Technical Note

Arthroscopic Distal Clavicle Resection Through the Supraspinatus Fossa Portal

Jin Tang, B.M., and Jinzhong Zhao, M.D.

Abstract: Disorders of the acromioclavicular (AC) joint quite often necessitate distal clavicle resection (DCR). Arthroscopic DCR is favored because of it is mini-invasive and convenient to treat concomitant intraarticular or subacromial lesions. In previous reports, arthroscopic DCR was performed through the anterior portal with the patient in beach chair position. However, when the patient is in the lateral decubitus position, it is inconvenient to perform DCR through the anterior portal. Thus, we introduce a special DCR technique through the supraspinatus fossa (SSF) portal. The critical point of this technique is viewing the acromioclavicular joint through the routine posterior portal, creating the SSF portal at the anterior edge of the scapular spine and the same medial-to-lateral level to the AC joint, and enough removal of the posterior edge of the distal clavicle. We believe the introduction of this technique will provide a special technical option when DCR is needed.

Acromioclavicular (AC) joint disorders, which can occur in isolation or in combination with intraarticular or subacromial disorders, are conditions that may impede shoulder function. Recalcitrant symptoms arising from the AC joint necessitate distal clavicle resection. Although it has been reported that no significant difference is detected between open and arthroscopic joint resection regarding functional restoration,[1] mini-invasive arthroscopic procedures are still preferred for their convenience to treat the concomitant intraarticular or subacromial lesions.[2]

Regarding the specific technique of arthroscopic DCR, it was performed in previous reports mostly through the anterior portal, with arthroscopic observation through the midlateral portal or accessary anterolateral portal.[3-5] These procedures are specially developed to be performed with the patient in the beach chair position. However, when the patient is in the lateral decubitus position, it is inconvenient to perform DCR through the anterior portal. Thus, we introduce a special DCR technique through the SSF portal, with arthroscopic observation through the routine posterior portal. The indication of this technique is recalcitrant symptomatic osteoarthritis of the acromioclavicular joint,[6] distal clavicle osteolysis,[7] and inadvertent acromioclavicular joint opening during acromioplasty or subacromial decompression.[8]

Surgical Technique

Patient Position and Portals

The patient is placed in the lateral decubitus position with 10-pound traction of the arm. Routine posterior, anterior, and midlateral portals are fashioned. Combined intraarticular and subacromial lesions are addressed (Table 1).

Finding the Acromioclavicular Joint

With the arthroscope placed in the subacromial space through the posterior portal and the instruments (a radiofrequency probe and an arthroscopy motorized shaver) placed in the midlateral portal, the acromioclavicular joint is detected. The

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Table 1. Step-by-step Procedure

1. The scope is placed into the subacromial space through the posterior portal.
2. The inferior capsule of the acromioclavicular joint is opened to define the joint space.
3. The underside of the acromioclavicular joint is debrided.
4. The supraspinatus fossa portal is created.
5. All the tissue in the joint space is removed.
6. The posterior edge of the distal clavicle is removed.
7. The distal clavicle is resected to an expected length.
8. The medial border of the inferior side of the acromion is removed.
9. Distal clavicle-scapular spine impingement is checked.

inferior capsule of the acromioclavicular joint is opened to define the AC space. The inferior capsule is removed, and the underside of the AC joint is debrided (Fig 1; Video 1).

Creating the Supraspinatus Fossa Portal

With the scope facing upward to the AC joint, a guide needle is placed through the supraspinatus fossa to the posterior side of the AC joint to locate the SSF portal. The ideal SSF portal is located at the anterior edge of the scapular spine and the same medial-to-lateral level of the AC joint (Fig 2). Multiple tries are usually needed for the desired location. Once the SSF portal is created, an obturator is placed through this portal to the posterior side of the AC joint to ensure the proper location of this portal (Fig 3). A shaver is placed in this portal to perform debridement at the posterior side of the AC joint (Fig 4).

Exposing the Distal End of the Clavicle

A radiofrequency probe is placed in the SSF portal. All the tissue in the AC space, including the cartilage layer and other fibrous tissues, is removed to fully expose the distal clavicle (Fig 5). Care is taken to preserve the anterior and superior AC ligament to the utmost.

