Arthroscopic Capsular Release for Idiopathic Adhesive Capsulitis

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Introduction

Our technique of arthroscopic capsular release involving two posterior portals and one anterior portal, to accomplish a complete 360° release, improves motion and reduces pain in patients with idiopathic adhesive capsulitis.

Surgical management strategies for idiopathic adhesive capsulitis (a painful, stiff shoulder of unknown etiology) include an open release, manipulation under anesthesia, arthroscopic capsular release, and combinations of open or arthroscopic capsular release with manipulation under anesthesia¹⁻³. Arthroscopic capsular release has been favored over manipulation under anesthesia¹ as it allows a more controlled and complete release of the contracted capsule, reduces the chance of a fracture, and has a more immediate outcome. Recently, arthroscopic capsular release for idiopathic adhesive capsulitis showed excellent long-term results in a series of forty-three patients (forty-nine shoulders)⁴. At a mean of seven years, these patients showed improvement in the range of motion of the shoulder joint, a decrease in pain frequency and severity, and improvement in shoulder function. In arthroscopic capsular release, as described in detail in the following sections, two posterior portals and one anterior portal are used to perform a complete 360° release of the capsule of the glenohumeral joint. The goal of the procedure is to improve the range of motion of the shoulder joint and to reduce pain in patients with idiopathic adhesive capsulitis.

The arthroscopic capsular release is performed in eight consecutive steps:

Step 1: Position the patient

Step 2: Establish a routine posterior glenohumeral joint arthroscopy portal

Step 3: Establish an anterior portal

Step 4: Release the rotator cuff interval and subscapularis tendon

Step 5: Release the anterior-inferior aspect of the capsule

Step 6: Establish a posterior-inferior portal

Step 7: Release the posterior-inferior aspect of the capsule

Step 8: Gently manipulate the arm

Step 1: Position the Patient

Place the patient in a beach-chair position for shoulder joint arthroscopy.

- Following administration of interscalene regional anesthesia, place the patient in a beach-chair position for shoulder joint arthroscopy.
- Assess the range of motion of the shoulder joint.
- Perform standard preparation and draping.

Step 2: Establish a Routine Posterior Glenohumeral Joint Arthroscopy Portal

Use a routine posterior glenohumeral arthroscopy portal to introduce the arthroscope.

- Establish a routine posterior glenohumeral arthroscopy portal (Fig. 1-A).
- Introduce the arthroscope into the glenohumeral joint via the posterior portal.
- Inspect the glenohumeral joint.

Step 3: Establish an Anterior Portal

Establish the anterior portal under direct vision using a spinal needle.

- Establish the anterior portal under direct vision using a spinal needle lateral to the coracoid process (Fig. 1-B). The spinal needle is used to ensure that the instruments can access the

inferior aspect of the joint capsule and, if possible, the posterior aspect of the capsule. Position the anterior portal just superior to the upper border of the subscapularis tendon.

Step 4: Release the Rotator Cuff Interval and Subscapularis Tendon

Release the rotator cuff interval, dividing no more than the upper half of the intra-articular subscapularis tendon.

- Release the tissue in the rotator cuff interval to the anterior border of the long head of the biceps and medially to the base of the coracoid process under direct vision using a 3.0-mm CoVac 50 ArthroWand (ArthroCare, Sunnyvale, California) and/or an arthroscopic punch.
- Divide no more than the upper half of the intra-articular subscapularis tendon (Fig. 2).

Step 5: Release the Anterior-Inferior Aspect of the Capsule

Cut the anterior-inferior aspect of the capsule completely.

- Through the anterior portal, cut the anterior-inferior aspect of the capsule completely, approximately 2 mm lateral to the glenoid labrum (Fig. 3 and Video 1).

Step 6: Establish a Posterior-Inferior Portal

Determine the location of the posterior-inferior portal with a spinal needle.

- As there are no helpful anatomical landmarks with which to judge the optimal location of the posterior-inferior portal, determine its location with a spinal needle. The tip of the spinal needle should be able to reach the posterior-inferior aspect of the capsule from at least the 5 to 11 o'clock position (Figs. 4-A and 4-B).

Step 7: Release the Posterior-Inferior Aspect of the Capsule

Release or perforate the posterior-inferior capsule of the joint with the arthroscopic wand.

