

Arthroscopic Reduction of a Chronic Locked Posterior Shoulder Dislocation



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Abstract: Posterior shoulder dislocation is a rare condition. It is easily overlooked and often appears in a chronic locked status, which makes the reduction difficult, even through open procedures. Few reports in the literature have described an isolated arthroscopic reduction because it is difficult to elevate the humeral head to the level of the glenoid surface and obtain anterior-posterior soft-tissue balance. On the basis of an analysis of the mechanisms of the locking of the humeral head and the soft-tissue imbalance, we describe a set of arthroscopic shoulder release and reduction techniques, which include mainly the removal of rotator interval tissue; a thorough subscapularis release from the coracoid, the conjoined tendon, and the glenoid; and a 360° capsule-muscle release from the glenoid and the scapula. The described technique is an effective method to obtain a medial-to-lateral humeral head reduction and anterior-to-posterior soft-tissue balance. The introduction of this technique will provide a practical tool for surgeons to realize an arthroscopic shoulder reduction in the case of a chronic locked posterior shoulder dislocation.

Posterior shoulder dislocation is rare and easily overlooked because of the nearly normal shoulder appearance and the easily overlooked bulb sign on radiographs.^{1,2} For an acute posterior shoulder dislocation, a reduction with the patient under anesthesia is easy,^{3,4} and it is easy to maintain the reduction because there is no soft-tissue imbalance. However, for a chronic posterior shoulder dislocation, which usually appears in a locked status, a medial-to-lateral reduction and anterior-to-posterior soft-tissue balance are difficult to realize.^{5,6} We consider the capsule-muscle contracture and adhesion to be the main mechanisms that impede the lateralization of the humeral head and consider the rotator interval contracture, scar formation around the subscapularis, and obstruction of the biceps to be the main mechanisms of anterior-posterior

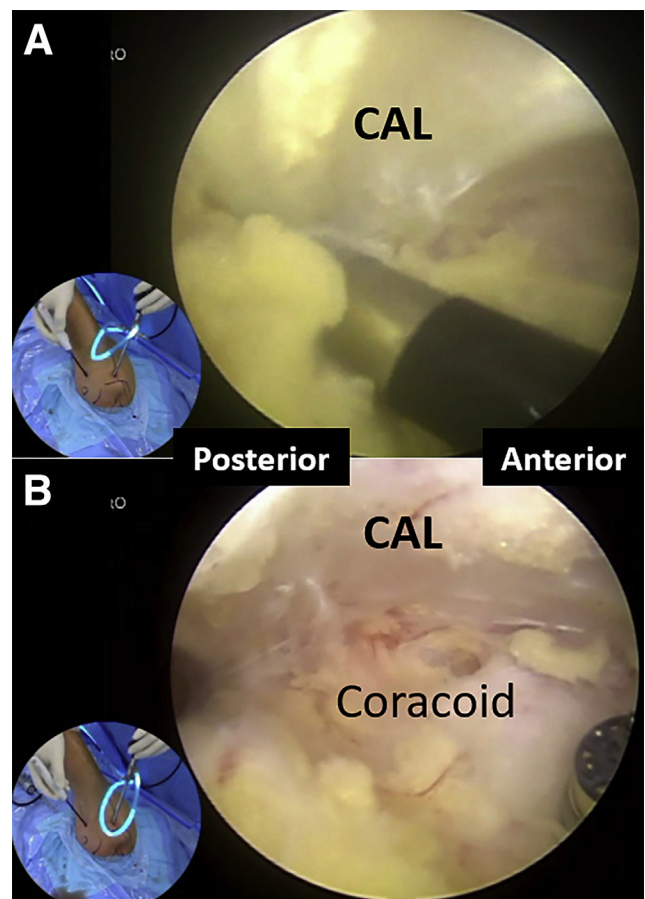


Fig 1. The subacromial space is debrided (A), and the coracoid is found along the coracoacromial ligament (CAL) (B) (arthroscopic view of right shoulder through midlateral portal).

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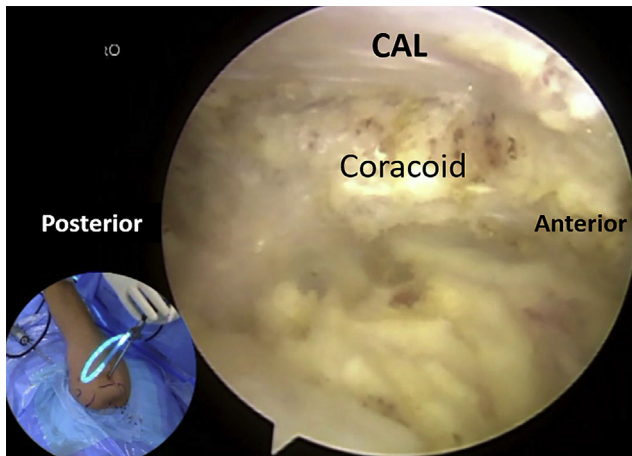


Fig 2. Release of rotator interval tissue and exposure of lateral side of coracoid (arthroscopic view of right shoulder through midlateral portal). (CAL, coracoacromial ligament.)

imbalance. Thus, we have developed a special arthroscopic shoulder release and reduction technique to address all these pathologic changes. Our experience indicates that we can address most locked posterior shoulder dislocations with this technique, no matter the chronicity of the dislocation.

