Anterior Cruciate Ligament Tunnel Position Measurement Reliability on Three-Dimensional Reconstructed Computed Tomography

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**Purpose:** The purpose of this study was to evaluate intraobserver and interobserver reliability of anterior cruciate ligament tunnel location measurement by use of 3-dimensional reconstructed computed tomography (CT).

**Methods:** Three-dimensional reconstructed CT images of 31 cadaveric knees were used in this study. Twenty-one knees were operated on with a double-bundle technique, and ten knees were operated on with a single-bundle technique. Femoral tunnel location was measured with 3 methods on the medial-lateral view of the lateral femoral condyle in the strictly lateral position. Tibial tunnel location was measured in the top view of the proximal tibia. The images were evaluated independently by 2 orthopaedic surgeons. A second measurement was performed, by both testers, after a 4-week interval.

**Results:** The 3 methods of femoral tunnel location measurement had intraobserver intraclass correlation coefficients (ICCs) that ranged from 0.963 to 0.998 and interobserver ICCs that ranged from 0.993 to 0.999. Tibial tunnel measurement had intraobserver ICCs that varied between 0.957 and 0.998 and interobserver ICCs that varied between 0.993 and 0.996.

**Conclusions:** The measurement of the anterior cruciate ligament tunnel location on 3-dimensional reconstructed CT provided excellent intraobserver and interobserver reliability.

**Clinical Relevance:** Three-dimensional reconstructed CT can be used for further studies to assess the effect of tunnel position on knee stability and patient outcomes.

Correct tunnel placement is crucial to achieve good outcomes after anterior cruciate ligament (ACL) reconstruction. Tunnel position influences knee stability, and postoperative clinical outcomes, and tunnel malpositioning is a common cause of recurrent instability after ACL reconstruction. If revision surgery is required, surgeons must evaluate the previous tunnel location and morphology. Plain radiographs have always been the main diagnostic tool for determining the tunnel’s characteristics. However, in a substantial percentage of patients, tunnel positioning is very hard to evaluate on the postoperative radiographs. Although computed tomography (CT) generally provides good visualization of bony structure, the 3-dimensional (3D) shape of the intercondylar notch precludes the use of a conventional 2-dimensional CT scan for measurement of the ACL tunnel location. Hoser et al. used sagittal and frontal reconstructed CT scans to evaluate the position of a single-bundle femoral tunnel reconstruction, whereas Lorenz et al. assessed both femoral and tibial insertion sites of both ACL functional bundles using...