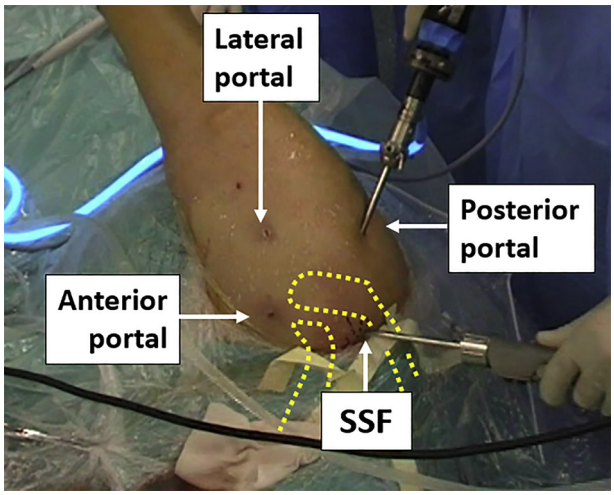

Fig 2. Illustration of portals used for arthroscopic distal clavicle resection. Right shoulder.

Resecting the Distal End of the Clavicle

An arthroscopic motorized burr is placed in the SSF portal. The posterior side of the distal end of the clavicle is removed (Fig 6), and the distal clavicle is removed from the posterior to the anterior side to obtain a 10-mm-wide AC space (Fig 7). Care is taken to fully remove the posterior edge of the distal clavicle to prevent distal clavicle-scapula spine impingement.

The medial edge of the inferior side of the acromion is also removed when the native AC joint space is not perpendicular but in a superolateral-to-inferomedial obliqueness, to enlarge the AC space without too

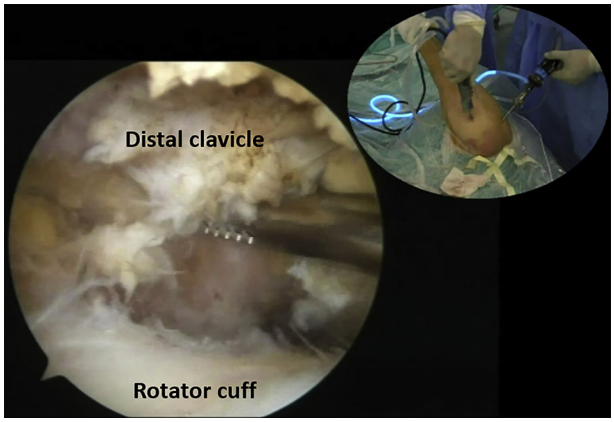

Fig 1. Debridement under the acromioclavicular joint through the midlateral portal. Arthroscopic view of right shoulder through the posterior portal.

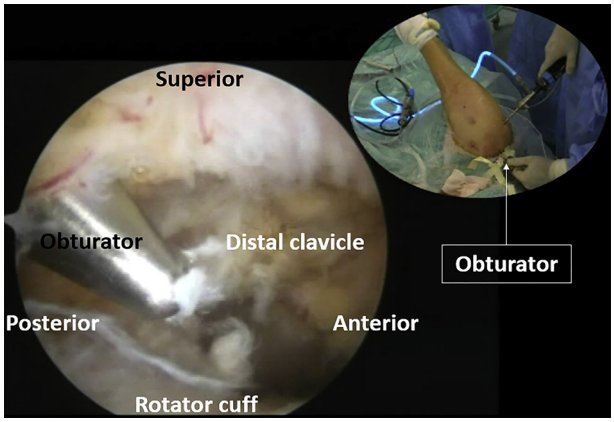

Fig 3. Checking the supraspinatus fossa portal with an obturator. Arthroscopic view of right shoulder through the posterior portal.

