

Posterolateral Acetabular Labral Repair: Drilling Using a Percutaneous Posterolateral Portal



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Abstract: Acetabular labral tears are commonly diagnosed in patients with hip or groin pain, most of which occur anterosuperiorly. In some cases, operative intervention in the form of arthroscopic labral repair may be necessary to restore labral function. Posterolateral tears can be technically challenging when using traditional modified anterior portal and anterolateral (AL) portal access owing to a suboptimal drill trajectory. In this article, we describe the establishment of a posterolateral (PL) portal 1 to 2 cm posterior to the tip of the greater trochanter, mirroring the distal-to-proximal trajectory of the AL portal and entering the capsulotomy at the 10-o'clock position. This method highlights that the PL portal is used for drilling and anchor placement, whereas the remaining work is performed through the AL portal. This avoids the use of any shavers or burrs in the PL portal near important neurovascular structures, including the sciatic nerve. Addressing posterolateral labral tears in the 9- to 11-o'clock position using a PL portal can enhance labral fixation, thereby mitigating the risk of suboptimal repairs that can negatively impact postoperative outcomes.

The acetabular labrum is a fibrocartilaginous extension of the bony acetabular rim with a critical role in hip biomechanics. Tears of the acetabular labrum are common and have been reported to exist in 22% to 55% of patients with hip or groin pain, potentially causing mechanical symptoms, restricted range of motion, and limitation in activities of daily living and sport.¹ Many patients are managed conservatively with rest, nonsteroidal anti-inflammatory drugs, and physical therapy. Operative intervention may be necessary in recalcitrant cases to restore labral function. Although debridement of labral tears has historically provided modest results, recent studies have shown labral repair to achieve superior clinical outcomes and restoration of native biomechanics.²

Although innovations in arthroscopic instrumentation and surgical technique have made hip arthroscopy one of the fastest developing fields in

orthopaedic surgery over the past 2 decades, the procedure is technically demanding and carries a significant learning curve.³ Acetabular labral repair is most commonly performed using suture anchors placed in the capsulolabral recess around the acetabular rim, with sutures passed through the chondrolabral junction for stabilization.⁴ When described using the “clock-face” analogy, most labral tears occur between the 12-o'clock (superior) and 3-o'clock (anterior) positions (Fig 1) and can be adequately visualized and addressed through the standard arthroscopic anterolateral (AL) portal and modified or mid-anterior portal (MAP) (Fig 2).

Tears that extend more posteriorly and laterally from the 12-o'clock position may be treated using traditional AL and MAP access, although this can be technically challenging given a suboptimal drill trajectory. It is our preference to use a posterolateral (PL) portal to obtain an appropriate and safe trajectory for drilling and suture anchor placement. Use of a PL portal represents a technical challenge because the sciatic nerve, gluteal vessels, and medial circumflex femoral artery lie in close proximity.⁵ Avoidance of large cannulas and penetrators may help to minimize the risk of injury to these important neurovascular structures. This technical note describes a safe and reproducible method of percutaneous PL portal development and use to gain improved access for drilling and suture anchor placement during arthroscopic repair of far lateral and posterior labral tears (Video 1).

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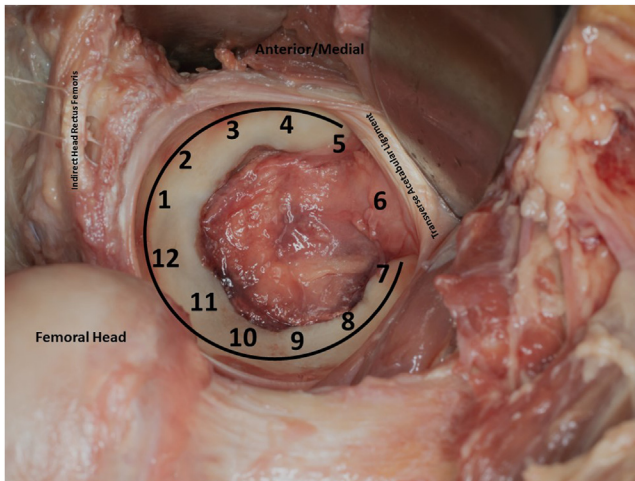


Fig 1. Clock-face description of acetabular labral orientation right hip specimen, with anterior/medial at top and proximal on left.

