

Introduction: Meniscal tears frequently accompany anterior cruciate ligament (ACL) rupture, yet the anatomical predictors of tear characteristics and reparability remain unclear.

Methods: In this single-center retrospective study, 397 patients (mean age 26.5 ± 8.1 years; 82.9 % male) who underwent primary or revision ACL reconstruction were reviewed. Pre-operative MRI was used to measure medial and lateral tibial slopes (MTS/LTS) and medial and lateral meniscal-bone angles (MMBA/LMBA). Arthroscopy provided definitive tear localization, zone (red, red-white, white), pattern, and the procedure performed.

Results: A meniscal tear was present in 46.6 % of knees; 49.7 % were medial, 34.1 % lateral and 16.2 % bicompartamental. Medial tears clustered in the posterior horn and vascularized red or red-white zones, while lateral tears more often involved the white zone and radial or complex patterns. Medial repairs predominated (75.4 % vs 26.9 % for lateral), whereas lateral injuries were usually treated by partial meniscectomy (63.4 %). A lower MMBA correlated with red-zone and less-complex medial tears, such as ramp, horizontal, and vertical tears, that are amenable to repair or rasping ($p < 0.01$), an association that was not observed for the LMBA. Whereas tibial slopes showed no significant relation to tear presence or type. Age displayed a weak but significant correlation with medial tearing ($r = 0.123$, $p < 0.05$).

Conclusions: Nearly half of ACL-deficient knees harbor a meniscal tear, most commonly a peripheral posterior-horn lesion of the medial meniscus that is amenable to repair. A flatter medial meniscus (low MMBA) predicts peripheral and ramp, vertical and horizontal tears, whereas tibial slope metrics do not. Recognizing this geometry on MRI can heighten suspicion for reparable lesions and refine surgical decision-making.