J Orthop Spine Trauma. 2021 March; 7(1): 24-6 DOI: http://dx.doi.org/10.18502/jost.v7i1.5963

Case Report

Acromioclavicular Reconstruction Using Semitendinosus Tendon Autograft: A Technical Note and Case Report

Mohammad Hasan Sharafi[1], Hamid Rabie[1], Leila Oryadi Zanjani[2,*]

[1] Resident, Department of Orthopedic and Trauma Surgery, Shariati Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[2] Assistant Professor, Shariati Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

[*] Corresponding author: Leila Oryadi Zanjani; Shariati Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran. Tel: +98-9125973795, Email: leila_zanjani@yahoo.com

Received: 08 October 2020; **Revised:** 17 December 2020; **Accepted:** 22 January 2021

Abstract

Background: Although there are several surgical options for the treatment of acromioclavicular joint (ACJ) dislocation, there is no definite gold standard. Anatomical reconstruction techniques are becoming more popular due to the new understandings of the anatomy and biomechanics of the ACJ.
Case Report: A 40-year-old male with left ACJ dislocation (Type 3 Rockwood classification) underwent anatomical reconstruction with a semitendinosus tendon graft harvested from the left knee.
Conclusion: Anatomical reconstruction of ACJ by autograft is an effective treatment option.

Keywords: Acromioclavicular Joint; Reconstructive Surgical Procedures; Hamstring Muscles; Autografts

Citation: Sharafi MH, Rabie H, Oryadi Zanjani L. **Acromioclavicular Reconstruction Using Semitendinosus Tendon Autograft: A Technical Note and Case Report.** *J Orthop Spine Trauma* 2021; 7(1): 24-6.

Background

Acromioclavicular joint (ACJ) injury following shoulder trauma is a common complaint in athletes, especially in contact sports. It occurs about five times more often in men than in women and frequently affects men under the age of 30 (1).

The ACJ is a diarthrodial joint between the lateral end of the clavicle and the medial facet of the acromion process, which establishes the connection between the axial skeleton and the upper limb (2). It has movements in all directions and is supported by a number of dynamic and static stabilizers. The deltoid and trapezius muscles are the dynamic stabilizers of this joint. The static stability of the AC joint in the anteroposterior (AP) axis is established by acromioclavicular ligaments, among which the strongest one is the superior ligament. The Conoid and trapezoid ligaments are responsible for the static stability of the AC joint in the superior-inferior axis (3-5).

The management of ACJ Injury depends on the patient's age and occupational demand, as well as the grading and severity of the injury (2). According to the Rockwood classification, the ACJ injury is classified into six types (3). Types 1 and 2 are usually treated with conservative management, while in higher grading or persistence of symptoms, surgical treatment is recommended (1).

Different surgical options have been proposed for ACJ dislocations, including fixation (screw, pin, or plate), transfer of coracoacromial ligament, and ligament reconstruction (6). Anatomical reconstruction techniques are becoming more popular due to the new understandings of the anatomy and biomechanics of the ACJ (7). In this technical note, we describe our preferred technique for open anatomic repair of ACJ separation using a semitendinosus autograft.

Case Report

A 40-year-old male presented to the outpatient clinic eight months after falling on his left shoulder while wrestling. He had a pain in his left shoulder, exacerbated by lifting heavy objects or lying on the affected side and not alleviating completely by rest and analgesics. On physical examination, he had a prominent left ACJ which was unpleasant for him (Figure 1).

Figure 1. Left acromioclavicular joint (ACJ) prominence

On palpation, the ACJ was tender. The left shoulder movements (active and passive) were painful, especially in adduction and internal rotation, with a full range of motion (ROM). The neurovascular examination was normal. In the Zanca view radiograph of ACJ, we detected a type 3 dislocation based on the Rockwood classification (Figure 2).

The patient underwent general anesthesia in the operating room. In the supine position, the semitendinosus tendon was harvested from the medial proximal of the left leg, using a classical 3-cm longitudinal incision (8).

