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Far Anteromedial Portal Technique for Posterolateral Femoral Tunnel Drilling in Anatomic Double-Bundle Anterior Cruciate Ligament Reconstruction: Effect of Knee Flexion Angle on Femoral Tunnel Characteristics

Atsuo Nakamae, MD, PhD, JAPAN
Mitsuo Ochi, MD, PhD, JAPAN
Nobuo Adachi, MD, PhD, JAPAN
Masataka Deie, MD, PhD, JAPAN
Tomoyuki Nakasa, MD, JAPAN
Goki Kamei, JAPAN

Hiroshima University
Hiroshima, JAPAN

Summary:
A knee flexion angle of 110° is recommended when using the far-anteromedial portal technique for posterolateral femoral tunnel drilling in double-bundle ACL reconstruction.

Abstract:
Introduction:
The purpose of this study was to identify the relationship between knee flexion angle and femoral tunnel length, as well as the exit points of guide pins, when using a far anteromedial (FAM) portal technique for posterolateral (PL) femoral tunnel drilling in anatomic double-bundle anterior cruciate ligament (ACL) reconstruction.

Methods:
Using the FAM portal technique in 8 cadaveric knees, femoral tunnel drilling for the PL bundle was performed at 3 knee flexion angles: 90°, 110°, and 130°. We measured the femoral tunnel length and the distances from each guide pin to the closest relevant structures on the lateral side of the knee.

Results:
The mean femoral tunnel length of the PL bundle at 90° knee flexion (25.8 mm) was significantly shorter than the length at 110° and 130° knee flexion (32.1 mm and 33.1 mm, respectively). The average distance between the exit point of the guide pin and the posterior articular cartilage of the lateral femoral condyle was the shortest at 90° knee flexion (3.3 mm). The distance between the guide pin and the center of the origin of the lateral collateral ligament (LCL) was the shortest at 130° knee flexion (8.0 mm). The guide pins penetrated the origin of the lateral gastrocnemius tendon in 2 cases at 110° knee flexion and in 1 case each at 90° and 130° knee flexion.

Conclusions:
When using the FAM portal technique, more than 110° knee flexion is desirable in terms of the femoral tunnel length and the articular cartilage injury of the lateral femoral condyle. In addition, the risk of damage to the origin of the LCL increases with an increase in the knee flexion angle to 130°.