Surgical Technique

Patient Positioning

The patient is positioned supine on a lower-extremity suspension table using a well-padded perineal post to secure the patient for traction (Fig 3). The patient's feet

are padded and placed into the traction footholds of the lower-extremity traction table. A large C-arm is positioned on the contralateral side, and traction is applied to the operative leg. Once the hip is confirmed to be distractible using fluoroscopy, the patient is prepared and draped in standard surgical fashion.

Arthroscopic Access, Portal Placement, and Capsulotomy

Under fluoroscopic guidance, a standard AL portal is established 1 to 2 cm anterior to the anterior border of the tip of the greater trochanter at the 12-o'clock position of the capsule. An access cannula is placed, and a 70° arthroscope (Stryker Sports Medicine, Greenwood Village, CO) is introduced into the AL portal to visualize the arthroscopic triangle of the hip. Approximately 2 cm distal and 4 cm medial to the AL portal, the MAP is developed via needle localization using an outside-in technique, penetrating the capsule at the 2-o'clock position under direct visualization from the AL portal. An arthroscopic scalpel is subsequently used to perform an interportal capsulotomy between the AL portal and MAP, with care taken to preserve a sufficient cuff of capsular tissue to allow capsular suspension and closure at the conclusion of the case. Suspension sutures are placed using a 70°

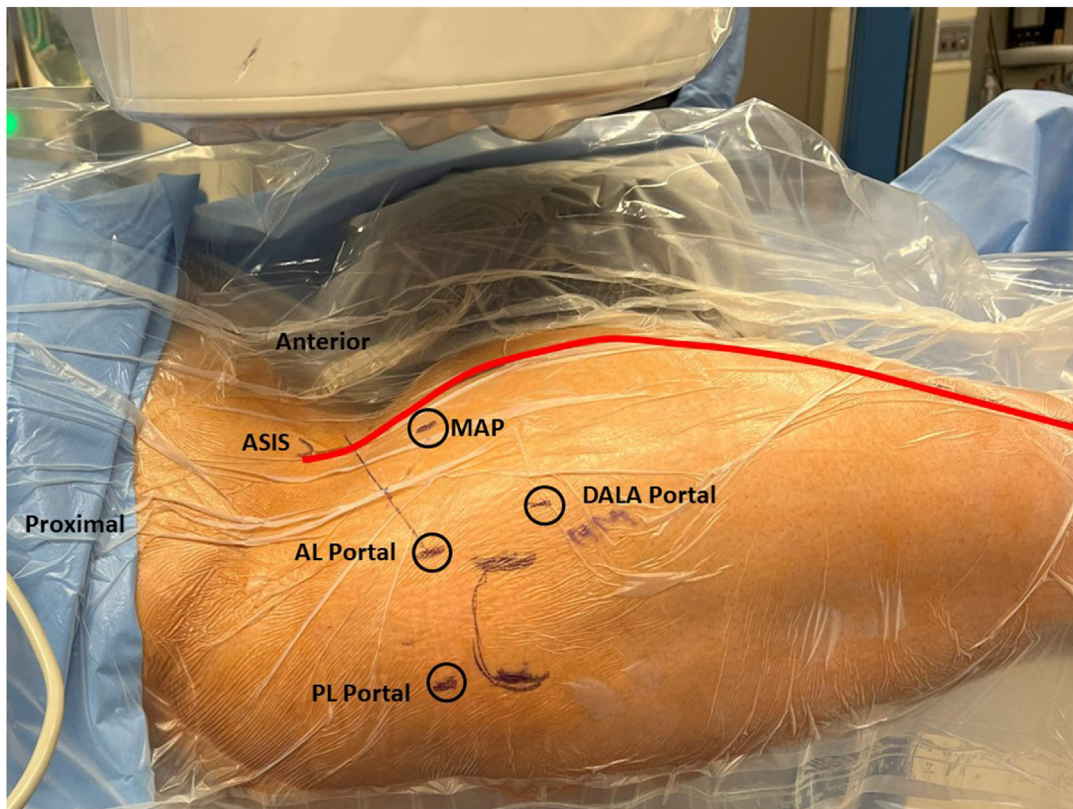


Fig 2. Portal placement in right hip. The red line indicates the medial border of the “safe zone” identified by connecting the anterior superior iliac spine (ASIS) to the lateral edge of the patella. (AL, anterolateral; DALA, distal anterolateral accessory; MAP, modified anterior portal; PL, posterolateral.)