Figure 2. Zanca view demonstrating left acromioclavicular joint (ACJ) with type 3 injury

The patient was then placed in the beach chair position. The left shoulder bony landmarks including the coracoid process, the lateral end of the clavicle, the ACJ, and the acromion were marked with a marker (Figure 3). A vertical incision was made along the Langer line, centered on the clavicle approximately 1 cm medial to the ACJ. After incising the skin and subcutaneous tissue, we opened the ACJ capsule. The cartilage surfaces of the distal clavicle and acromion were severely damaged.

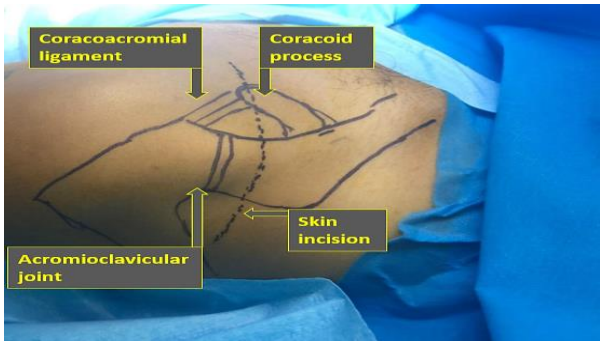

Figure 3. Anatomical landmarks for skin incision

First, we resected 5 mm of the distal clavicle (Mumford procedure; Figure 4).

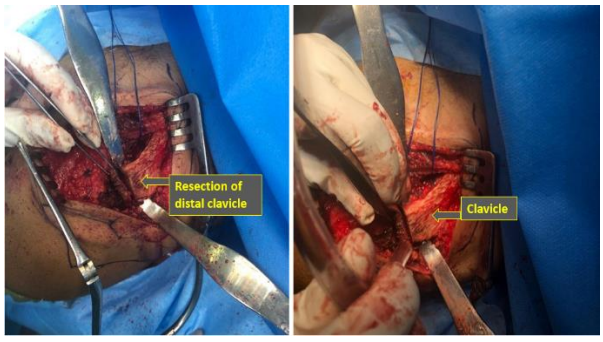

Figure 4. Intraoperative photographs of the Mumford procedure

Then, we created two 45-mm and 25-mm tunnels from ACJ with drill bit number 3.2. The semitendinosus tendon autograft was passed from underneath the base of the coracoid process and its two ends were passed through the tunnels. After reducing the ACJ by pushing the arm upward, the two tails of the tendon graft were attached together on the superior surface of the clavicle by FiberWire suture number 5 (Arthrex, Naples, Florida, USA). The distal ends of the tendon were passed over the ACJ and attached to the acromion by trans-osseous sutures to replicate the superior ACJ capsular ligament (Figure 5).

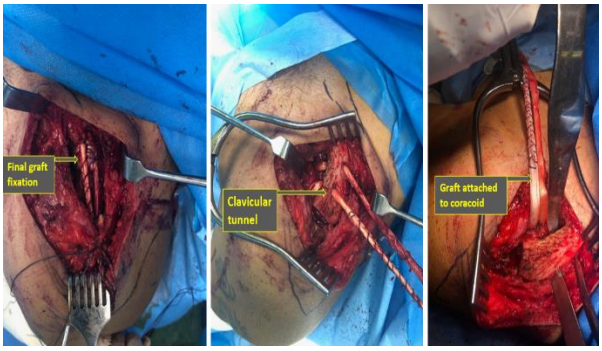

Figure 5. Placement of the clavicular tunnels and graft passage

Finally, the acromion process was fixed to the distal clavicle percutaneously by a number 2 K-wire in order to achieve temporary stability to support the tendon graft. The immediate postoperative X-ray showed a reduced ACJ (Figure 6).