This article introduces our arthroscopic shoulder reduction technique. The indication for this technique is a locked posterior shoulder dislocation in the chronic stage that causes severe functional impediment.

Surgical Procedure

Patient Positioning

General anesthesia and brachial plexus anesthesia are administered. The patient is placed in the lateral decubitus position with the arm in 30° of abduction and with 10 lb of traction. A routine midlateral portal is established, and a far anterior portal is created on the anterior midline of the upper arm, at a distance of approximately 5 cm to the coracoid tip.

Debridement in Subacromial Space and Release on Lateral Side of Coracoid

With the arthroscope placed in the midlateral portal and a shaver placed in the far anterior portal, debridement is performed in the subacromial space. The coracoacromial ligament is defined. The coracoid is found along the coracoacromial ligament. The rotator interval tissue is released from the lateral side of the coracoid (Fig 1). The coracoid base is exposed (Fig 2). The anterior side of the supraspinatus is identified, and the nearby rotator interval tissue is removed (Table 1, Video 1).

Release of Subscapularis From Coracoid and Conjoined Tendon

The inferior side of the coracoid is exposed. The adhesion between the inferior side of the coracoid and the subscapularis is released (Fig 3). The conjoined tendon is defined. The adhesion between the subscapularis and conjoined tendon is released (Fig 4). The scar tissue at the anterior-superior edge of the subscapularis is removed to fully expose the subscapularis (Fig 5).

Release of Anterior and Inferior Capsule

Routine anterior and anterior-superior portals are created. By use of these 2 portals, along with the midlateral portal, intra-articular debridement is performed through the rotator interval to expose the glenoid surface (Fig 6). The anterior and inferior capsule is released from the glenoid (Fig 7). The adhesion between the posterior side of the subscapularis and the anterior scapula is released (Fig 8).

Release of Long Head of Biceps and Superior Capsule

A superior-posterior portal is created at the posterolateral edge of the acromion. The posterior edge of the

Table 1. Step-by-Step Procedure of Arthroscopic Reduction of Chronic Locked Posterior Shoulder Dislocation

1. Debridement is performed in the subacromial space.
2. The coracoid is found along the coracoacromial ligament.
3. The rotator interval tissue is removed from the lateral side of the coracoid.
4. The adhesion between the inferior side of the coracoid and the subscapularis is released.
5. The adhesion between the subscapularis and conjoined tendon is released.
6. The scar tissue at the anterior-superior edge of the subscapularis is removed to fully expose the subscapularis.
7. Intra-articular debridement is performed through the rotator interval to expose the glenoid surface.
8. The anterior and inferior capsule is released from the glenoid.
9. The adhesion between the posterior side of the subscapularis and anterior scapula is released.
10. The posterior edge of the glenoid is exposed.
11. The long head of the biceps, as well as the superior and posterior-superior capsule, is released from the glenoid.
12. The bony and scar tissue at the conjunction of the humeral insertion of the subscapularis and supraspinatus is removed to expose the humeral head.
13. The posterior capsule is released from the superior-to-inferior side.
14. The scar tissue between the posterior rotator cuff and the posterior scapula is thoroughly released.
15. An obturator is placed in the posterior portal to elevate the humeral head to the plane of the glenoid surface and then reduce it anteriorly.
16. The remaining posterior-inferior capsule is released from the glenoid.
17. Slight internal and external rotation of the arm is performed to achieve the final soft tissue balancing.
18. The humeral head is reduced to the center of the glenoid.