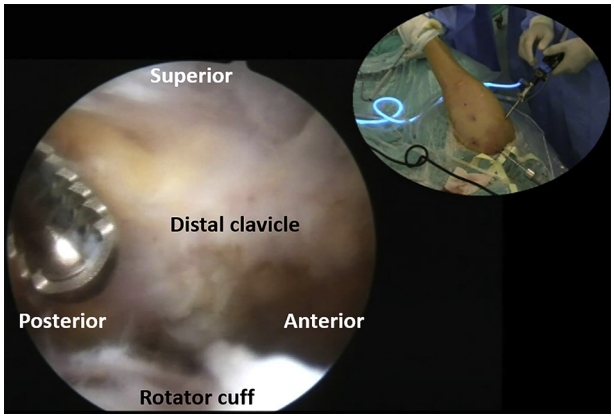

Fig 4. Debridement at the posterior side of the acromioclavicular joint through the supraspinatus fossa portal. Arthroscopic view of right shoulder through the posterior portal.

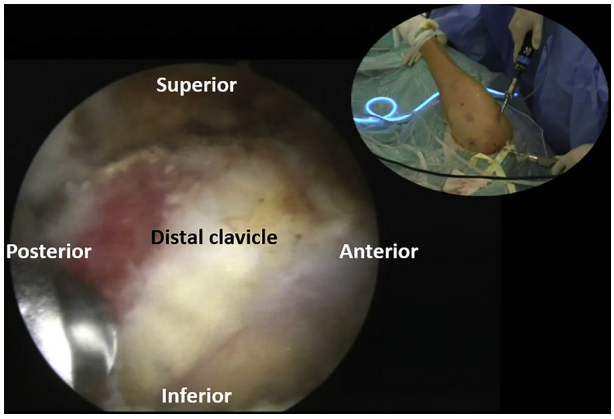

Fig 6. Beginning distal clavicle resection from its posterior edge through the supraspinatus fossa portal. Arthroscopic view of right shoulder through the posterior portal.

much resection of the distal clavicle (Fig 8). The distal clavicle is pushed backward to check whether there is distal clavicle-scapula spine impingement. If so, further removal of the posterior edge of the distal clavicle is performed till the impingement is eliminated (Fig 9). When distal clavicle hypertrophy exists, further medial resection of the clavicular end is performed to remove the enlarged portion until a reduced cross-section view appears (Figs 10 and 11).

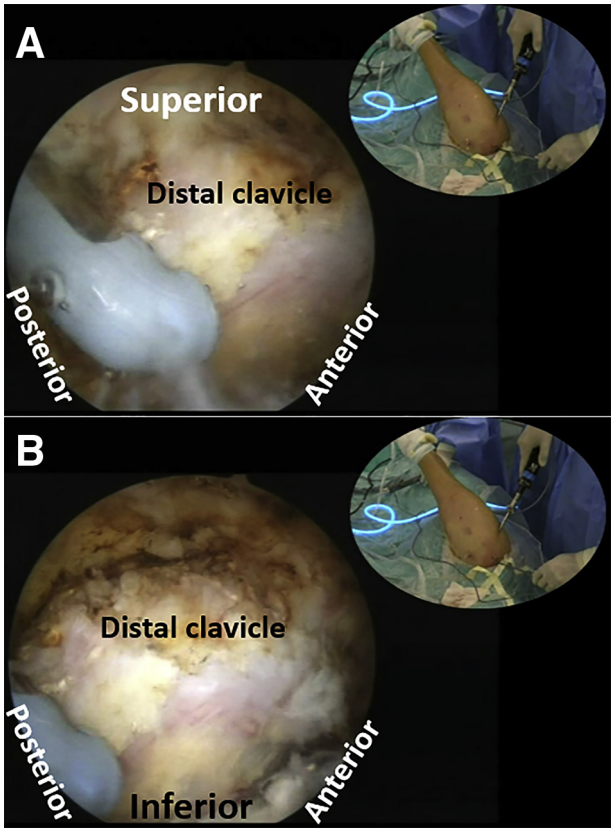

Fig 5. Exposing the distal clavicle through the supraspinatus fossa portal. (A) At the beginning of exposing. (B) After exposing. Arthroscopic view of right shoulder through the posterior portal.

Postoperative Rehabilitation

For isolated AC joint disorders, range of motion exercise and muscle strengthening begin immediately after the operation. In case of combined lesions, such as repaired rotator cuff, the rehabilitation protocol abides by the protocol for the combined lesions.

