Arthroscopic Stabilization of Posterior Shoulder Instability Without Glenoid Bone Loss

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Background: Contact athletes who experience posterior shoulder instability have a high likelihood of recurrence necessitating surgery.

Indications: Patients with posterior shoulder instability without glenoid or humeral head bone loss who have failed activity modification, bracing, and physical therapy may benefit from arthroscopic stabilization surgery.

Technique Description: We describe a technique for arthroscopic labral repair with capsular plication through 4 portals in the lateral decubitus position.

Results: Arthroscopic capsulolabral reconstruction is an effective and reliable treatment for posterior shoulder instability with good patient-reported outcomes, low recurrence rates, and high rate of return-to-play.

Discussion/Conclusion: Arthroscopic capsulolabral reconstruction in the lateral decubitus position with appropriately placed portals allows for safe and effective repair of the labrum and capsular plication to address posterior shoulder instability.

The author(s) attests that consent has been obtained from any patient(s) appearing in this publication. If the individual may be identifiable, the author(s) has included a statement of release or other written form of approval from the patient(s) with this submission for publication.

Keywords: shoulder instability; glenoid labrum tear; posterior labral tear; arthroscopic labral repair

VIDEO TRANSCRIPT

This is a video for describing the technique for treating posterior shoulder instability.

Relevant disclosures are listed here.

We will begin by reviewing a case presentation, including the evaluation and work-up regarding history, physical examination, and imaging. We will then describe our surgical technique for arthroscopic posterior shoulder stabilization, focusing on technical pearls and avoiding potential complications. Finally, we will discuss postoperative rehabilitation and outcomes after surgery.

The patient is a 17-year-old male who plays center on his high school football team and is planning to play on the collegiate level. He presented with >6 months of pain in his left shoulder, which was made worse with blocking during practice as well as pressing activities while lifting weights.

Physical examination was notable for pain with posterior stress with the shoulder in a forward flexed, adducted, and internally rotated position; grade 3 posterior load-and-shift test with pain; and pain with Kim testing. He had no voluntary instability and no sulcus sign to suggest multidirectional instability.

Grashey, axillary, and scapular Y views of the left shoulder show no evidence of fracture or dislocation. There is no evidence of humeral head or glenoid bone loss and no significant glenoid retroversion or hypoplasia.

Representative images from magnetic resonance imaging show a nondisplaced tear of the posterior inferior labrum. Again, demonstrated is no significant glenoid bone loss.

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Unfortunately, there are no large-scale natural history studies performed in patients with posterior shoulder instability, although studies suggest inferior results with nonoperative treatment after traumatic shoulder instability. When considering treatment options, it is important to first consider the etiology of the instability, whether it is acute and traumatic versus chronic and as a result of repetitive loading. Next, it is important to consider whether there is identifiable pathology, whether bony or soft tissue, that could be addressed surgically. One must consider whether there exists concomitant pathology to address surgically, such as a superior labral tear or rotator cuff pathology. Finally, the risk of persistent instability or recurrence can be influenced by patient-specific risk factors.

Nonoperative treatment consists of activity modification and physical therapy. Bracing to limit end-range motion is typically used for management of in-season injuries. Physical therapy should focus on proprioception training and scapulothoracic and rotator cuff strengthening, specifically the subscapularis.

When considering surgical treatment, it is important to address any soft tissue or bony pathology identified on preoperative imaging. A variety of surgical techniques exist, but the most important principle is to attempt to restore normal soft tissue and/or bony anatomy. If there is significant glenoid bone loss, bone block augmentation may be performed using autograft or allograft, including a distal tibial allograft which has been shown to have similar glenohumeral joint biomechanical properties. The precise amount of posterior glenoid loss necessitating a bony augmentation procedure has not yet been identified, so it is reasonable to extrapolate from literature on anterior glenoid bone loss.

Given the patient's desire to return to football and lifting weights, his failure of extensive nonoperative treatment, and his desire to play football in college, he elected to proceed with surgery. The patient was positioned in the lateral decubitus position with an arm holder applying inline traction as well as abduction through a strap. The arm was positioned in 45° of abduction and 10° of forward elevation. A sterile bump can be used in the axilla to provide additional abduction if needed. We prefer the lateral decubitus position as we find it easier to access the inferior and posterior aspect of the shoulder in this position.

An examination under anesthesia should always be performed prior to proceeding with surgery. In this case, we were able to redemonstrate the grade 3 posterior load-and-shift.

We typically begin with 3 portals: 1 posterior and 2 anterior in the rotator interval. Although it is the authors' preference to establish 2 portals in the rotator interval to improve access to soft tissue and ease of suture passage and shuttling, it is not always necessary to establish both portals, particularly if additional inferior portals are planned. Depending on pathology, additional portals can be used, such as a posterior inferior 7 o'clock portal to gain better access to address the posterior inferior labrum. To begin, the posterior portal is established, and the arthroscope is introduced into the glenohumeral joint.