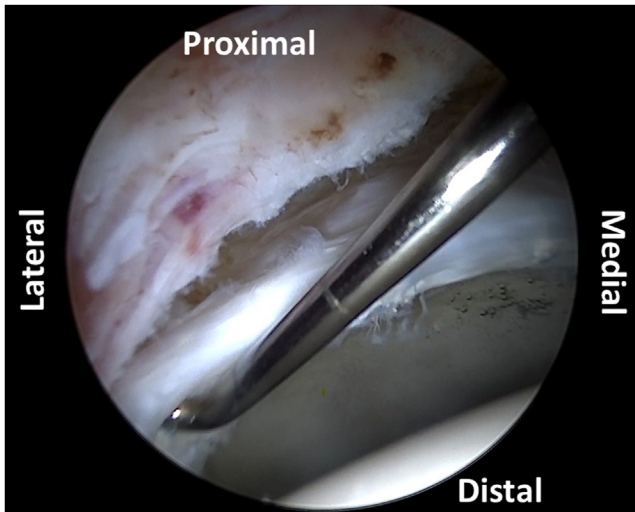


Fig 3. Posterolateral labral tear viewing from anterolateral portal in right hip. The arthroscopic probe is placed at approximately the 10-o'clock position.

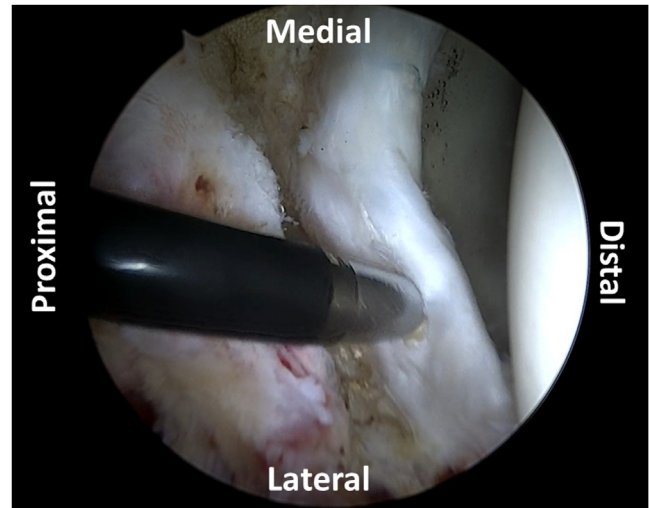


Fig 4. Posterolateral labral tear in right hip viewing from modified anterior portal. An arthroscopic radiofrequency ablation wand is used as a probe via the anterolateral portal and placed at the 10-o'clock position.

suture-passer, and the suture limbs are clamped under tension against the skin for capsular suspension. A percutaneous distal anterolateral accessory portal can be similarly established 3 to 5 cm distal to the AL portal by an outside-in technique under direct visualization from the AL portal. It is the preference of the senior author (M.H.) to use these 3 portals for most hip arthroscopic procedures, namely those without far posterolateral labral tear extension.