Discussion

Clinically, isolated AC disorders are rare. AC disorders are always combined with other lesions, such as rotator cuff tear or disorders of the long head of the biceps brachii or the coracoacromial arch.

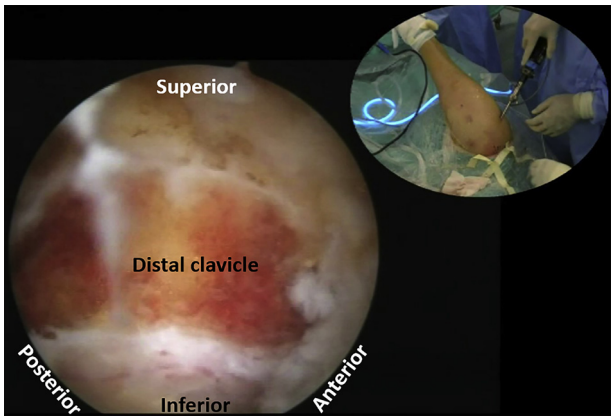

Fig 7. Arthroscopic view of right shoulder through the posterior portal after preliminary distal clavicular resection.

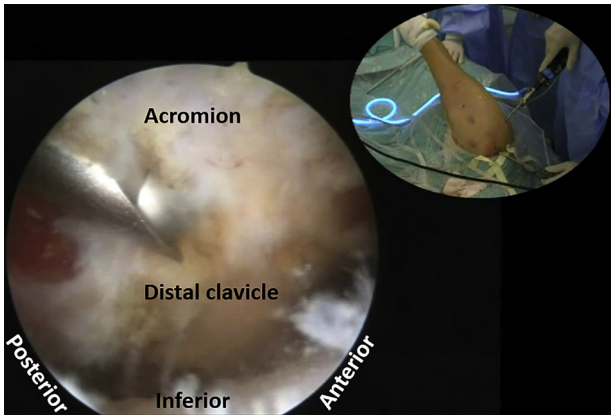

Fig 8. Resection of the medial border of the inferior acromion through the supraspinatus fossa portal. Arthroscopic view of right shoulder through the posterior portal.

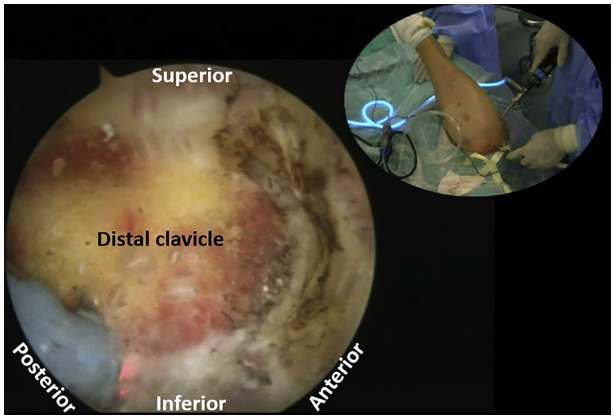

Fig 10. Arthroscopic view of right shoulder through the posterior portal after final distal clavicular resection.

Although the advantage of DCR in case of rotator cuff tear still needs to be proven, DCR is a typical procedure clinically.[9,10] To address all these lesions efficiently, a time-sparing DCR technique is preferred. The current procedure usually takes 10 to 15 minutes, leaving time to treat more complicated combined lesions.

This technique is special in that the DCR is completed through an SSF portal instead of the anterior portal. The SSF portal is different from the routine Neviaser portal because it is located more lateral. Another specialty of this technique is that the AC joint is observed through the posterior portal instead of through the midlateral portal or accessary anterolateral portal. Through the routine posterior portal, the entire AC joint can be observed. With the patient in lateral decubitus position, it is extremely convenient to perform DCR through the SSF portal while viewing through the posterior portal.

