



Accessory Anteromedial Portal for Anatomic Femoral Tunnel Placement in ACL Reconstruction: A Technical Short Communication

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Received Date: 15/09/2025

Revised Date: 16/10/2025

Accepted Date: 23/11/2025

KEYWORDS:

Anteromedial
Portal attention.

ABSTRACT:

Anterior cruciate ligament (ACL) reconstruction success is critically dependent on accurate anatomic femoral tunnel placement. Malpositioned femoral tunnels remain a leading cause of residual rotational instability, graft failure, and revision surgery.^{1,2} The traditional transtibial technique often results in a more vertical femoral tunnel, compromising restoration of native ACL biomechanics.³ The standard anteromedial (AM) portal improves access but may still limit trajectory, particularly in smaller knees or when aiming for the true low–deep native footprint.

INTRODUCTION

Anterior cruciate ligament (ACL) reconstruction success is critically dependent on accurate anatomic femoral tunnel placement. Malpositioned femoral tunnels remain a leading cause of residual rotational instability, graft failure, and revision surgery.^{1,2} The traditional transtibial technique often results in a more vertical femoral tunnel,

compromising restoration of native ACL biomechanics.³ The standard anteromedial (AM) portal improves access but may still limit trajectory, particularly in smaller knees or when aiming for the true low–deep native footprint.

We wish to share our experience with the **accessory anteromedial (AAM) portal technique** as a simple,



reproducible adjunct that facilitates anatomic femoral tunnel creation during single-bundle ACL reconstruction.

Technique Overview

Arthroscopy is performed using standard anterolateral viewing and conventional AM working portals. After diagnostic arthroscopy and notch preparation, the **AAM portal** is established under direct visualization using a spinal needle.

- **Surface landmarks:** the portal is made just medial to the patellar tendon and approximately 1–2 cm above the medial joint line, slightly more distal and medial than the conventional AM portal.
- **Arthroscopic confirmation:** with the knee flexed to 90°, a spinal needle is introduced toward the **native ACL femoral footprint** on the lateral wall of the intercondylar notch (at the low–deep position, respecting the lateral bifurcate and resident’s ridges where identifiable).
- Once optimal trajectory is confirmed (allowing a low, anatomic entry point and adequate posterior wall), a small stab incision is made and a cannula or direct instrument passage is used through the AAM portal.

With the **knee hyperflexed to 110°–120°**, a femoral guide pin is inserted through the AAM portal to the center of the native footprint. The femoral tunnel is then reamed in a retrograde direction while continuously confirming:

- **Sufficient posterior cortex (“back wall”)**
- **Adequate tunnel length**
- **Avoidance of convergence with the anterolateral femoral cortex**

Standard tibial tunnel preparation and graft passage (hamstring or BPTB) are subsequently performed. Fixation is achieved with suspensory devices and/or interference screws as per surgeon preference.

Technical Advantages of the AAM Portal

Compared with the conventional AM portal alone, we found the AAM portal to provide:

1. **Improved tunnel trajectory**
 - Lower and more horizontal approach to the lateral femoral condyle
 - Facilitates placement at the true anatomic center of the ACL femoral footprint^{4,5}

2. **Reduced risk of posterior wall blowout**

- Hyperflexion plus a low medial entry allows a more tangential reaming angle
- Better visualization of the back wall during drilling

3. **Adequate tunnel length, even in smaller knees**

- Oblique drilling through the AAM portal results in a **longer intraosseous tunnel**, improving graft–bone contact and fixation options.⁶

4. **Versatility and reproducibility**

- Can be performed with routine arthroscopy equipment
- Easily adopted in training/teaching environments in tertiary centers such as ours

Practical comparison of standard AM vs accessory AM portal in ACL reconstruction

- **Portal position:**
 - Standard AM: just medial to patellar tendon at joint line
 - AAM: more distal and medial, 1–2 cm above joint line
- **Femoral tunnel access:**
 - Standard AM: sometimes limited for low–deep footprint
 - AAM: improved access to anatomic center
- **Tunnel trajectory:**
 - Standard AM: steeper, risk of shorter tunnel
 - AAM: more oblique, typically longer tunnel
- **Risk of posterior wall blowout:**
 - Standard AM: higher in narrow notches or small femurs
 - AAM: reduced with proper hyperflexion



- **Learning curve:**

- Standard AM: familiar
- AAM: short additional learning curve; easily reproducible

Clinical Experience (Brief Summary)

In our ongoing series of patients undergoing primary ACL reconstruction with AAM portal-assisted transportal femoral drilling, we have observed:

- Consistent ability to place the femoral tunnel at the anatomic footprint
- Reliable posterior wall preservation
- Satisfactory tunnel length on intraoperative assessment and postoperative imaging
- Early functional outcomes suggesting good restoration of stability and return to activity (IKDC/KOOS/Tegner as applicable)

DISCUSSION

Transportal femoral drilling via an AM-based portal has been shown to achieve more anatomic femoral tunnel positioning than the transtibial technique, with improved rotational control and graft isometry.^{1,4} However, concerns remain regarding short tunnels, posterior wall blowout, and difficulty accessing the true low-deep footprint in certain knee morphologies.^{3,7}

The **AAM portal** addresses these limitations by subtly altering the entry point and trajectory without significantly increasing operative time or equipment needs. Similar accessory or far-medial portals have been reported to improve femoral footprint access, particularly when combined with hyperflexion and thorough notch preparation.^{5,6}

In resource-limited environments and high-volume government or teaching institutions, adoption of a **simple, low-cost technical modification** that reliably facilitates anatomic tunnel placement has particular relevance. In our setting, the AAM portal has become our standard approach for primary anatomic ACL reconstruction.

Limitations of our current experience include a single-center design and relatively short-term follow-up. Further prospective comparative studies against other femoral drilling techniques (standard AM, outside-in, or retrograde devices) with objective radiological and functional assessment would help define the precise clinical advantages of the AAM portal.

CONCLUSION

The **accessory anteromedial portal** is a safe, inexpensive, and easily reproducible modification that enhances anatomic femoral tunnel placement in ACL reconstruction. By providing a lower, more favorable trajectory to the native ACL femoral footprint, it helps preserve the posterior wall, optimizes tunnel length, and is particularly useful in smaller knees and teaching environments. We propose that this technique be considered as a routine adjunct to standard portals in surgeons aiming for truly anatomic ACL reconstruction.

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