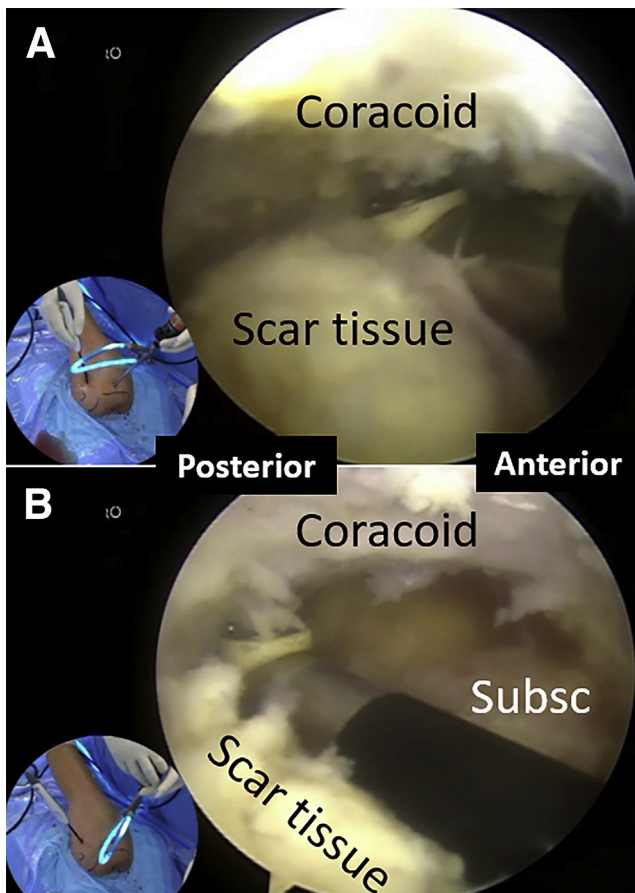


Fig 3. Release of subscapularis (Subsc) from inferior side of coracoid (arthroscopic view of right shoulder through mid-lateral portal). (A) During release. (B) After release.

glenoid is exposed. The long head of the biceps (LHB) and the superior capsule are released from the glenoid (Fig 9). The bony and scar tissue at the conjunction of the humeral insertion of the subscapularis and supraspinatus is removed (Fig 10).

Release of Posterior Capsule and Scar Tissue

With the arthroscope placed in the anterior-superior portal and instruments placed in the superior-posterior portal, the posterior capsule is released from the superior-to-inferior side. The posterior portal is fashioned for the release of the most inferior part of the posterior capsule. The scar tissue between the posterior rotator cuff and the posterior scapula is thoroughly released (Fig 11).

Reduction of Humeral Head

An obturator is placed in the posterior portal to elevate the humeral head to the plane of the glenoid surface and then reduce it anteriorly (Fig 12A). The remaining posterior-inferior capsule is released from

the glenoid. Slight internal and external rotation of the arm is performed to achieve the final soft tissue balancing. The humeral head is reduced to the center of the glenoid (Fig 12B).

Subsequent Repair

Posterior capsule repair, glenoid bone grafting,⁷ posterior glenohumeral ligament reconstruction, and humeral head bone grafting are conducted when indicated (Figs 13 and 14). The shoulder is immobilized in a brace in the neutral rotation position for 6 weeks, after which range-of-motion exercises are allowed.

Discussion

A chronic locked posterior shoulder dislocation is rare and is challenging to orthopaedic surgeons. Few surgeons have accumulated enough experience in their careers to treat this lesion owing to its rarity. The mechanism of its irreducibility is still unclear. There are

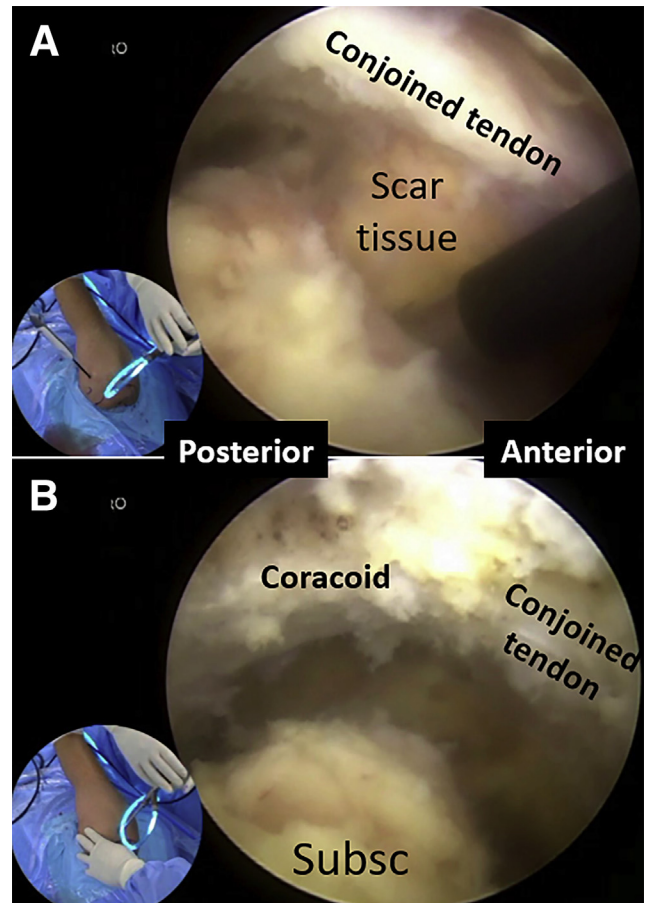


Fig 4. Release of subscapularis (Subsc) from conjoined tendon (arthroscopic view of right shoulder through mid-lateral portal). (A) During release. (B) After release.

