

ACL integrity focus directly on the morphology of the ligaments. These criteria include: nonvisualization or poor delineation of ligamentous fibers, a focal fluid replacing the gap within the ligament, an edematous mass replacing the ligament, or abnormal horizontal orientation of the ligament.¹⁵ Secondary signs such as "kissing" bone contusions in the lateral compartment of the knee may offer high diagnostic specificity in an acute setting. Avulsion tears of the ACL frequently occur at its tibial insertion and are associated with lipohemarthrosis (Fig. 2). Overall, conventional criteria have a sensitivity of 61% to 100% and a specificity of 82% to 100%. However, difficulties in differentiation between complete and partial tears, and between chronic complete tears and normal ligaments are still present in daily practice. The distinction of complete from partial tears is clinically important, because the presence a partial tear is generally not considered an indication for surgical reconstruction.

The author established a helpful adjunctive sign—the MR "anterior drawer" sign for diagnosis of complete ACL tears.^{16,17} An anterior translation of the tibia greater than 5 mm (grade 2 or more) relative to the femur on sagittal MR images of the knee indicates the presence of this sign. Proper use of this sign requires

little experience, yet it offers improved distinction between partial and complete tears, especially in a sub-acute setting.

Meniscal Tears

Trauma and degeneration of the meniscus are major factors contributing to meniscal tears. Patients with meniscal degeneration or tears do not necessarily have symptoms. A history of specific injury may or may not be obtained. MR imaging plays a major role in the evaluation of the entire meniscus and parameniscal structures, instead of being limited to surface abnormalities as in arthroscopy and arthrography.

Stoller and associates¹⁸ in an autopsy study categorized abnormal intrameniscal MR signals into 3 grades. Grade I and II signals represent meniscal degeneration, and only a grade III signal indicates tearing (Fig. 3). The overall diagnostic sensitivity and specificity are, respectively, 84% to 97% and 80% to 91% for medial menisci, and 58% to 92% and 91% to 100% for lateral menisci.¹⁵

Because of the limitations of arthroscopy, it is not surprising that small numbers of false-positive MR findings are reported. The question of whether intrasubstance degeneration may progress to a complete tear is controversial. A longitudinal study will be helpful to solve this problem.

Arthritis and Synovial Plicae

Articular cartilage irregularity, erosion, and thinning can be seen in patients with trauma (e.g., osteochondral fractures), degeneration (osteoarthritis), and synovial inflammation (e.g., rheumatoid arthritis). MR imaging demonstrates cartilaginous abnormalities before they are evident radiographically. For example, MR imaging frequently detects tricompartmental disease when a radiograph only shows bicompartmental involvement.^{19,20} Many important findings (cartilage loss, osteophytes, subchondral cysts, and sclerosis) remain undetected by plain radiographs and even CT scan. MR imaging also permits detection of active hypervascular pannus in rheumatic arthritis, which may be helpful for early treatment planning.^{21,22}

Plicae are persistent remnants of embryonic syno-

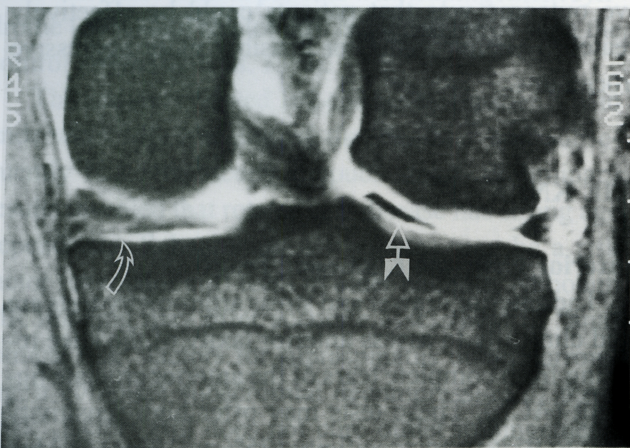


Fig. 3. Coronal T2* gradient-echo image showing a displaced meniscal fragment (arrow) toward the intercondylar notch indicating a bucket-handle tear of the lateral meniscus. A cleavage tear of the medial meniscus (curved arrow) also is noted.