Percutaneous PL Portal Technique

Once adequate exposure of the capsulolabral recess has been performed, the labrum is inspected. At the lateral aspect of the acetabulum, the articular cartilage and labrum are traced posteriorly to define the posterior-most extent of the posterolateral labral tear (Figs 4 and 5). Standard rim preparation is performed with a 5.5-mm diamond-tipped burr (Stryker Sports Medicine) using the AL portal and viewing from the MAP (Fig 6). It is the senior author's preference to use the PL portal to access labral tears in the 9- to 11-o'clock position for anchor drilling and subsequent placement. While viewing from the MAP, a spinal needle is used to localize and create a PL portal 1 to 2 cm posterior to the tip of the greater trochanter (Fig 2). This should mirror the distal-to-proximal trajectory of the previously established AL portal and enter the capsulotomy at its posterior extent, at approximately the 10-o'clock position. The spinal needle is exchanged for a nitinol wire, followed by a 25° curved drill guide. A flexible drill is used to drill for anchor placement within the drill guide. The trajectory and position of the drill can be visualized on fluoroscopy (Fig 7), and the articular cartilage should be directly visualized with the arthroscope to monitor

for intra-articular penetration. A 1.4-mm PEEK (polyetheretherketone) suture anchor (NanoTack; Stryker Sports Medicine) is placed in the drill guide, seated, and subsequently impacted to the appropriate depth as indicated by the laser line visible in the distal aspect of the guide. The sutures are then retrieved through the AL portal through an 8.5 × 110-mm clear threaded cannula (CLEAR-TRAC; Smith & Nephew, Watford, England) (Fig 8). A penetrating crescentic suture passer (NanoPass; Stryker Sports Medicine) is used to pass one of the suture limbs starting from the exterior edge of the labrum through the chondrolabral interface and then retrieved back out of the AL portal.

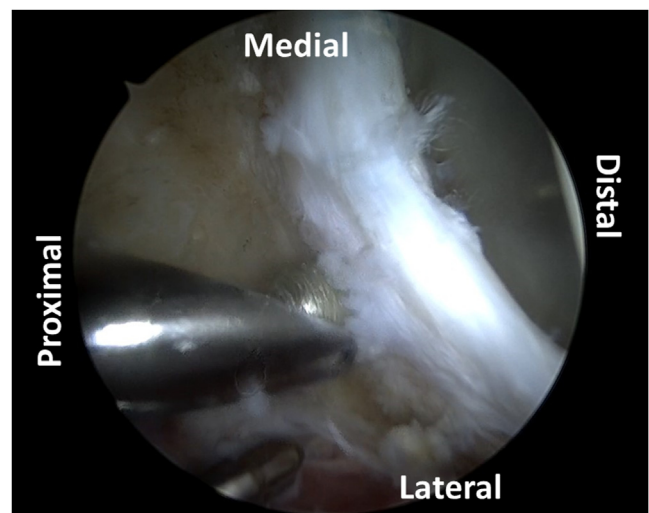


Fig 5. Acetabular rim preparation performed with 5.5-mm diamond-tipped burr in right hip while viewing from modified anterior portal and performing instrumentation from anterolateral portal.

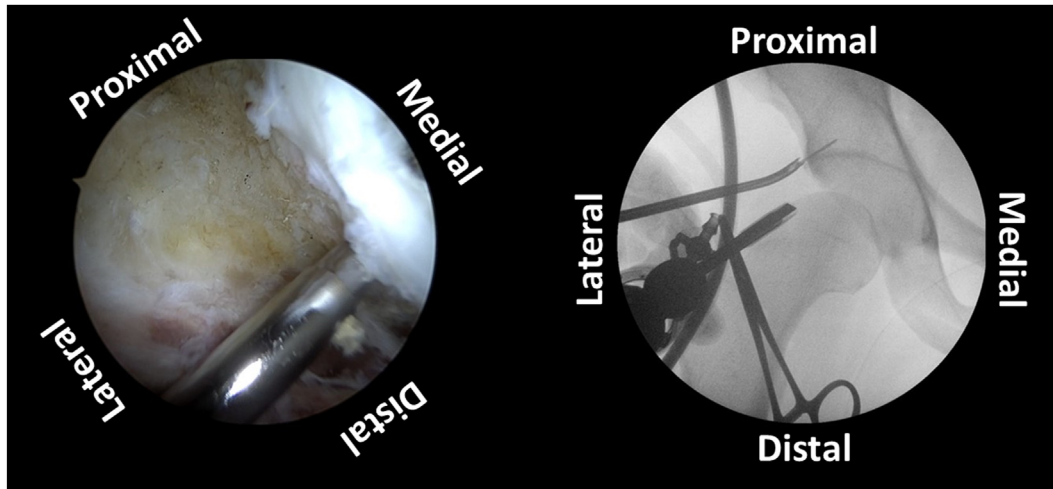


Fig 6. Drilling for posterolateral anchor using curved guide placed through posterolateral portal while viewing from modified anterior portal in right hip: arthroscopic view (left) and corresponding fluoroscopic images from drilling at 11-o'clock position (right).