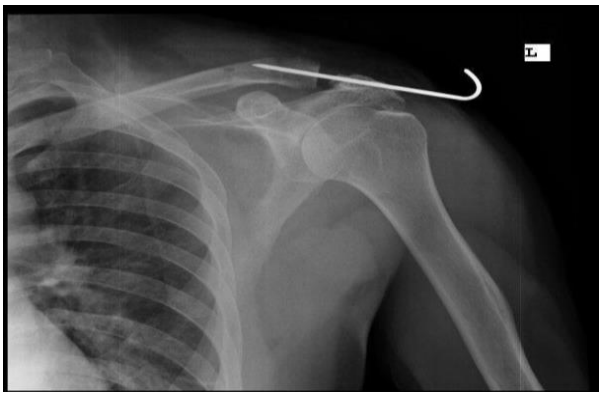

Figure 6. Postoperative radiograph

An arm sling was applied for 6 weeks. We removed the K-wire 4 weeks after surgery. Pendulum movements and ROM physiotherapy started at 4 and 6 weeks after surgery, respectively. At the 6-month follow-up, the patient had no pain, the left shoulder ROM was normal, and the ACJ maintained the reduction. The autograft donor site healed completely and the patient had no donor-site complications.

Discussion

There are several options for surgical treatment of ACJ dislocation with no definite gold standard. The most common method for joint stabilization is fixation with a hook plate. However, it has complications like hardware failure, probability of the need for plate removal, and a deficit in simulation of native joint biomechanics. To reduce the technical gap, alternative methods have been developed.

Conclusion

Anatomical reconstruction of the coracoclavicular ligaments, which is an attempt to restore the normal anatomical and biomechanical features of the joint, is increasingly becoming popular among shoulder surgeons. Due to the high cost and possibility of infection following the use of allograft, it seems that ACJ reconstruction by autograft can be a good choice due to the absence of device-related side effects and subsequent

device removal surgery. Additionally, the postoperative rehabilitation of this method is satisfactory for both surgeon and patient. In brief, it leads to optimal functional and cosmetic results.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgments

None.

References

1. Sirin E, Aydin N, Mert Topkar O. Acromioclavicular joint injuries: Diagnosis, classification and ligamentoplasty procedures. *EFORT Open Rev*. 2018;3(7):426-33. doi: 10.1302/2058-5241.3.170027. [PubMed: 30233818]. [PubMed Central: PMC6129955].
2. Alrasheed O. Case report: Arthroscopic fixation of type V acromioclavicular joint dislocation. *Egypt J Hosp Med*. 2019;74(7):1604-6. doi: 10.12816/ejhm.2019.28266.
3. Beim GM. Acromioclavicular joint injuries. *J Athl Train*. 2000;35(3):261-7. [PubMed: 16558638]. [PubMed Central: PMC1323387].
4. Lee BK, Jamgochian GC, Syed UAM, Getz CL, Dodson CC, Namdari S, et al. Reconstruction of acute acromioclavicular (AC) joint dislocations with or without tendon graft: A retrospective comparative study. *Arch Bone Jt Surg*. 2019;7(3): 239-45. [PubMed: 31312681]. [PubMed Central: PMC6578477].
5. Yoo JC, Ahn JH, Yoon JR, Yang JH. Clinical results of single-tunnel coracoclavicular ligament reconstruction using autogenous semitendinosus tendon. *Am J Sports Med*. 2010;38(5):950-7. doi: 10.1177/0363546509356976. [PubMed: 20228243].
6. Cote MP, Wojcik KE, Gomlinski G, Mazzocca AD. Rehabilitation of acromioclavicular joint separations: Operative and nonoperative considerations. *Clin Sports Med*. 2010;29(2): 213-28, vii. doi: 10.1016/j.csm.2009.12.002. [PubMed: 20226315].
7. Johansen JA, Grutter PW, McFarland EG, Petersen SA. Acromioclavicular joint injuries: Indications for treatment and treatment options. *J Shoulder Elbow Surg*. 2011;20(2 Suppl): S70-S82. doi: 10.1016/j.jse.2010.10.030. [PubMed: 21195634].
8. Colombet P, Graveleau N. Minimally Invasive Anterior Semitendinosus Harvest: A Technique to Decrease Saphenous Nerve Injury. *Arthrosc Tech*. 2016;5(1):e139-e142. doi: 10.1016/j.eats.2015.10.011. [PubMed: 27274445]. [PubMed Central: PMC4885910].