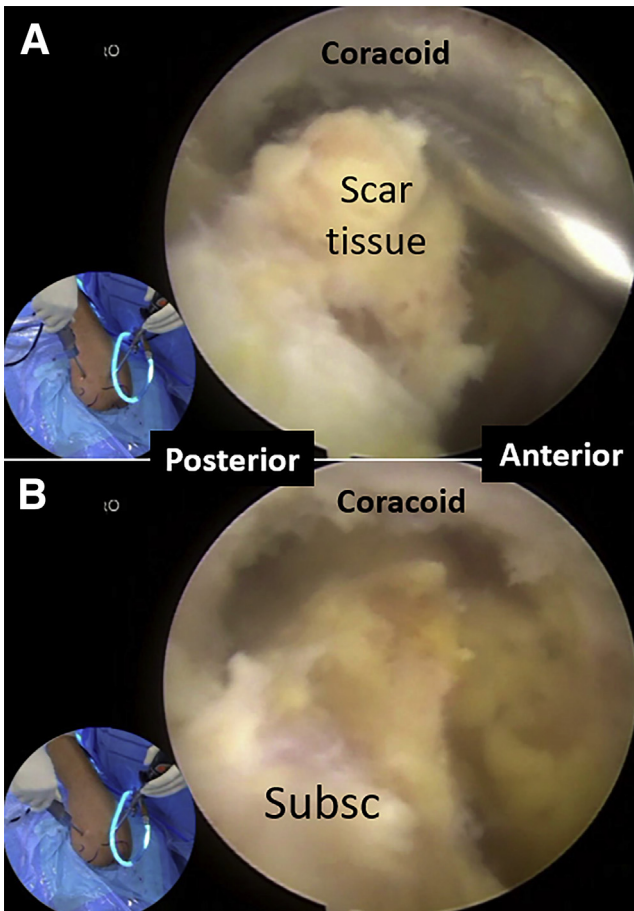


Fig 5. Removal of scar tissue on anterior and superior side of subscapularis (Subsc) (arthroscopic view of right shoulder through midlateral portal). (A) Before removal. (B) After removal.

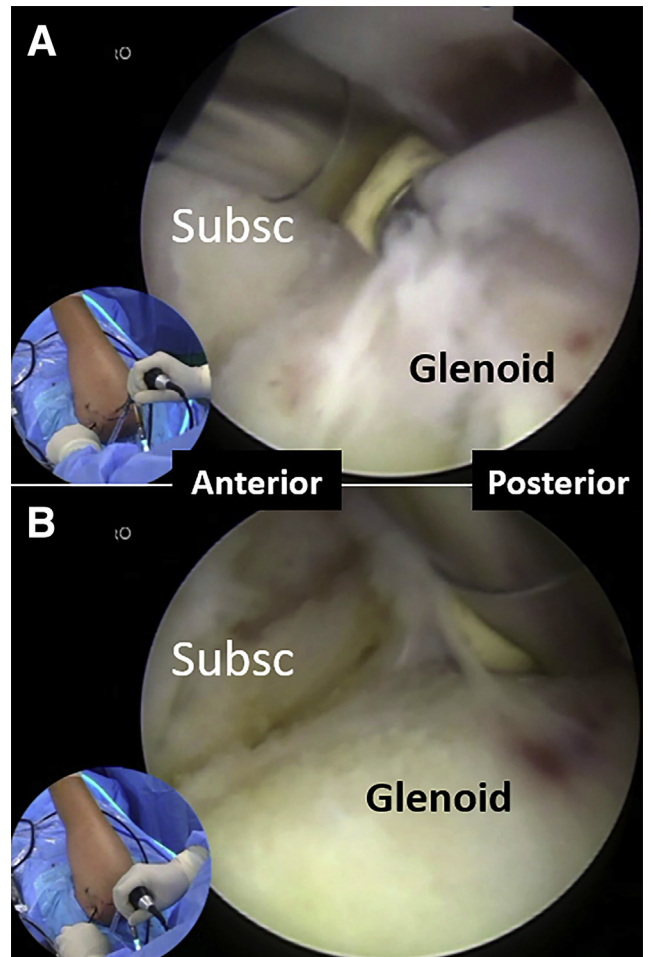


Fig 7. Release of anterior (A) and inferior (B) capsule from glenoid (arthroscopic view of right shoulder through anterior-superior portal). (Subsc, subscapularis.)