An arthroscopic knot is tensioned, tied, and subsequently cut using the cannulated AL portal. This technique emphasizes using the PL portal for drilling and anchor placement only. The rest of the work is performed through the cannulated AL portal, thus avoiding placing shavers, burrs, and sharp penetrators through the PL portal in proximity to the significant neurovascular structures. Additional anchors are placed, as needed, progressing further posteriorly and inferiorly, proceeding with drilling and anchor placement from the percutaneous PL portal and subsequent suture passage and tying through the AL portal. Repeated probing should demonstrate a stable labral repair.

Discussion

This technical note describes a safe and reproducible method of percutaneous PL portal development and use to gain improved access for drilling and suture anchor placement during arthroscopic repair of posterior and lateral labral tears. The location of the PL portal has recently been described to be, on average, 21 mm away from the sciatic nerve but has been shown to be as close as 11 mm in a series of cadaveric hips.⁵ Given the proximity of this important nerve, surgeons may have reservations about working through the PL portal. Furthermore, the deep branch of the medial femoral circumflex artery and its terminal divisions are close to the PL portal tract. Sussmann et al.⁶ highlighted that the

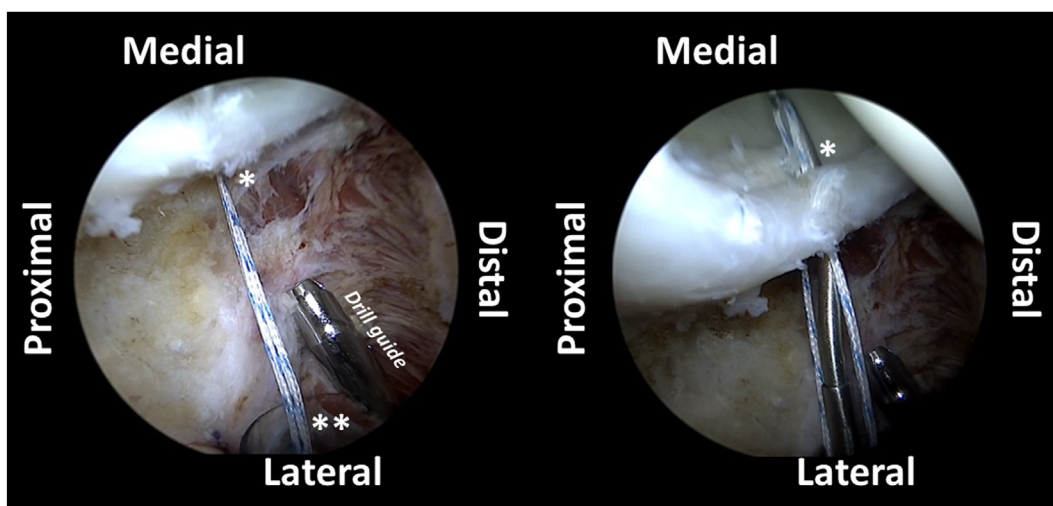


Fig 7. Suture anchor at 11-o'clock position (1 asterisk) with sutures retrieved from cannulated anterolateral portal (2 asterisks) (left). The drill guide is visible in the posterolateral portal for reference. Suture passage through chondrolabral junction (asterisk) from cannulated anterolateral portal (right). The drill guide is again visible in the posterolateral portal for reference. Right hip shown.

