

Editorial Commentary: Independent Femoral Tunnel Drilling Avoids Anterior Cruciate Ligament Graft Malpositioning: Advice From a Transtibial Convert



Patrick A. Smith, M.D.

Abstract: Optimal femoral anterior cruciate ligament graft placement has been extensively studied. The champions of transtibial reconstruction debate the backers of anteromedial portal and outside-in drilling. The holy grail is footprint restoration and how we best to get there. To me, creating the femur independently provides the best chance of finding that footprint by being unconstrained by the tibia. Anterior cruciate ligament surgery is challenging enough; decrease intraoperative stress and increase your likelihood of femoral footprint restoration by drilling it through the anteromedial portal.

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As anterior cruciate ligament (ACL) surgeons, we all have the same goal: a successful outcome with ACL reconstruction. To me, that means the patient has a knee that is stable enough to be able to return to their previous level of activity (including sports) with no limitations, to not retear their graft, and ideally, to not develop later osteoarthritis (OA). To accomplish this goal, optimal graft placement at the time of surgery is critical. I believe graft choice is also important, but this discussion will not be about graft choice, which would be an editorial in and of itself.

The literature has shown that femoral graft position is important for reproducing ACL kinematics and stability.¹⁻³ Not to suggest that the tibial position is not important, as it is, but malpositioning of the femoral tunnel has been found to be a leading cause of technical failure in ACL reconstructions.⁴ So, the issue is how we best make our ACL femoral socket? Certainly, this topic has been well researched,⁵ but now authors Moorthy, Sayampanathan, and Tan in their article “Superior Postoperative Stability and Functional Outcomes With Anteromedial Versus Transtibial Technique of

Single-Bundle Autologous Hamstring Anterior Cruciate Ligament Reconstruction: A Meta-analysis of Prospective Randomized Controlled Trials” have provided us with further evidence of the benefit of anteromedial (AM) portal drilling.⁶ The authors should be congratulated on their thorough methodology to validate their conclusions.

Personally, I was a transtibial (TT) surgeon from 1989 until 2000—performing approximately 150 ACL reconstructions a year—before changing to the AM-portal approach. Having been in practice for 35 years in the same location with the opportunity to take care of family generations, I have seen many of my TT reconstructions in long-term follow-up. My level 5 evidence assessment of my TT experience is the grafts were generally vertical, my retear rate was low, but the development of OA—especially with the medial compartment—was unacceptably high. All are indicative of the problem of a relatively vertical ACL graft not optimally controlling rotation. In that situation, the graft doesn’t see the load; but the joint does, hence low graft failure and increased OA development.^{7,8} It was challenging in those days trying to drill an anatomic femoral socket through the tibia, frequently bending guide pins in the process and dilating with my reamer the previously made tibial tunnel. Can the appropriate position on the femur be reached transtibially? Absolutely, in the hands of experienced ACL surgeons, especially with improved technology like flexible reamers and the use of intraoperative fluoroscopy; but, I find the AM-portal drilling technique is more reliable

University of Missouri

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to reach the native femoral footprint, which has been substantiated by the literature.⁹⁻¹¹ In addition, studies confirmed the stability advantages of an independent femoral socket and tibial tunnel.¹²

To highlight the findings of this study, the authors found regarding ACL stability—by way of Lachman, pivot shift, and instrumented (KT-1000) side-to-side difference—that AM-portal drilling was significantly better than TT. Also, AM-portal drilling was significantly better functionally with International Knee Documentation Committee (IKDC) grade A scores and Lysholm scores. Subjective IKDC and Tegner scores, however, were statistically comparable. Notably, the patient numbers for subjective IKDC (277) and especially Tegner (127) were considerably less than for Lachman (368), pivot shift (591), side-to-side difference (510), and Lysholm (510). Therefore, there is potentially a lack of power with the IKDC subjective and Tegner scores, which could account for no statistical difference with those 2 categories.

The importance of this meta-analysis in favor of AM femoral drilling over TT relates to this being statistically significant both for stability parameters and functional outcome with good patient numbers obtained from only level 1 randomized controlled trials. Furthermore, other than 1 study with 6 months follow-up, the 6 other studies had follow-up greater than 12 months—with 3 of those having follow-up greater than 24 months, which is important since the majority of ACL graft retears occur in the first 2 years.¹³

In conclusion, to drill consistent anatomic femoral sockets, I believe evidence-based literature—including this latest meta-analysis by Moorthy et al.—currently supports AM-portal drilling over TT. Hopefully, residents and fellows alike are being taught the nuances of AM-portal drilling, including the use of flexible reamers, which in a recent publication were found to result in a more normal sagittal ACL angle than with the use of a standard reamer through the AM portal, with the coronal ACL angle showing no difference.¹⁴

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