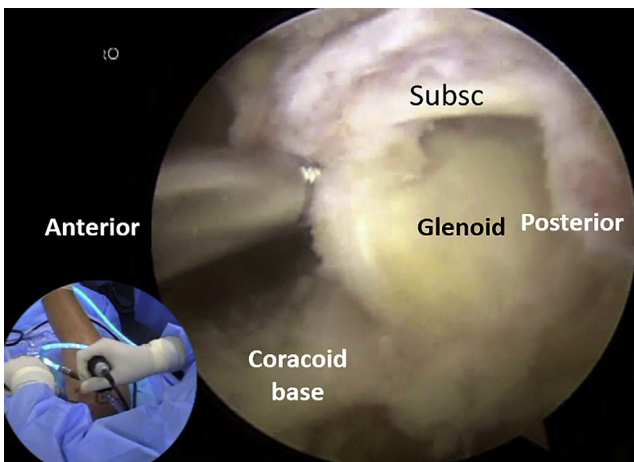


Fig 6. Access to glenohumeral joint through rotator interval (arthroscopic view of right shoulder through anterior-superior portal). (Subsc, subscapularis.)

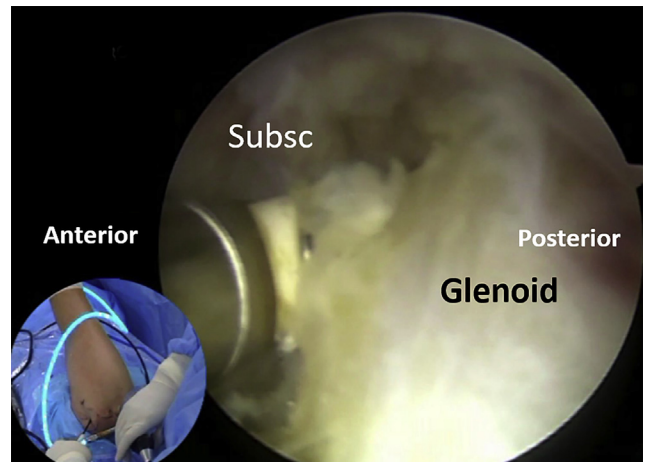


Fig 8. Release between subscapularis (Subsc) and scapula (arthroscopic view of right shoulder through anterior-superior portal).

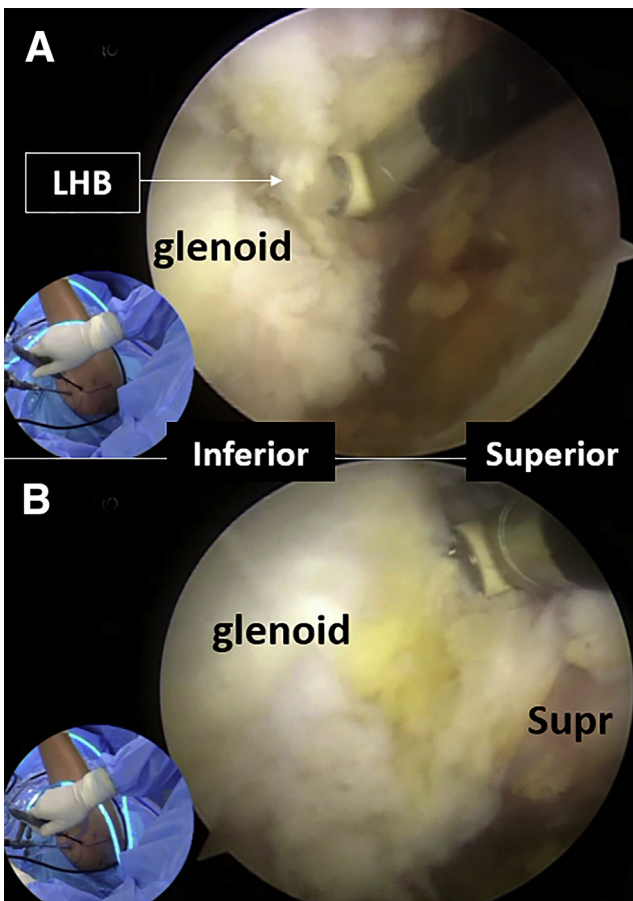


Fig 9. Release of long head of biceps (LHB) (A) and superior capsule (B) from glenoid (arthroscopic view of right shoulder through anterior portal). (Supra, supraspinatus.)

2 main problems in the surgical treatment of a chronic locked posterior shoulder dislocation: (1) It is difficult to reduce the humeral head to the level of the glenoid surface, and (2) it is difficult to obtain anterior-posterior soft-tissue balance, which means that even though the humeral head can be reduced to the level to the glenoid surface, it always stays in a posteriorly subluxated position.

