J Clin Invest Surg. 2017; 2(2): 105-109
doi: 10.25083/2559.5555.22.105109



*Case Report*

# Arthroscopic treatment of acromioclavicular dislocation

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**Abstract**

A thorough understanding of biomechanical function of both acromioclavicular (AC) and coracoclavicular (CC) ligaments, stimulated surgeons to repair high-grade AC dislocation using arthroscopic technique. This technique necessitates a clear understanding of shoulder anatomy, especially of the structures in proximity to the clavicle and coracoid process and experiences in arthroscopic surgery.

The follow case describes an arthroscopic technique used to treat AC dislocation in young man 30 years old, who suffered an injury at right shoulder. Results were similar to those obtained using open surgery and this encouraged us to continue utilization of this method.

As a conclusion, arthroscopic treatment of AC separation is one of the best options as surgical treatment. Early results suggested that immediate anatomic reduction of an acute AC separation usually provides satisfactory clinical results at intermediate-term follow-up.

**Keywords**: acromioclavicular dislocation, arthroscopic treatment

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## Introduction

The purpose of surgery in AC dislocation is to restore the normal anatomy of the shoulder, knowing importance of clavicle as a link between thorax and superior arm (1). CC ligaments keep clavicle connected with coracoid in moment of abduction. In AC separation these ligaments are torn and upper arm, under influence of weight drop down, while clavicle under action of trapezius lifts up. AC separations are classified in six types after Rockwood (2). The first two degreases are treated conservatively, the last three are treated operatively and the type three is treated both conservatively and operatively (athletes and high-demand manual laborers) (3, 4).

Open surgery was done with success for many decades and this challenged surgeons to use arthroscopic technique in treatment of this instability (5). The advantages of this technique are: the minimally invasive nature of arthroscopic surgery, deltotrapezial fascia is not removed from lateral clavicle, direct visualization of AC joint reduction and placement of coracoid fixation under protected visualization. Additionally allows glenohumeral inspection and treatment of concomitant pathology.

## Case presentation

We present now a case of a young patient who had an injury by falling on the right shoulder with acromioclavicular dislocation type V (Figures 1-2).

**Figure 1.** Acromioclavicular dislocation; clinical aspect

**Figure 2**. Acromioclavicular dislocation; radiological aspect

After debated we choose like modality of treatment, arthroscopic repair of lesion using Dog Bone Button (6). The Dog Bone Button is a precontoured button that allows the use of multiple Fiber Tape sutures for AC joint reduction, providing a construct that is twice as strong as existing AC joint repair devices. Because trauma was recent, was not necessary to augment the repair with autograft. The steps of surgery were as follow (7).

*Patient positioning*

Patient was placed in beach-chair position. Once more under anesthesia was performed an examination of shoulder (glenohumeral joint and AC joint). After draping with sterile fileds, shoulder was positioned in such way to allow a Mini-C-arm to be used for verification during approach or drilling ligament reconstruction tunnels. For arthroscopy, a standard 30-degree arthroscope was used with three working portals: posterior, anterolateral and accessory anteromedial (Figure 3).

**Figure 3**. Patient positioning

*Surgical technique*

For our case, we used dog bone button device placed through clavicle and coracoid in an anatomic position corresponding to the native ligaments. This was done with help of drill guide system. Operation started with a routine diagnostic glenohumeral joint arthroscopy through the standard posterior portal. The anterolateral portal was positioned using a spinal needle for guidance, within the anterior edge of the rotator interval. The secondary low anteromedial portal was made at 1-2 cm under the tip of coracoid process to allow introduction of 8.25 mm cannula to make possible passage and handling of the guide.

After this step rotator interval was cleared and with help of radiofrequency ablation device, inserted through the anterior portal, the coracoid undersurface was debrided to ensure visualization of the medial and lateral edge of the undersurface of the coracoid process extending to the base.

Next, an incision of 3,5 cm was made perpendicular to the clavicle approximately 3-4 cm medial to the lateral border of the clavicle. The fascia was incised to expose the bone. After that the AC joint was reduced and held in reduction (under fluoroscopic control).

To drill the tunnel, a special guide was introduced in 8.25 mm cannula with tip fixed under the coracoid process. The guide arms feature angled tips and two post to help seat the guide firmly against the base of the coracoid. Under direct arthroscopic visualization 3 mm cannulated drill was introduced through the guide in the midline of the clavicle and the base of the coracoid process. A suture lasso is passed through the cannulated drill. This is used to pull the dog bone button retrograde through the coracoid and clavicle tunnels until the button is fixed under the coracoid process.

A superior button is applied on the clavicle superior surface and the two Fiber Tape sutures of the device are tensioned keeping the clavicle reduced under fluoroscopic control and secured by alternating square knots on the top of the clavicle. The fascia and skin were closed and the arm was placed in a sling postoperatively. A fluoroscopy was used to confirm reduction and position of device and postoperative radiographs was taken to validate the quality of reduction and placement of fixation (Figure 4).

**Figure 4.** Postoperative radiography

*Postoperative management*

A rehabilitation program began immediately postoperatively. Patient's shoulder was protected in a sling first 6 weeks. This protection intended to alleviate painful gravity-derived forces on the implant and to promote healing. Next day after surgery he started passive motion and active up to 30 degrees of flexion and abduction for the first 2 weeks. Range of active motion was extended to 60 and 90 degrees in following 4 weeks. After this period patient was instructed to come out of the sling and focus to regain full range of motion and strength. External and internal rotation strengthening are allowed in a neutral position. At 12 weeks activity was function-directed strengthening and sport-directed activity. At 6 months patient were able to return to full sport activities (Figure 5; a-d).

