

Use of transtibial aimer via the accessory anteromedial portal to identify the center of the ACL footprint

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Abstract

Purpose To assess the ability of a transtibial aimer with a 7-mm off-set in a standardized position to reach the center of the ACL footprint on the femur through the AM portal. **Methods** Nineteen cadaveric knees were dissected, and the perimeter of the femoral ACL footprint was marked. The aimer was placed just superior to the medial joint line close to the medial condyle through the AM portal. The guide was rested upon the posterior cortex and placed in three different positions: (A) at zero degrees in frontal plane and 60° in axial plane, (B) at 45° in frontal and 45° in axial, and (C) at the center of the ACL insertion site under direct visualization. A digital camera was used to take pictures on the axial plane, and *Image J* software was used for angle measurement. Aluminum beads were used to mark the three positions indicated by the aimer, and CT

scans were performed. The distances from the true center of the ACL to each point were determined.

Results Position A resulted in femoral tunnel placement furthest from the center of the ACL footprint (8.6 mm). Position B was at a distance of 3.2 mm, and position C was the most accurate, with an average distance of 2.0 mm. The angles required by Position C varied with an average of $54^\circ \pm 11^\circ$ in the frontal plane and an average of $44^\circ \pm 6^\circ$ in the axial plane.

Conclusion The 7-mm transtibial aimer was unable to reach the center of ACL footprint at a fixed orientation.

Keywords Anterior cruciate ligament · ACL · Anatomical reconstruction · Transtibial aimer · ACL footprint

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Introduction

Some orthopaedic surgeons still perform both anatomical single and double-bundle ACL reconstruction using an anatomical femoral aimer with different off-sets to reach the center of the footprint [6, 11]. An understanding of the anatomy of the anterior cruciate ligament (ACL), particularly its anatomical footprint on the lateral femoral condyle, is important in anatomic ACL reconstruction [20, 25]. For single-bundle ACL reconstruction, correct anatomic position of the femoral tunnel is important as incorrect positioning of the femoral tunnel has been shown to lead to poor clinical results [13]. Most of the femoral tunnels placed using a transtibial technique tend to be placed deep and high in the notch, away from the center of the ACL footprint [1, 8, 23]. Use of a transtibial technique constrains the surgeon's freedom in choosing the position for the center of the ACL footprint leading some surgeons to use