From our point of view, the difficulty in achieving medial-to-lateral reduction is not because of the mechanical locking; rather, it is because of the global contracture of the capsule, as well as the adhesion between the rotator cuff and the scapula (Fig 15). To address these pathologic changes, a 360° capsule release and scar release between the rotator cuff and the scapula should be performed. Regarding the difficulty in obtaining anterior-posterior soft-tissue balance, we consider the main causes to be the adhesion of the

subscapularis to the surrounding structures and the nearby scar tissue formation (Fig 15). To address these pathologies, a thorough release of the subscapularis and scar removal should be performed. Furthermore, we consider the contracture or ossification of the rotator interval tissue and the dislocation and adhesion of the LHB to be factors that hinder both lateral and anterior reduction of the humeral head. Thus, complete rotator interval tissue removal and LHB tenotomy are proposed.

Matthewson and Wong⁶ introduced a purely arthroscopic surgical procedure for a chronic locked posterior shoulder dislocation. In their report, the glenohumeral joint could be accessed through a routine posterior portal. However, we believe that their case was not a typical chronically locked case because in a typical case, the locked humeral head prevents glenohumeral access

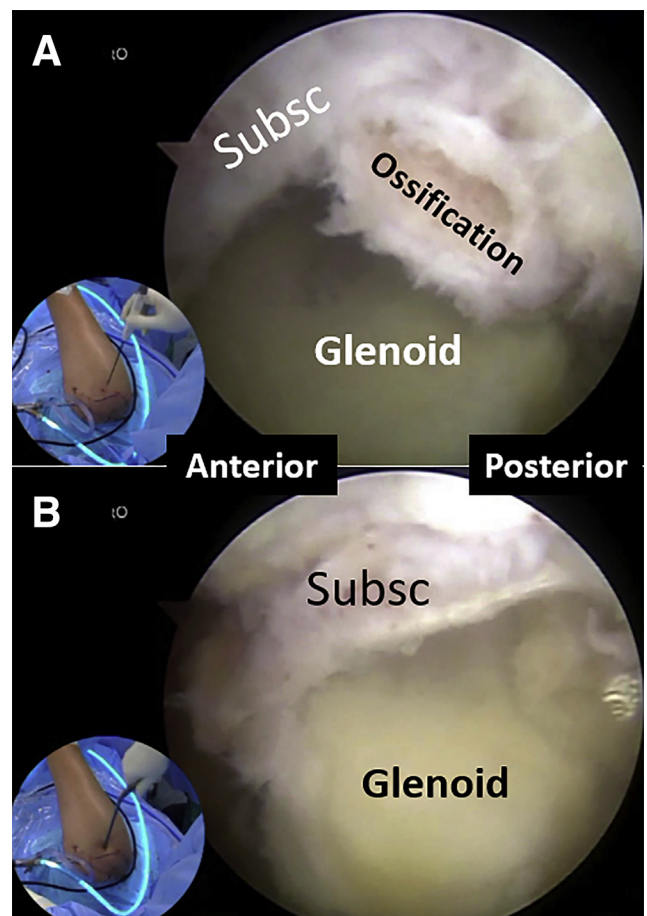


Fig 10. Removal of ossified tissue in rotator interval (arthroscopic view of right shoulder through anterior portal). (A) Before removal. (B) After removal. (Subsc, subscapularis.)

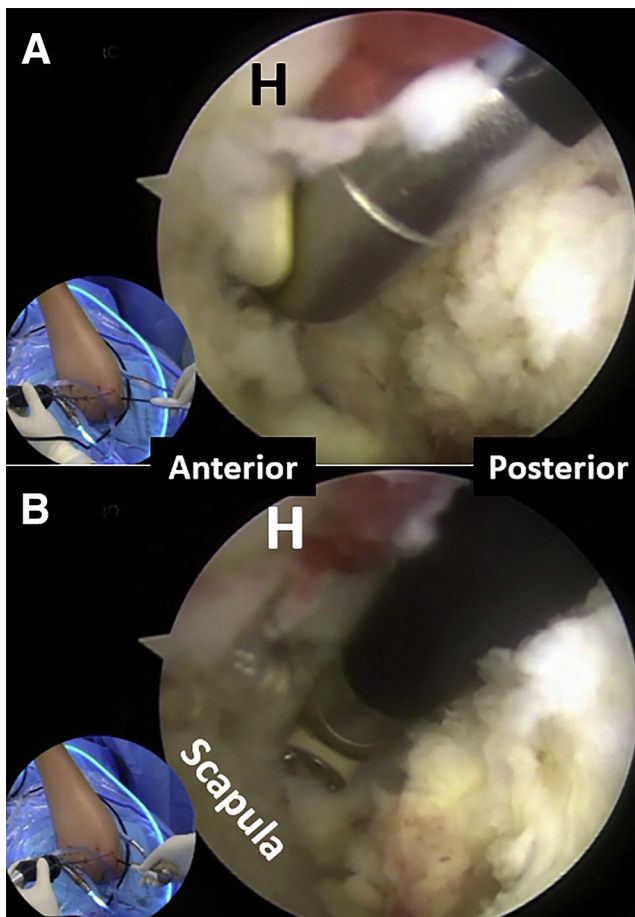


Fig 11. Release of posterior capsule (A) and adhesion between scapula and posterior rotator cuff (B) (arthroscopic view of right shoulder through anterior-superior portal). (H, humeral head.)

through the routine posterior portal and the only window by which to reach the glenohumeral joint is through the rotator interval. Prasathaporn et al.⁵ reported an arthroscopy-assisted reduction case. In their case, the arthroscopic technique was used just for debridement outside the rotator interval, whereas open procedures were used to access the glenohumeral joint and perform reduction. Furthermore, soft-tissue balance was not reached in this case, and a joint-crossing Steinmann pin was used for the maintenance of reduction.

