Arthroscopic Posterior Labral Repair for Posterior Shoulder Instability

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Background: Posterior shoulder instability occurs in 2% to 10% of shoulder instability cases and is more commonly due to repetitive microtrauma as opposed to the more traumatic onset seen in anterior shoulder instability. In posterior instability, the posterior capsulolabral complex becomes attenuated or torn. Thus, surgical treatment aims to restore the posterior soft-tissue stabilizers typically with an arthroscopic, suture-anchor-based labral repair.

Indications: Surgical indications include posterior instability with traumatic cause and associated soft-tissue and/or osseous pathology and for those patients with repetitive microtrauma who have failed nonsurgical management.

Technique Description: Following diagnostic arthroscopy, the glenoid is prepared using an arthroscopic elevator, rasp, and chisel first viewing from the posterior portal, then from the anterior portal using a 70° arthroscope. An all-suture anchor is placed at the 7 o'clock position using a curved guide which obviates the need for an accessory 7 o'clock portal. The repair suture is then shuttled through the labrum using a suture lasso and monofilament. This repair suture is then shuttled through the suture anchor using the inbuilt shuttling fiberlink. The repair suture is then tightened to secure the labrum. The remainder of the repair uses knotless 2.9-mm biocomposite suture anchors and free suture tape as the all-suture anchor and associated curved guide are typically only necessary for the angle of the most inferior portal. Following a 3 to 5 anchor repair, the posterior portal capsular rent is closed to avoid leaving a stress riser. Posterior capsular closure is achieved using monofilament suture passed with a birdbeak and tied blindly in the subacromial space.

Results: In a study of 200 shoulders at 36 months, patients undergoing posterior stabilization had improvements in their American Shoulder and Elbow Surgeons (ASES) scores and improvements in stability, pain and function. Ninety percent of patients were able to return to sport and 64% of patients returned to the same level. Failure rate was low at 6%.

Discussion/Conclusion: Posterior labral repair is a technically nuanced but reliable procedure for the management of posterior instability.

Patient Consent Disclosure Statement: 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: posterior instability; shoulder; surgical technique; sports medicine; arthroscopy

VIDEO TRANSCRIPT

Arthroscopic posterior labrum repair for posterior shoulder instability presented by Dr. James Bradley, Clinical Professor of Orthopedic Surgery, University of Pittsburgh Medical Center and head team physician for the Pittsburgh Steelers along with Michael Nammour Orthopedic Sports Medicine Fellow. These are our disclosures.

Posterior shoulder instability has become increasingly recognized as a distinct and important subcategory of shoulder instability with a higher incidence than historically reported. Unlike anterior instability, which is generally associated with a traumatic event, posterior glenohumeral instability in the young active patient population is more often caused by repetitive microtrauma, leading to recurrent posterior instability (RPS).[5,8]

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Recurrent posterior instability commonly occurs in many different athletes with repetitive microtrauma causing posterior capsular attenuation and labral tearing.[5,8]

The combination of a thin posterior capsule and a thin posterior inferior glenohumeral ligament (PIGHL) means that less energy is required to disrupt the posterior tissues. Hence why posterior instability is caused more often by repetitive microtrauma rather than a single traumatic episode and is thus believed that shearing forces on the posterior labrum lead to labral tearing, posterior capsular laxity, and capsular redundancy.[5,6,8] Osseous morphology also plays a role, and there may be a predisposition to posterior shoulder instability based on humeral head retroversion, glenoid hypoplasia, glenoid bone loss, and glenoid retroversion.[2,3,11,16]

The classic patient presentation of a posterior dislocation while blocking with the flexed, adducted, and internally rotated arm is rare. The more common presentation is a patient with ambiguous complaints of diffuse or deep posterior shoulder pain, along with worsening athletic performance and endurance without distinct injury.[5] Patients may also complain of mechanical symptoms such as clicking or popping, which may be reproducible on examination.

When evaluating these patients, a complete physical examination of both shoulders should be performed including provocative tests for posterior shoulder instability.[12] Our group also uses a dynamic posterior instability test also known as DPIT and the modified DPIT to aid in the diagnosis of posterior shoulder instability. A positive DPIT is when a patient has pain in the shoulder with resisted throwing motion. A positive modified DPIT occurs when the shoulder pain is relieved when the humerus is stabilized posteriorly with resisted throwing motion. Our group has found that these tests, when in combination with a positive Whipple and O'Brien's active compression tests, have a 94% sensitivity and a 95% specificity for posterior shoulder instability.

Workup of these patients typically includes a complete set of shoulder radiographs which are typically normal and a magnetic resonance imaging (MRI) or magnetic resonance angiography (MRA). In posterior shoulder instability, MRI may show posterior humeral head translation, posterior labral capsular avulsions, posterior labral tears, posterior capsular tears, flattening of the glenoid articular surface, glenoid dysplasia, reverse bony Bankart lesions, reverse humeral avulsion of the glenohumeral ligament (HAGL) lesions and glenoid and humeral retroversion.