## Discussions

In recent years, arthroscopic techniques have been applied to the treatment of AC joint instability with good clinical results in the short term setting. The surgery was applied for painful AC joint separation classified as Rockwood type IV, V and VI. In our case was a young person, eager to turn back to sportive activities with acute posttraumatic AC separation.

Intervention was done as soon as possible knowing that the best results are obtained when anatomic reduction was done immediately after injury. Radiography postoperative showed us good reduction of the clavicle. The patient regained full range of motion, without pain and at 6 months postoperatively was able to return to full sport activities. Removal of the AC Dog Bone implant is not necessary due to its low profile.


**Figure 5**. Clinical aspects at 6 months (a, b, c, d)

## Conclusions

Arthroscopic treatment of AC separation is one of the best options as surgical treatment. It must be stressed that only an experienced arthroscopist should perform this technique to allow precise placement of the tunnel and implant fixation. Dog bone button was one of the first choice from the assembly of implants existing on the market. Because the Dog-Bone buttons can be applied to the TightRopes after they are passed, the tunnels in the clavicle and coracoid can be small (3 mm). A small hole in the coracoid process reduces the possibility of coracoid fracture, which is a risk with the larger coracoid tunnel used for another constructs (8,9). This technique is a novel, anatomical, and nonrigid reconstruction of the AC joint, aiming for the advantages and minimizing the limitations of others techniques.

Early results suggested that immediate anatomic reduction of an acute AC separation with this kind of device provides satisfactory clinical results at intermediate-term follow-up (10-13).

## References

1. Rios CG, Arciero RA, Mazzocca AD. Anatomy of the clavicle and coracoid process for reconstruction of the coracoclavicular ligaments. *Am J Sports Med*. 2007; 35(5): 811-7. PMID: 17293463, https://doi.org/10.1177/0363546506297536
2. Li MK, Woods D. Ligament Augmentation and Reconstruction System Failures in Repair of Grade V Acromioclavicular Joint Dislocation. *Case Rep Orthop*. 2017; 2017: 3792610. PMID: 29038741, https://doi.org/10.1155/2017/3792610
3. Bradley JP, Elkousy H. Decision making: operative versus nonoperative treatment of acromioclavicular joint injuries. *Clin Sports Med*. 2003; 22(2): 277–90. PMID: 12825530, https://doi.org/10.1016/S0278-5919(02)00098-4
4. Simovitch R, Sanders B, Ozbaydar M, Lavery K, Warner JJ. Acromioclavicular joint injuries: diagnosis and management. *J Am Acad Orthop Surg*. 2009; 17(4): 207–19. PMID: 19307670, https://doi.org/10.5435/00124635-200904000-00002
5. Salzmann GM, Walz L, Schoettle PB, Imhoff AB. Arthroscopic anatomical reconstruction of the acromioclavicular joint. *Acta Orthop Belg*. 2008; 74(3): 397-400. PMID: 18686468
6. Rosslenbroich SB, Schliemann B, Schneider KN, Metzlaff SL, Koesters CA, Weimann A, Petersen W, Raschke MJ. Minimally invasive coracoclavicular ligament reconstruction with a flip-button technique (MINAR): clinical and radiological midterm results. *Am J Sports Med*.

2015; 43(7): 1751-7. PMID: 25896983, https://doi.org/10.1177/0363546515579179

7. Mah JM; Canadian Orthopaedic Trauma Society (COTS). General Health Status After Nonoperative Versus Operative Treatment for Acute, Complete Acromioclavicular Joint Dislocation: Results of a Multicenter Randomized Clinical Trial. *J Orthop Trauma*. 2017; 31(9): 485-90. PMID: 28832388, https://doi.org/10.1097/BOT.0000000000000881
8. Jensen G, Katthagen JC, Alvarado L, Lill H, Voigt C. Arthroscopically assisted stabilization of chronic AC-joint instabilities in GraftRope™ technique with an additive horizontal tendon augmentation. *Arch Orthop Trauma Surg*. 2013; 133(6): 841–51. PMID: 23604789, https://doi.org/10.1007/s00402-013-1745-2
9. Nordin JS, Aagaard KE, Lunsjö K. Chronic acromioclavicular joint dislocations treated by the GraftRope device. *Acta Ortop*. 2015; 86(2): 225–8. PMID: 25323800, https://doi.org/10.3109/17453674.2014.976806
10. Chernchujit B, Tischer T, Imhoff AB. Arthroscopic reconstruction of the acromioclavicular joint disruption: surgical technique and preliminary results. *Arch Orthop Trauma Surg*. 2006; 126(9): 575-81. PMID: 16341538, https://doi.org/10.1007/s00402-005-0073-6
11. Mazzocca AD, Santangelo SA, Johnson ST, Rios CG, Dumonski ML, Arciero RA. A biomechamical evaluation of an anatomical coracoclavicular ligament reconstruction. *Am J Sports Med*. 2006; 34(2): 236-46. PMID: 16282577, https://doi.org/10.1177/0363546505281795
12. Lim YW. Triple endobutton technique in acromioclavicular joint reduction and reconstruction. *Ann Acad Med Singapore*. 2008; 37(4): 294-9. PMID: 18461213
13. Hou Z, Graham J, Zhang Y, Strohecker K, Feldmann D, Bowen TR, Chen W, Smith W. Comparison of single and two-tunnel techniques during open treatment of acromioclavicular joint disruption. *BMC Surg*. 2014; 14: 53. PMID: 25127715, https://doi.org/10.1186/1471-2482-14-53