Arthroscopic Distal Clavicle and Medial Border of Acromion Resection for Symptomatic Acromioclavicular Joint Osteoarthritis
Adinun Apivatgaroon, M.D., and Prakasit Sanguanjit, M.D.

Abstract: Acromioclavicular joint osteoarthritis can lead to persistent shoulder pain. Distal clavicle excision is the most common operative procedure in patients with failed, conservative symptomatic acromioclavicular joint osteoarthritis treatment, with some reports of complications. This report describes an alternative procedure that can be used to excise the distal clavicle together with the medial border of the acromion. This technique is a simple procedure because the standard distal clavicle excision can preserve the acromioclavicular ligament, as well as the joint capsule, and achieve an adequate resection length.

The acromioclavicular joint (ACJ) is a small joint in the superior aspect of the shoulder that can produce shoulder problems. Primary or secondary osteoarthritis of the ACJ can lead to persistent pain in the anterior or anterosuperior aspect of the shoulder that requires operative intervention.1 ACJ osteoarthritis can occur concomitantly pathologically with many shoulder diseases, such as rotator cuff syndrome, tendinopathy in the long head of the biceps, SLAP lesions, or osteoarthritis of the glenohumeral joint. As a result, surgeons should always address the pre-existing ACJ condition before making the decision to perform surgical intervention. Underdiagnosis of pre-existing ACJ problems may lead to persistent postoperative shoulder pain or a need for reoperation.

Distal clavicle excision (DCE) is one of the most common operative procedures in the treatment of ACJ osteoarthritis, with either an open or arthroscopic procedure.2 Most surgeons have agreed that the resection length should be approximately 8 to 10 mm to prevent the bony contact between the acromion and the clavicle while preserving the acromioclavicular ligament and capsule.1 The reported complications of DCE include ACJ dislocation due to over-resection, persistent pain due to under-resection, and fractures of the distal clavicle.3,4

This report describes a procedure that can be used alternatively to excise the distal clavicle together with the medial border of the acromion. This technique is a simple procedure because the standard DCE can preserve the acromioclavicular ligament, as well as the joint capsule, and achieve an adequate resection length (Table 1).

Surgical Technique

Patient Positioning and Setup
In the preoperative setup, we placed the patient in an upright beach-chair position at approximately 70° from the horizontal plane. 

Table 1. Key Points

| Underdiagnosis of concomitant acromioclavicular joint problems may lead to a second operation or persistent postoperative shoulder pain. |
| Over-resection of the distal clavicle can lead to postoperative instability. |
| Under-resection of the distal clavicle can lead to persistent shoulder pain. |
| The described technique is simple, preserves the acromioclavicular ligament and joint capsule, and achieves an appropriate resection length. |

From the Department of Orthopaedics, Faculty of Medicine, Thammasat University, Pathumthani, Thailand.

The authors report that they have no conflicts of interest in the authorship and publication of this article.

Received July 26, 2016; accepted August 29, 2016.

Address correspondence to Adinun Apivatgaroon, M.D., Department of Orthopaedics, Faculty of Medicine, Thammasat University, Pathumthani 12121, Thailand. E-mail: adino_ball@yahoo.com

© 2016 by the Arthroscopy Association of North America 2212-6287/16/36.00 http://dx.doi.org/10.1016/j.eats.2016.08.033
(Video 1). The affected shoulder is prepared and draped, free from the upper portion of the ipsilateral chest to the hand. General anesthesia with or without regional anesthesia can be used.

**Placement of Portals and Identification of ACJ**

A standard posterior viewing portal is created initially to allow examination of the glenohumeral joint. An anterosuperior portal near the ACJ is created in the case that it may be necessary to perform intra-articular work through the rotator interval. After completion of the intra-articular procedures, the posterior viewing portal is redirected into the subacromial and subdeltoid space. A standard lateral working portal (Fig 1) is created; then the subacromial bursectomy is performed, with or without acromioplasty and a co-planing cut of the undersurface of the distal clavicle, as determined during preoperative planning. The undersurface of the ACJ is identified with a 30° arthroscope (Fig 2). The anterosuperior working portal is created or re-created at the same skin incision (in certain cases with intra-articular work). The anterosuperior portal should be within 5 mm proximal to the distal edge of the clavicle and should have a parallel orientation to the ACJ (Fig 3).