- Release the posterior-inferior aspect of the capsule of the joint using the arthroscopic

wand via the posterior-inferior portal. Aim for a complete 360° release of the joint capsule.

- Alternatively, if access to the posterior or inferior aspect of the capsule is technically challenging, perforate as much of the posterior-inferior aspect of the capsule as possible using the arthroscopic wand.

Step 8: Gently Manipulate the Arm

Manipulate the arm in abduction, then forward and backward flexion, and then external and internal rotation.

- Gently manipulate the arm and assess the range of motion of the glenohumeral joint. Start the arm manipulation in abduction, followed by forward flexion and backward flexion. Next, externally and internally rotate the arm. The surgical assistant should hold the shoulder girdle firmly using both hands to stabilize the scapula.
- Inject 10 mL of Depo-Medrol (methylprednisolone) with lidocaine into the glenohumeral joint for pain relief.
- Close the portals and apply a soft bulky dressing. No arm sling is needed.

Results

An arthroscopic capsular release with use of the technique described here was performed in forty-nine shoulders in forty-three patients with idiopathic adhesive capsulitis⁴. Eight patients indicated that they had bilateral idiopathic adhesive capsulitis at some point, and six of them required an arthroscopic capsular release for both shoulders. The mean age of the patients was sixty-one years. At a mean of seven years (range, five to thirteen years) after the operation, these patients reported a significant decrease in pain frequency and severity, increase in shoulder function, and decrease in shoulder joint stiffness in comparison with the findings at the initial presentation and after one year of follow-up. The shoulder joint range of motion also improved and was comparable with that of the contralateral shoulder. There were no complications.

What to Watch For

Indications

- Idiopathic adhesive capsulitis

Contraindications

- Shoulder joint stiffness related to osteoarthritis
- Active joint infection

Pitfalls & Challenges

- The axillary nerve is the important anatomic structure at risk during this procedure. The axillary nerve is closest to the glenohumeral joint capsule between the 5 and 7 o'clock positions. Anatomic studies showed that, during abduction and external rotation of the arm, the axillary nerve stays in its position while the glenohumeral capsule tightens, which increases the distance between the two structures⁵. Thus, when the arthroscopic capsular release is performed, the incision of the inferior half of the glenohumeral joint capsule should preferably be made with the arm abducted and externally rotated.
- Damage to the long head of the biceps tendon anchor should be avoided.
- The shoulder should not be immobilized after the surgery; postoperative exercises should start immediately, on the day of the surgery.

Clinical Comments

- To optimize the arthroscopic view during surgery, we prefer to use an automatic pump system for the inflow and outflow control of the saline solution into the glenohumeral joint.
- When there is a partial or full-thickness tear of the rotator cuff, it can be repaired during the same operative session with use of the tendon undersurface repair technique⁶. Establish a lateral portal under direct vision using a spinal needle. Debride the edges of the torn tendon using a shaver system. The tendon can be repaired with an inverted mattress suture and a knotless suture anchor (OPUS AutoCuff System, ArthroCare).
- A portion of the intra-articular subscapularis tendon is also divided during surgery as this improves the range of motion of the shoulder joint postoperatively⁷.

Appendix

A video demonstrating the capsular release procedure in a right frozen shoulder is available with the online version of this article as a data supplement at jbjs.org.

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Figures

Fig. 1-A

Standard placement of the trocar in the posterior portal.

Fig. 1-B

Introduction of the spinal needle anteriorly and the arthroscope into the posterior portal (Step 2).

Fig. 2

Intra-articular view with the arthroscope in the posterior portal, illustrating the partial division of the subscapularis tendon (Step 4).

Fig. 3

The anterior-inferior capsular release with use of an arthroscopic wand (Step 5). This intra-articular view shows the arthroscope in the posterior portal and the arthroscopic wand introduced from the anterior portal.

Fig. 4-A

Outside view of the marking of the position of the posterior-inferior portal (Step 6).

Fig. 4-B

Intra-articular view with the arthroscope in the posterior portal and the tip of the spinal needle introduced from the posterior-inferior portal.

Fig. 1-A

Fig. 1-B

Fig. 2

Fig. 3

Fig. 4-A

Fig. 4-B