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A Prospective Evaluation of the Anterior Horn of the Lateral Meniscus as a Landmark for Tibial Tunnel Placement in ACL Reconstruction

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Summary:
Use of the posterior border of the anterior horn of the lateral meniscus as a landmark for tibial tunnel placement yields an inconsistent tunnel location.

Abstract:
OBJECTIVES
Recent literature has placed considerable focus on femoral tunnel placement for independent tunnel ACL reconstruction, while considerably less attention has been given to the tibial tunnel. Staubli, et al localized the center of the tibial ACL footprint to be 43.3% of the anterior to posterior distance of the tibia; the posterior border of the anterior horn of the lateral meniscus is typically used as a landmark to achieve a tibial tunnel placement in the footprint. The goal of the present study was to prospectively evaluate the accuracy and consistency of the anterior horn of the lateral meniscus as a landmark in achieving the desired tibial tunnel location in the anatomic footprint.

METHODS
After institutional IRB approval was obtained, 100 consecutive adult patients undergoing primary ACL reconstruction were enrolled in the study. A single sports-fellowship trained surgeon with over 20 years' experience including over 1,500 ACL reconstructions performed all reconstructions using independent tunnel drilling with an accessory anteromedial portal for the femoral tunnel. All guide pins for the tibial tunnel were placed using a 55 degree guide using the posterior border of the anterior horn of the lateral meniscus as a landmark. Following pin placement, a true lateral fluoroscopic image was obtained. These were digitally analyzed to measure the location of the pin along the length of the tibial plateau, using the method described previously by Staubli, et al. The location was expressed as a percent of the A-P distance of the tibia.

RESULTS
The average A-P distance achieved using the posterior border of the anterior horn of the lateral meniscus as a landmark for tibial tunnel placement was 37.0% +/- 5.2% [range 26.4% - 49.2%]. 66% of tibial tunnels were located between 30.0% - 39.9% of the A-P tibial distance. Only 18% of tibial tunnels localized between 40.0% - 44.9%, the area of the anatomic footprint described by Staubli, et al. 16% of patients were significant outliers, with tunnels localizing to 25.0% - 29.9% (6 patients) or 45.0% - 49.9% (10 patients).

CONCLUSIONS
Use of the posterior border of the anterior horn of the lateral meniscus as a landmark for tibial tunnel placement yields an inconsistent tunnel location. Without any variation in tunnel placement technique in a prospectively collected population of 100 patients, the average tunnel location achieved was anterior to the anatomic footprint (37.0% vs 43.3%), had a significant variation in location (+/- 14.1%) and a wide range of locations (26.4% - 49.2%) with numerous outliers. Further study is required to determine the optimal location for tibial tunnel placement and the best method to consistently achieve this location in independent tunnel ACL reconstruction.