A Shortcut to Arthroscopic Suprascapular Nerve Decompression at the Suprascapular Notch: Arthroscopic Landmarks and Surgical Technique

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Abstract: Arthroscopic suprascapular nerve decompression at the suprascapular notch is a technically demanding surgical procedure with a steep learning curve. The aim of this Technical Note is to describe important pearls for an arthroscopic decompression of the suprascapular nerve relying on the palpation of the coracoclavicular ligaments before starting the arthroscopic visualization. This reduces the time and minimizes the resection of the surrounding fat.

Arthroscopic suprascapular nerve (SSN) decompression at the suprascapular (SS) notch is a technically demanding surgical procedure with a steep learning curve. This is because the nerve is located medial to the acromioclavicular joint and requires following several landmarks to reach the area, while passing through the fat that needs to be resected, with the potential risk of bleeding. This is a time-consuming step and is often difficult in the earlier learning curve. Potential complications may occur, especially the injury of the SS artery, which shows a lot of variability in the location and origin. The aim of this Technical Note is to describe important pearls for an arthroscopic decompression of the SSN relying on the palpation of the coracoclavicular (CC) ligaments before starting the arthroscopic visualization. This reduces the time and minimizes the resection of the surrounding fat.

Preoperative Preparation and Patient Positioning

After general anesthesia and interscalene nerve block, the patient is placed in the beach chair position and the bony landmarks of the shoulder (scapular spine, acromion, acromioclavicular joint, and coracoid tip) are drawn with a marker pen. Sterilization and draping of the shoulder are done in the classic manner used for standard arthroscopic shoulder surgery but with care to expose medially up to the root of the neck.

Arthroscopic Portals

For decompression of the SSN, we use 3 portals: a lateral portal and 2 medial portals. The lateral portal is in line with the posterior edge of the lateral end of the clavicle and about 2 cm lateral to the acromion. However, with a 30° scope, it might be easier to move 1 to 2 cm posterior to get a better visualization of the SS ligament. Two portals are placed medial to the acromion, the medial and far medial portals. They are placed approximately 1.5 and 3.5 cm medial to the acromioclavicular joint and 1.5 cm posterior to the clavicle. The far medial portal is for retraction of the fat and the suprascapular artery, while the medial portal (Neviaser portal) is used to introduce the instrument for cutting the SS ligament (see Video 1).

Procedure

Through the far medial portal, we insert a switching stick (Karl Storz, Tuttinglen, Germany) and direct it medial and anterior; through tactile sensation we palpate the CC ligaments. They feel like a hard
Fig 1. (A) Left shoulder, posterolateral view. Through the far medial portal, the switching stick is used to palpate the lateral border of the coracoclavicular (CC) ligaments by tactile sensation. (B) Left shoulder, posterolateral view. The switching stick is moved in a windshield wiper-like movement to palpate the medial border of the CC ligaments and then the suprascapular ligament. (C) Left shoulder, posterolateral view. The scope is triangulated on the switching stick through the lateral portal to visualize the CC ligaments. (D) Left shoulder, arthroscopic view of the subacromial space through the lateral portal using a 30° scope. The switching stick is further used to wipe the fat and move it medially with the suprascapular artery to expose the suprascapular nerve. (E, F) Left shoulder arthroscopic view, subacromial space through the lateral portal using a 30° scope. While the switching stick is retracting and protecting the suprascapular artery, the punch is used through the medial portal to cut the SS ligament and expose the suprascapular nerve (SSN).
structure, and there is a feeling of giving way on both the medial and lateral sides. Once you are on the medial edge of the CC ligaments, you can bring the stick downward on the slope to feel the base of the coracoid process and the top of the SS ligament (see Fig 1A and B).

After reaching the desired area, the scope is introduced through the lateral portal and, through triangulation, is progressed, by feeling, medially until it reaches the switching stick edge (see Fig 1C). The switching stick is used to clear away the fat and retract the SS artery medially. A shaver may be inserted through the medial portal to clear as little as possible from the fat and improve the view under vision, while maintaining the medial retraction of the artery by the switching stick (Fig 1D). Once a clear view is achieved, a cutting instrument like an arthroscopic scissors or low-profile basket forceps (Karl Storz) is used to cut the SS ligament. The switching stick is used to lift the nerve and confirm its release from the SS notch (Fig 1E and F). The steps of this surgical technique and the possible pitfalls are summarized in Table 1.

Recently, we have also used the medial portal for visualization, if the SS ligament is not thoroughly seen from the lateral portal. Then we use the cutting instrument through the far medial portal.