In most reports regarding chronic locked posterior dislocation, open surgical procedures have been recommended through the anterior deltoid–pectoralis approach.⁸ However, through an anterior opening, it

is still difficult to release the posterior capsule and the posterior rotator cuff; it is also difficult to perform posterior capsulolabral repair. Arthroscopic reduction and repair possess advantages.

The pearls and pitfalls of our technique are listed in Table 2. The most critical point is that during release of the subscapularis from the coracoid and the conjoined tendon, care should be taken to avoid maneuvering too medially to prevent vascular nerve injury. Another critical point is that before thorough release of the capsule and the anterior and posterior rotator cuff, the surgeon should not elevate the humeral head forcefully to the glenoid surface; otherwise, it will lead to humeral head fracture due to osteoporosis. The advantages and disadvantages of the described technique are listed in Table 3.

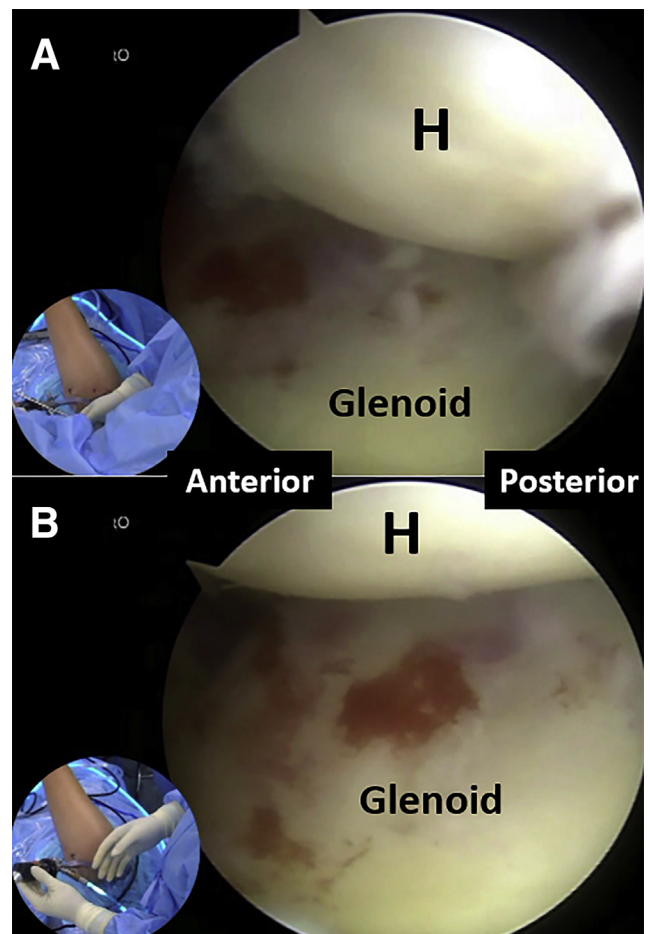


Fig 12. Humeral head (H) elevation to level of glenoid surface (A) and reduction to center of glenoid (B) (arthroscopic view of right shoulder through anterior-superior portal).

Fig 13. Preoperative (A) and postoperative (B) computed tomography images of a case of a chronic locked posterior shoulder dislocation (right shoulder).