**Distal Clavicle and Medial Border of Acromion Resection Process**

By use of the posterior viewing portal, removal of the soft tissue and fat pad underneath the ACJ with a
4.5-mm-diameter arthroscopic shaver (Smith & Nephew) and the use of electrocautery through the lateral or anterosuperior working portal are helpful for adequate visualization and controlling bleeding. The 4.0-mm-diameter Dyonics acromionizer (Smith & Nephew) is inserted through the anterosuperior portal. The lateral edge of the distal clavicle is carefully cut to approximately 4 to 5 mm (about the diameter of the acromionizer) together with the medial border of the acromion to about 3 to 4 mm. This preserves the superior and posteroveroprior ACJ ligament and capsule. Resection is performed from the inferior to the superior aspect in the anterior-to-posterior direction of the distal clavicle and the medial border of the acromion (Fig 4).

Fig 4. Arthroscopic views from the posterior portal of the right shoulder using a 30° arthroscope. (A) Resection is performed through the anterosuperior working portal. (B, C) Resection starts from the inferior to superior portion of the distal clavicle and the medial border of the acromion. (D) Direction of resection from anterior to posterior. (E) Complete resection of both the distal clavicle and medial acromion.
Intraoperative Evaluation After Resection

When the resection is completed, an arthroscopic probe or measuring implement can be inserted from either the lateral or anterosuperior portal to measure and confirm the amount of resection. A dynamic test can also be performed with passive cross-body adduction of the surgically repaired arm. The 30° arthroscope can then be switched into the anterosuperior portal to directly visualize the resected area. This step is also helpful in checking that the posterosuperior border of the distal clavicle and the acromion have been resected adequately (Fig 5, Table 2).

Postoperative Management

Postoperative management is dependent on patients’ concomitant shoulder pathologies; for patients with isolated ACJ osteoarthritis, early passive and active range of motion is encouraged as soon as possible. In rotator cuff–repaired patients, total immobilization of the shoulder with a simple sling is advocated for 4 weeks after the procedure, with passive range of motion during the fourth to sixth weeks; active range of motion can then be started.

Discussion

ACJ osteoarthritis is one of the common shoulder problems and can occur as an isolated pathology or concomitantly with other shoulder disorders. Conservative management is still considered the first-line management. This includes activity modification, medications, or steroid injections.1 In cases of unsuccessful conservative treatment, open or arthroscopic DCE is the most common surgical procedure; in most cases, it provides good to excellent results. Arthroscopic DCE may have advantages in term of reducing postoperative pain and a short rehabilitation period, which can result in a quick return to work. Although there have been no studies to compare the open and arthroscopic techniques, a systematic review has shown that arthroscopic DCE had a slightly higher percentage of “good to excellent” results in some retrospective studies.2

DCE has shown some complications. Over-resection can result in postoperative instability of the ACJ or of the fracture. Under-resection may lead to persistent pain from inadequate space achievement. There is no absolute size regarding how much resection should be performed. There is a consensus that an 8- to 10-mm DCE promotes sufficient space for the joint, reduces bony contact between the distal clavicle and the acromion, and prevents postoperative instability of the ACJ.1

Stine and Vangsness5 performed cadaveric studies and concluded that the safe zone to resect the ACJ is approximately 2 to 3 mm to the medial acromion and 3 to 4 mm to the distal clavicle without ACJ capsular insertion removal. Pandhi et al.6 performed biomechanical testing of cadavers and reported that 5-mm bony resections of both the medial acromion and the distal clavicle have shown a more significant anterior-posterior load to failure of the ACJ than a resection of 10 mm to the distal clavicle alone. On the basis of those theories, the resection of both the medial acromion by about 3 to 4 mm and the distal clavicle by about 4 to 5 mm would be able to create the 8- to 10-mm resection length while preserving ACJ stability.
Our technique is reported as an alternative arthroscopic approach in symptomatic ACJ osteoarthritis with resection of the distal clavicle together with the medial border of the acromion. The technique has advantages because it is a simple and reproducible method and is similar to the traditional DCE. The difference is that the surgeon simply turns the burr (acromionizer) to resect the medial border of the acromion. This can preserve the acromioclavicular ligament and joint capsule and achieve an adequate resection length. This technique has a limitation or risk in a patient with hypertrophy of the superior portion of the distal clavicle and the medial border of the acromion. The resection is technically demanding and may not be considered arthroscopically simple because it is necessary to apply pressure on the distal clavicle manually during burring to aid in the resection of the superior aspect. In certain cases, we have had to change to an open surgical procedure (Table 3).

References