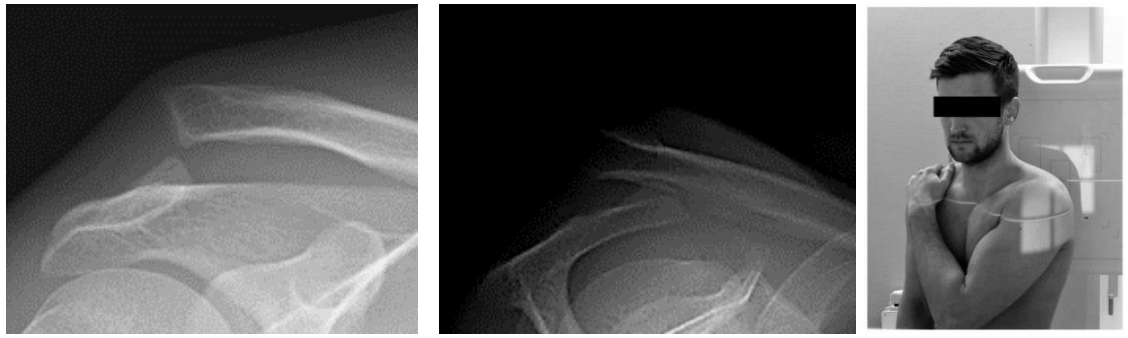
Conclusions

acute AC dislocation with posterior instability
Rockwood type 5 or 3B



CC stabilization (AS assisted)

AC stabilization (Oblique brace)

AC Dog Bone Button
Fiber Tape (Arthrex)

InternalBrace
(Arthrex)

CC and AC stabilization for acute AC dislocation with post. instability showed good clinical and radiological outcomes at 6 and 12 months after surgery without complication, suggesting that this technique is one of the good options for the treatment for acute AC dislocation.

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References

1. Beitzel K, Cote MP, Apostolakos J, Solovyova O, Judson CH, Ziegler CG, Edgar CM, Imhoff AB, Arciero RA, Mazzocca AD. Current concepts in the treatment of acromioclavicular joint dislocations. Arthroscopy. 2013 Feb;29(2):387-97. doi: 10.1016/j.arthro.2012.11.023. PMID: 23369483.
2. Scheibel M, Dröschel S, Gerhardt C, Kraus N. Arthroscopically assisted stabilization of acute high-grade acromioclavicular joint separations. Am J Sports Med. 2011 Jul;39(7):1507-16. doi: 10.1177/0363546511399379. Epub 2011 Mar 24. PMID: 21436458.
3. Nakazawa M, Nimura A, Mochizuki T, Koizumi M, Sato T, Akita K. The Orientation and Variation of the Acromioclavicular Ligament: An Anatomic Study. Am J Sports Med. 2016 Oct;44(10):2690-2695. doi: 10.1177/0363546516651440. Epub 2016 Jun 17. PMID: 27315820.
4. Morikawa D, Huleatt JB, Muench LN, Kia C, Berthold DP, Cote MP, Obopilwe E, Kelolli D, Scheiderer B, Mazzocca AD. Posterior Rotational and Translational Stability in Acromioclavicular Ligament Complex Reconstruction: A Comparative Biomechanical Analysis in Cadaveric Specimens. Am J Sports Med. 2020 Aug;48(10):2525-2533. doi: 10.1177/0363546520939882. Epub 2020 Jul 21. PMID: 32692952.
5. Maziak N, Audige L, Hann C, Minkus M, Scheibel M. Factors Predicting the Outcome After Arthroscopically Assisted Stabilization of Acute High-Grade Acromioclavicular Joint Dislocations. Am J Sports Med. 2019 Sep;47(11):2670-2677. doi: 10.1177/0363546519862850. Epub 2019 Aug 2. PMID: 31373831.

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