Under direct visualization, the anterior superior portal is established in the superior rotator interval, just inferior to the long head of the biceps tendon. The anterior inferior portal is then established, just superior to the upper edge of the subscapularis tendon. A complete diagnostic arthroscopy is then performed. In addition to the inferior labral tear, we identified pathologic capsular laxity, which we elected to address as well.

The arthroscope is then placed through the anterior superior portal, and the extent of the labral tear is defined using a probe. The tear extends from the 6 o'clock to the 9 o'clock position.

A sharp elevator is then used to elevate the labrum off of the glenoid and expose bleeding, cancellous bone to which the labrum can heal.

Under direct visualization, an accessory posterior inferior 7 o'clock portal is established. A blunt switching stick can be used to ensure adequate access from each portal.

We began by performing an anterior inferior capsular plication. A curved loop suture passer is used to capture the capsule and labrum. The wire is retrieved, and a looped suture is shuttled through. The other end of the suture is retrieved, and a luggage-tag stitch is established and passed through the eyelet of an anchor. The drill guide for an anchor is placed on the edge of the glenoid. The glenoid is then drilled and the anchor is placed.

These steps were repeated to ensure that the entirety of the posterior labral tear is repaired, performing an inferior and posterior inferior capsular plication as well.

In this case, a total of 4 anchors were placed.

The final repair construct is shown here.

Finally, the traction and abduction strap were removed, and the humeral head was visualized to remain centered in the glenoid throughout range of motion, including forward flexion and internal rotation.

Lateral distraction with the use of the abduction strap with or without a sterile bump improves access to the posterior inferior glenoid. Establishing a posterior inferior 7 o'clock portal improves the ability to pass suture and place anchors on the inferior glenoid. We recommend entering the skin more laterally so that the angle of entry into the joint is steep. This will help to drill perpendicular to the joint and avoid skiving. Alternatively, anchors can be drilled and placed through percutaneous portals without placement of a cannula. Using the mallet to gently tap the drill guide onto the edge of the glenoid helps to decrease the risk of skiving during drilling for anchor placement. In addition to repairing the torn labrum, performing a capsular shift helps to improve postoperative stability, although the magnitude of the shift should be individualized for each patient.

Postoperative stiffness is the most common complication. Complications can occur secondary to positioning, traction, and lateral distraction. It is important to minimize the time and weight of traction to decrease the risk of traction neurapraxia. While rare, there is a chance of nerve injury, the most common being the axillary nerve. Prior cadaveric studies have shown that the axillary nerve is approximately 12 mm inferior to the glenoid at the 6 o'clock position. Injury to the axillary nerve can be

avoided by ensuring that portals remain superior to the inferior edge of the glenoid and excessive capsular plication is avoided. We use blunt dilation of all portals to limit chance of nerve injury. Inability to repair the inferior labrum is typically due to suboptimal angle for anchor placement on the inferior edge of the glenoid. To avoid this, we use the additional posterior inferior portal. Recent evidence has shown that on-the-edge anchor placement is associated with less glenoid rim erosion and equivalent stability compared with on-the-face anchor placement.

The postoperative rehabilitation protocol is shown here. In the first 3 weeks after surgery, the arm is held in a sling in neutral rotation, coming out for gentle pendulum exercises only. In the subsequent 3 weeks, begin isometrics with the arm at the side, not exceeding 90° of forward flexion or internal rotation past the stomach. Starting at 6 weeks postoperatively, gradually increase range of motion and advance strengthening, primarily closed-chain exercises. For athletes, begin sports-related rehabilitation at 3 months postoperatively. Return to throwing program beginning at 4.5 months.

Return to play after achieving full range of motion and strength equal to the contralateral side. We prefer approximately 6 months for contact and throwing athletes. Evidence for return-to-play testing following arthroscopic posterior shoulder stabilization is limited, but there is increased interest in criteria-based and quantitative testing to determine appropriate return-to-play parameters. One recent study showed that criteria-based return-to-play testing leads to lower recurrence rates after arthroscopic Bankart repair.

Regarding patient outcomes, several studies have shown capsulolabral reconstruction to be an effective and reliable treatment with high rates of return-to-play postoperatively. A study of collegiate football players found that although they are typically able to return-to-play after a posterior glenohumeral instability event, they are highly likely to experience recurrence, ultimately necessitating surgery. When considering arthroscopic versus open stabilization procedures, a large meta-analysis showed superior outcomes with lower recurrence rates and higher return-to-play after arthroscopic stabilization. Because of the heterogeneity of these studies, however, caution should be used when applying these outcomes, especially in patients with glenoid or humeral head bone loss.

Thank you for your attention.

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