Discussion

SSN entrapment at the SS notch is a rare condition and is difficult to diagnose clinically, requiring a high index of suspicion to diagnose it.4,5 Most of the cases are idiopathic, but it commonly affects overhead sports athletes. Patients with malunited scapular fractures and ossified SS ligament are also susceptible to nerve entrapment.4 Additionally, several authors relate the fatty atrophy of the rotator cuff to compression of the nerve through the retraction of the cuff medially and recommend decompressing the nerve routinely with all massive rotator cuff tears.4,5 Although there are several open and arthroscopic techniques to decompress the SSN, they all depend on the localization of the CC ligaments, which lead to the SS ligament.1,4,5

The importance of the CC ligaments as a landmark for the SS ligament can be understood by the study of
Harris et al., who evaluated the anatomical variability of the CC ligaments. They found that despite the variability of the shape, length, and insertion area of the CC ligaments, the conoid ligament and the SS ligament shared, in all their studied cases, the same insertion on the coracoid process. Harris et al. also found that the fibers of the conoid component of the CC ligaments blend with the fibers of the SS ligament. The potential space surrounding the SSN and the CC ligaments is filled with fat that makes visualization in this area at the start of arthroscopy very difficult, and usually fat resection is done as the first step in all the previously described arthroscopic decompression techniques. This step is reported to be the most time-consuming step in the surgery as it is associated with bleeding. To reduce the bleeding, Yamakado recommended increasing the pressure of the pump to 100 mmHg, which has drawbacks or even complications. Our technique depends on tactile sensation to reach the landmark, which requires minimal fat resection to reach the CC ligaments, thus shortening the operative time and reducing the risk of bleeding or SS artery injury. Furthermore, this is an easy and reproducible technique that has a less steep learning curve compared with the previously described techniques. The difference between our surgical technique and the previously described techniques for arthroscopic decompression of the SSN as well as the advantages and disadvantages of each are described in Table 2. Although this technique shortens the operative time of the arthroscopic SSN decompression, it is still technically demanding, with a potentially high risk of complications. We recommend that this surgery be

Table 1. Shortcut Technique for Arthroscopic Suprascapular Nerve Decompression at the Suprascapular Notch: Main Steps and Pitfalls

| Step                          | Description                                                                 | Pitfalls                                                                                           |
|-------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Patient positioning           | Beach chair position                                                        | Drapes should be placed to allow medial exposure of the shoulder up to the root of the neck, to allow the placement of 2 portals medial to the acromion by 3.5 cm. |
| Lateral portal                | Placed about 2 cm lateral to the acromion in line with the posterior border of the lateral end of the clavicle. | Too much anterior placement of the portal will not allow clear visualization of the targeted structures in the surgical field. |
| Medial and far medial portals | Placed 1.5 and 3.5 cm medial to the acromion and 1.5 cm posterior to the clavicle | Placing these portals too close to each other or too close to the clavicle will not allow easy manipulation of the instruments |
| Obtaining a good arthroscopic view | A switching stick is placed through the far medial portal to feel the coracoclavicular (CC) ligaments, and then the scope is introduced through the lateral portal and triangulated on the switching stick. The switching stick is used to clear the view by displacing the fat medially using a windshield wiper-like movement. | Using the shaver to remove the fat will cause a lot of bleeding and increase the risk of injury to the suprascapular (SS) artery. |
| Decompression of the SS nerve | The stick is moved downward along the medial border of the CC ligaments to feel the base of the coracoid process and the top of the SS ligament. Once there, an arthroscopic scissors or low-profile basket forceps is used to cut the SS ligament through the medial portal. | Starting the decompression before obtaining a good view or without protecting the SS artery. |

Table 2. Advantages and Disadvantages of the Classic Technique and the Shortcut Technique for Arthroscopic Suprascapular Nerve Decompression at the Suprascapular Notch

| Surgical Technique | Classic Technique for Arthroscopic Suprascapular Nerve Decompression⁵ | Shortcut Technique for Arthroscopic Suprascapular Nerve Decompression |
|-------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------|
| Principle         | Resecting the fat medial to the subacromial space under vision until reaching the suprascapular notch. | Palpating the coracoclavicular ligaments before starting the arthroscopic visualization, which is used as a landmark to guide the scope directly to the suprascapular notch. |
| Advantages        | • Every step of the surgery is done under vision.                      | • Minimizes fat resection.                                           |
|                   | • Long time operative time.                                            | • Reduces the risk of injury of the suprascapular artery.            |
|                   | • Bleeding caused by fat resection reduces the visualization.          | • Shortens the operative time.                                      |
|                   | • Relatively higher risk of injury of suprascapular artery.            | • Technically demanding.                                             |
carried out by a highly skilled arthroscopic shoulder surgeon.

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