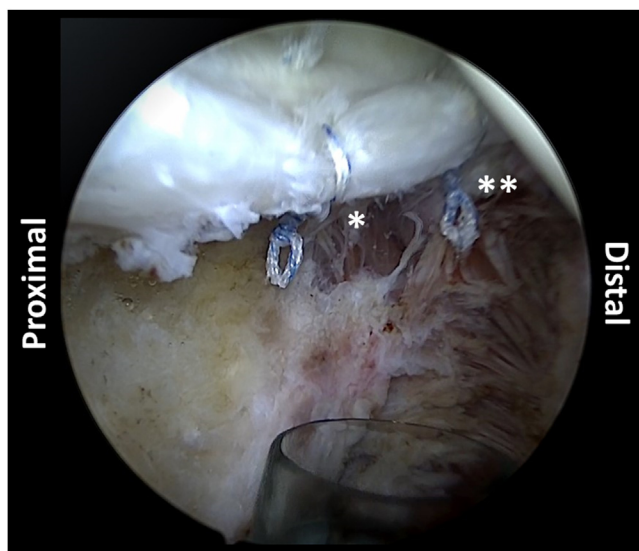


Fig 8. Final posterolateral labral repair construct, with sutures at 11-o'clock position (1 asterisk) and 10-o'clock position (2 asterisks), viewed from modified anterior portal in right hip.

circumflex artery and its branches are within 10 mm at its closest point on average and patients with abnormalities in the posterior aspect of the greater trochanter are at risk because of lack of protection from the overhang of the greater trochanter. Despite these anatomic considerations, the PL portal should be a familiar tool because it allows for optimal drilling trajectories, leading to theoretically greater success of anchor fixation and avoiding intra-articular penetration.⁷ Some of the anatomic drawbacks can be addressed by avoiding excessive work in the PL portal by performing rim preparation, labral suture passing, and knot tying all through the AL portal, only using the PL portal for percutaneous drilling and anchor placement within the confines of a drill guide (Table 1). This strategy helps to effectively mitigate the aforementioned risks.

Addressing posterior and lateral labral tears that are present at the 9- to 11-o'clock position or beyond can be technically challenging without the knowledge and efficient use of key portals such as the PL portal. Suboptimal repairs can negatively impact postoperative outcomes, particularly given that recurrent or incompletely treated labral tears are among the most commonly reported indications for revision hip arthroscopy.⁸ Therefore, there is an impetus to understand strategies for mitigating risk when using less familiar portals because their use can enhance labral fixation and, ultimately, yield favorable hip arthroscopy outcomes.

Disclosures

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: M.H. reports a

Table 1. Pearls and Pitfalls

Pearls

- The surgeon should visualize the cartilage with an arthroscope while drilling to ensure extra-articular placement.
- The capsulotomy should be carried posteriorly and/or laterally for visualization and accessibility.
- The surgeon should consider the use of capsular suspension sutures for even greater exposure and visualization.
- A curved drill guide can help obtain an even safer trajectory away from the articular surface.
- A fluoroscopic view showing the parallel trajectory to the anterolateral portal can help in triangulation for posterolateral portal placement.
- Tying through a cannula in the anterolateral portal can mitigate tissue bridges and help avoid working near neurovascular structures close to the posterolateral portal.

Pitfalls

- Lower extremity internal or external rotation may bring the sciatic nerve closer to or farther from the posterolateral portal tract.
- The curved drill guide requires the anchor to be fully seated prior to impacting; otherwise, it can deflect and deform.
- Using a posterolateral drilling portal for anchors at the 12-o'clock position may lead to a divergent drilling path. The posterolateral portal should be reserved for far posterior anchors.
- Failure to pass sutures from the posterolateral drilling portal to the cannulated anterolateral portal under direct visualization may lead to the creation of tissue bridges.

consulting or advisory relationship with DJO-Envois, Moximed, and Vericel; receives funding grants from Elsevier; and reports board membership with *Journal of Cartilage and Joint Preservation*. A.J.K. receives funding grants from Aesculap; reports board membership with *American Journal of Sports Medicine*, Arthroscopy Association of North America, International Cartilage Repair Society, and Springer; and reports a consulting or advisory relationship with Arthrex. All other authors (F.M., S.S.R., K.N.S.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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