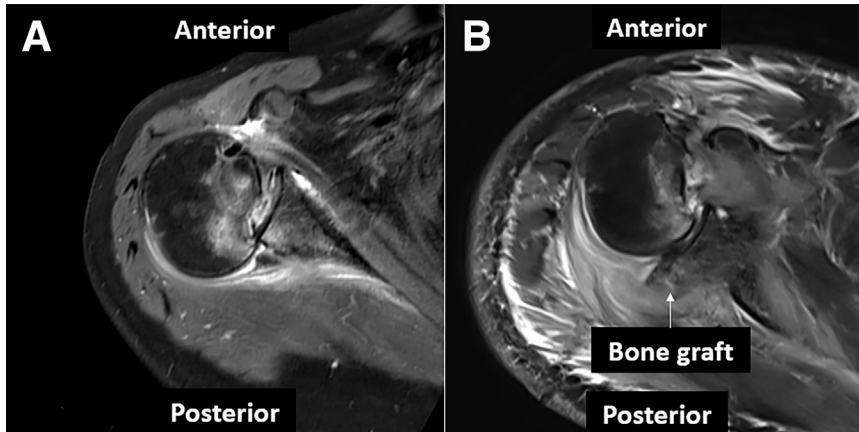
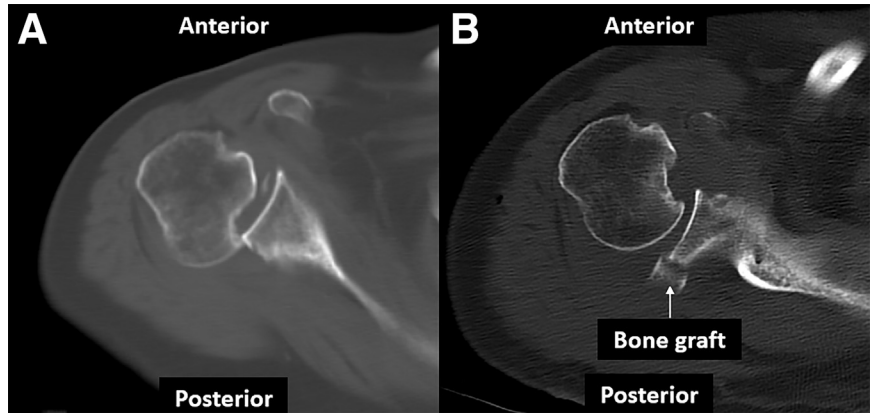


Fig 14. Preoperative (A) and postoperative (B) magnetic resonance images of a case of a chronic locked posterior shoulder dislocation (right shoulder).

Fig 15. Images indicating sites of adhesion and scar formation in a case of a chronic locked posterior shoulder dislocation (transverse view of right shoulder).

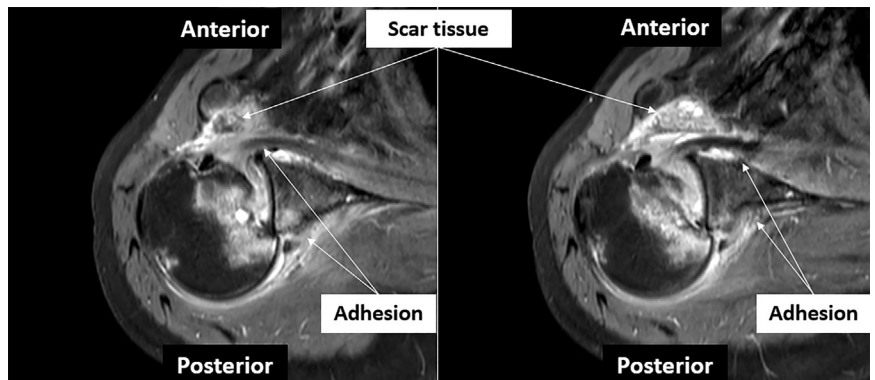


Table 2. Pearls and Pitfalls of Arthroscopic Reduction of Chronic Locked Posterior Shoulder Dislocation

Owing to a posterior Dislocation of the Shoulder, the Spatial Relation Between the humeral Head and the Coracoacromial arch Changes; the Most Efficient way to find the Coracoid is to Perform debridement Medially along the Coracoacromial Ligament.

The rotator interval tissue must be fully removed to allow access to the glenohumeral joint and medial-to-lateral and posterior-to-anterior reduction of the humeral head.

During rotator interval tissue removal, care should be taken not to remove the supraspinatus muscle.

The subscapularis should be thoroughly released from the coracoid and the conjoined tendon, and the scar tissue adhering to the subscapularis should be thoroughly removed to obtain anterior-posterior soft-tissue balance.

During release of the subscapularis from the coracoid and the conjoined tendon, care should be taken to avoid maneuvering too medially to prevent neurovascular injury.

A 360° capsule release and thorough release of the anterior and posterior rotator cuff from the scapula must be performed to obtain satisfactory medial-to-lateral reduction of the humeral head.

The long head of the biceps should be released from the glenoid. Otherwise, it will hinder reduction of the humeral head.

Before thorough release of the capsule and the anterior and posterior rotator cuff, the surgeon should not elevate the humeral head forcefully to the glenoid surface; otherwise, it will lead to humeral head fracture owing to osteoporosis.

Table 3. Advantages and Disadvantages of Arthroscopic Reduction of Chronic Locked Posterior Shoulder Dislocation**Advantages**

- The described technique is minimally invasive.
- All factors that affect medial-to-lateral humeral head reduction and anterior-to-posterior balance can be addressed.
- Simultaneous posterior reconstruction can be performed.

Disadvantages

- It is time-consuming to conduct arthroscopic reduction.
- Arthroscopic inferior capsule ligament release is more difficult than the open procedure.

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