The pearls and pitfalls of this technique are listed in Table 2. The most critical step is the proper creation of the SSF, which should be located at the anterior edge of the scapular spine, just parallel to the AC space in a medial-to-lateral direction. Too-medial location of this portal makes the resection maneuver difficult. During DCR, the anterior and superior capsule should be preserved to minimize resulting AC instability.[11]

Although this DCR technique is developed for patients in lateral decubitus position it can also be used for patients in beach chair position. The main advantage of this technique is that the posterior edge of the distal clavicle cannot be overlooked to eliminate distal clavicle-scapular spine impingement. The main disadvantage of this technique is that the posterior AC ligament is always disrupted, which may result in AC joint instability.

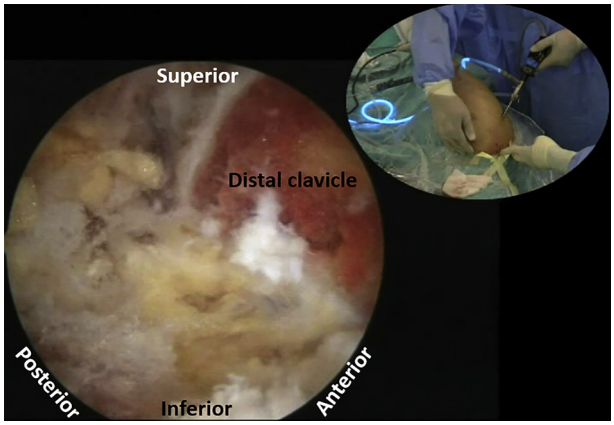

Fig 9. Checking whether there is distal clavicle-scapular spine impingement after distal clavicle resection. Arthroscopic view of right shoulder through the posterior portal.

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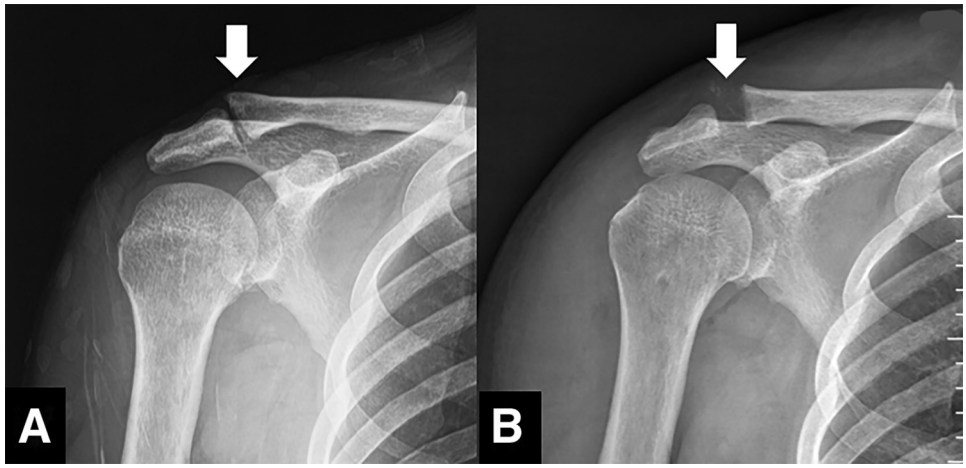

Fig 11. Anterioposterior view radiography before (A) and after (B) distal clavicle resection. Right shoulder. Arrows indicate acromioclavicular joint osteoarthritis (A) and resected distal clavicle (B).

Table 2. Pearls and Pitfalls

1. When there is muscle atrophy of the rotator cuff muscle, the inferior side of the acromioclavicular (AC) joint can be easily exposed after debridement. However, when the rotator cuff muscle is normal, it may fill the sub-AC space and hinder observation. In this case, a switching stick can be placed through the anterior portal to press the rotator cuff muscle downward.
2. The supraspinatus fossa portal should be located against the scapular spine instead of the distal clavicle. Otherwise, it may be difficult to remove the superior part of the distal clavicle.
3. The posterior edge of the distal clavicle should be removed enough to prevent distal clavicle-scapular spine impingement.
4. Because the cortex of the distal clavicle is white, it may be confused with the surrounding capsule ligament. It should be detected and fully removed; otherwise, it may cause AC space symptoms.
5. The anterior and superior AC ligament should be preserved to the utmost to reduce AC instability.
6. The anterior posterior stability of the acromioclavicular joint should be checked.

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