Nonsurgical management is the initial treatment modality for posterior shoulder instability of nontraumatic cause. It includes physical therapy with proprioception training, scapulothoracic, and subscapularis strengthening for 3 months. This has shown to be 70% effective in athletes. Surgical management is reserved for those with a traumatic cause with soft tissue and or osseous pathology and for those who have failed nonsurgical management. Of note, arthroscopic repair has shown to have superior outcomes compared to open repairs.[6]

For this case, we will discuss an 18-year-old linebacker with persistent left shoulder pain for several months. He has failed physical therapy and has pain with pushing off blockers and pain in the posterior shoulder. On examination, he has full range of motion, 5 out of 5 strength, a positive DPIT, modified DPIT, and a 2+ posterior load and shift. Radiographs of the left shoulder are normal. The MRI demonstrates a posterior labral tear as indicated by the yellow arrow.

The patient is placed in the right lateral decubitus position with the left arm suspended with 10 pounds of traction. Local anesthetic and saline is preinjected into the joint and the shoulder is then prepped and draped. A modified posterior portal 1 cm distal and 1 cm lateral to the standard viewing portal is established. With the camera in the posterior portal, the posterior labrum is released with an arthroscopic elevator from the anterior portal. A 70° arthroscope is then used and placed in the anterior portal for improved posterior labrum visualization. The posterior labrum is then released from the posterior portal using the arthroscopic elevator and the debris is removed with the shaver. A rasp is then used as well as a chisel to create a bleeding bony bed on the glenoid. The preparation of the bony bed is essential to allow for labral healing. A curved guide was then used to allow inferior placement of the anchor.

We prefer to use a 2.9-mm biocomposite anchor with suture tape. Tape suture allows for a greater surface area of fixation therefore making the construct stronger. These also have a higher pull through strength. For this type of repair, the monofilament suture is passed through the labrum first and the suture tape is then shuttled. The anchor is then loaded and while holding tension on the sutures, the anchor hole is then drilled. The anchor is then placed in the hole and while holding the appropriate tension, it is malleted into place. After the anchor is placed, the suture is cut. This process is repeated for the remaining anchors.

Alternatively, a 7 o'clock portal can be placed for improved trajectory. It should be noted that the axillary nerve is at risk during placement of the inferior suture anchor at the 6 o'clock position on the glenoid rim as it lies 12.4 mm inferior to this position. The suture anchor is then drilled and malleted into place. While holding tension on the sutures from the suture anchor, a monofilament suture is then passed around the labrum taking care not to overtighten the tissues and not to grab too deep to avoid injury to the axillary nerve. The monofilament passing suture as well as the blue repair suture are then retrieved. When working through a single cannula, care must be taken to avoid tangling the sutures. The blue suture is then shuttled. The looped black suture is then retrieved and outside the patient, the blue suture is placed in the loop. The opposite black suture is then pulled and this allows for the blue suture to tighten around the labrum for a knotless repair. The knot pusher is then used to tension the repair and the suture is then cut. For the remainder of the repair, a curved guide is not required as the rest of the anchors can easily be placed from the posterior portal.

The suture is passed and then shuttled. The anchor is then drilled and placed and tensioned and the sutures are cut. The senior author adjusts the amount of capsular

advancement based on the sport of the athlete and the degree of instability. In throwing athletes, the senior author avoids capsular advancement whereas in nonthrowers or patients with a patulous capsule, he will incorporate more capsule with his labral repair. Of note, to successfully accomplish this repair, it is important to start with the most inferior anchor and work superiorly through the posterior labrum as each successive anchor will compress the joint space and minimize the viewing field. Typically we use 3 to 5 anchors for an isolated posterior labral repair.

After completing the posterior labrum repair, we perform a posterior portal closure. We do this as a posterior portal defect in the posterior capsule is a potential stress riser in the setting of posterior shoulder instability, and the senior author has seen these lead to large capsular defects that expand. To perform the posterior portal repair, the cannula is backed out just posterior to the capsule and the subacromial space. The suture passer is then used to pass a monofilament suture. The suture is then retrieved on the other side of the defect with a bird beak, and the suture is then tied blindly in the subacromial space. Here you can see our completed repair.

This slide highlights some important technical pearls to remember from the senior author including appropriate portal placement to improve the trajectory of the instruments, tailoring the capsular plication to the specific athlete, using knotless anchor constructs and remembering to close the posterior portal.

In the initial 6 weeks post op, the patient is in a sling with an abduction pillow. The patient can remove the sling to perform pendulums and gentle limited passive range of motion to flexion of 120° and abduction to 90°. Internal rotation with the shoulder flexed should be avoided. At 6 weeks, the sling is discontinued, and the patient can begin active range of motion in all planes. At 3 months, once full range of motion is achieved, strengthening begins. At 4 to 6 months, once strength is 80% of the contralateral shoulder sport specific rehab begins. Return to sport is at 6 to 9 months.

Arthroscopic posterior labral repair with suture anchors have proven to be 80% to 90% effective with high patient satisfaction rates, significant improvements in pain and function, and high rates of return to sport and midterm follow-up.

Risk factors for failure include glenoid bone loss greater than 11%, decreased glenoid bone width female sex, rotator cuff injury, and the use of less than 3 anchors. Contact athletes and those with a traumatic cause generally have the best outcomes postoperatively.[1-4,9-11,14] Throwers have similar return to sport rates as nonthrowers but are less reliably able to return to preinjury level especially when their main position is pitcher.[4,7,13,15,16]

These are our references.

Thank you for your attention.

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