Technical Note

Arthroscopic Reinforced Capsular Shift of Anterior Shoulder Instability

Basim A. Fleega, M.D.

Abstract: This article presents an arthroscopic inferior capsular shift technique. In this technique, the same type of inferior capsular shift as with the open standard Neer procedure can be performed. After standard diagnostic shoulder arthroscopy, a bone trough is made along the capsular attachment to the humeral head using an abrader. An inverted L-shaped incision is performed in the anterior capsule. A suture is passed through the apex of this triangular flap, which is then pulled up and tied over the upper edge of the subscapularis, thus reducing the size of the wide anterior capsule. No hardware implants are used, and the procedure is not technically complicated. The surgery required fewer steps than open repair. The advantages of this technique are the preservation of the subscapularis, faster rehabilitation, and earlier return to normal activities, including sports. It also causes less postoperative range of motion limitation, while offering the same amount of capsular shift as the traditional open repair. Key Words: Shoulder arthroscopy—Shoulder instability—Capsular shift repair.

The open technique of inferior capsular shift for cases of inferior and antroinferior shoulder instability has proven successful in restoring stability and function to the shoulder.1,2 It has become the standard open surgical treatment of cases of shoulder instability needing capsular repair. Despite the high success rate, however, this technique is not without its limitations. For example, some limitation in the range of motion with delay in the rehabilitation program and some functional restrictions are noted. These represent disadvantages of the approach but not of the procedure.

By limiting the invasiveness of the surgical procedure, we can reduce the incidence of postoperative problems that the patient may face, especially in athletes. This technique addresses the capsular problem3-6 while avoiding the shortcomings of arthroscopic thermal capsular shrinkage. Thermal capsular shrinkage is still controversial, carrying the risk of tissue elongation if the postoperative rehabilitation regimen is too aggressive.7

SURGICAL TECHNIQUE

Patient Positioning

The patient is placed in an 80° sitting position with the arm hanging freely, allowing the shoulder to be manipulated in all directions. The shoulder is examined under general anesthesia.

Portals

A standard posterior portal, 1.5 cm medial and 1.5 cm below the posterior angle of the acromion, is used for visualization with a 70° arthroscope. The second portal is an anterior portal 1.5 cm lateral to the coracoid process and is used as a working portal for introduction of surgical instruments. It passes intra-
articulate between the subscapularis and the biceps tendon. Routine diagnostic arthroscopy is performed.

**Instrumentation**

Instruments used include:

- Standard arthroscopy setup and instruments, with a 70° arthroscope and a shaver device with a 4.5-mm abrader blade
- Set of chop needles (Fig 1A), chop needle catcher with a hole to pass through the skin in the joint and a puller also able to pass through the skin to pull the suture
- Convex knot-pushing devices
- Additional instruments including an arthroscopy punch, standard arthroscopic hook, small sharp elevator, and ring forceps

**Repair Technique**

The arthroscopic inferior capsular shift technique is mainly used for cases of shoulder instability that require capsular repair. The idea of this technique is that an arthroscopically performed inverted L-shaped incision is performed in the anterior capsule, which is shifted up, reducing the size of the redundant anterior capsule. No hardware implants such as anchors, tucks, or staples are required, and the technique is not technically complicated.

**Capsular Shift Technique**

**Trough Formation.** Through the anterior working portal, a 4.0-mm abrader is introduced to make a trough on the anterior humeral neck along the attachment of the anterior capsule to the humeral head (Fig 1B). This trough should be just deep enough to reach a raw bleeding surface, thus encouraging the healing of the ligaments and capsule to the bone.\(^2\) In case of inferior instability, the inferior humeral head is abraded as well.

**Inverted L-Shaped Incision.** An inverted L-shaped incision is performed in the inferior part of the anterior capsule. This may be performed using a hooked basket, a laser probe, or a thermal cutting probe. The horizontal limb of the incision runs along the level of the mid-labrum, between the middle and inferior glenohumeral ligaments. The vertical limb runs along the trough made in the humeral head. In case of marked capsular redundancy further inferior extension of the vertical limb of the incision may be needed. This would allow more shifting of the inferior capsule and axillary pouch at the end of the procedure (Fig 2).

**Suture Placement.** Next, a straight (0°) chop needle pusher (Fig 3) with a No. 2 absorbable suture is passed into the apex of the triangular flap (Fig 4).

**Suture Retrieval.** Next, a straight (0°) needle puller (Fig 3) is passed through the anterior working portal and then through the upper edge of the subscapularis to pull on one of the 2 limbs of the suture and bring it out of the anterior working portal. Then, the
needle puller is passed once more via the anterior portal to pull the other strand of the suture directly through the anterior portal. Now, both limbs of the suture at the apex of the triangular flap appear from the anterior working portal with one strand passing through and the other passing above the upper edge of the subscapularis (Fig 5).

By pulling on the 2 strands, the surgeon can evaluate the amount of capsular shift achieved. Extending the vertical limb of the incision further down may cause further release of the inferior capsule. Another 1 or 2 sutures may be added as needed.

**Capsular Shift.** While the arm is in the neutral position, the triangular flap is pulled up, thus shifting the inferior capsule up and reducing the size of the inferior recess. The suture is tightened over the upper border of the subscapularis using a giant sliding knot and a concave knot pusher. This would bring the edge of the triangular flap of the inferior capsule in contact with a previously prepared trough in the humeral head (Fig 6). The other sutures (if used) are then tightened in consequence.

**Postoperative Management**

The arm is placed in a shoulder sling immobilizer or cast in 10° abduction and 50° internal rotation for 3 or 6 weeks, according to the condition of the capsule. During the next 3 weeks, passive self-assisted exercises are begun, allowing up to 10° external rotation and 80° forward elevation. Active assisted exercises are started the next 3 weeks, followed by strengthening exercises.

After 12 weeks, the patient is allowed to return to normal activities (including sports), provided that the range of motion and the strength of forward elevation and external rotation are comparable to those of the opposite side.

**First Results**

Arthroscopic L-type inferior capsular shift was performed for 28 patients. The average patient age was

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**Figure 3.** (A) 0° chop needle catcher with No. 2 absorbable suture is passed through the skin and through the flap, and a 0° chop needle puller is used to pull the upper end of the suture through the portal. (B) The chop suture catcher is pulled through the skin, and the puller is pulled through the portal.

**Figure 4.** While the posterior suture limb is pulled out through the portal, the chop catcher is pulled out.

**Figure 5.** The chop needle puller is used to pull the anterior suture limb out through the subscapularis.
31 years (17 to 66 years), and the average follow-up time was 46 months. All patients had capsular redundancy, and 5 had associated labral tears. Preoperatively, all patients complained of recurrent shoulder dislocation and had a positive apprehension sign. Postoperatively, only 1 patient experienced a traumatic redislocation. The average score on the UCLA Shoulder Rating scale improved from a preoperative value of 18 (poor) to a postoperative value of 33 (good).

REFERENCES


**Figure 6.** (A) The flap is shifted superiorly and laterally to lie on the prepared trough. (B) After the repair is complete; the knot is extracapsular and the capsule is shifted.