80. Collateral Ligaments, Knee

Like other ligaments, type 1 collagen lends the medial and lateral collateral ligaments of the knee a hypointense appearance on conventional MR pulse sequences. The superficial portion of the medial collateral ligament (MCL) arises from the medial femoral condyle and inserts below the joint line, merging with low SI cortical bone posterior to the pes anserinus. The course of this ligament is illustrated on the coronal FS and non-FS PDWI of Fig. 80.1A,B, respectively. The superficial MCL fibers are separated from the deep fibers by the Voshell bursa. The pes anserinus bursa lies distal to this, anterior to the tendons of the sartorius, semitendinosus, and gracilis. The deep MCL is well seen in the PDWI of Fig. 80.1A, merging with the joint capsule and medial meniscus medial to the superficial portion. Generally, the MCL is best evaluated on coronal images. Interstitial injuries (Grade 1 lesions) demonstrate signal hyperintensity of the ligament without fiber disruption. Grade 2 lesions are partial-thickness tears that demonstrate signal hyperintensity of the ligament and additional disrupted fibers involving various degrees of the cross-sectional area of the ligament. A grade 3 lesion is a complete tear and is illustrated on the coronal FS T2 and PDWI in Fig. 80.1C,D. Here, particularly on the (C) FS T2WI, thickening and high SI edema within the MCL with full thickness disruption (black arrow) of the proximal fibers of the superficial and deep ligamentous components are visualized. These features are not as clearly demonstrated on the (D) PDWI without fat saturation, although compared to a normal MCL (Fig. 80.1B), the ligament is clearly less distinct. Tears of the ligamentous substance, as in this lesion, tend to be associated with concurrent ACL injury, while peripheral tears often occur in isolation. Other associated findings in MCL tears include femoral condylar fracture and contusion. The medial condyle is typically involved with direct injury and the lateral in valgus-type injuries, both appearing as hyperintensity on FS PD and T2WI. Simple joint effusions are seen as fluid SI tracking around and along nearby ligaments, while subacute hemorrhagic effusions demonstrate hyperintensity on T1 and T2WI. A hypointense, free body may indicates an avulsed bone fragment. Pellegrini-Stieda disease—a form of mineralization at the proximal attachment of the MCL—may occur chronically. Such mineralization is initially seen as hypointensity, whereas with ossification, fatty bone marrow signal is present. GRE can be helpful for the detection of mineralization. Associated bursitis may appear as abnormal edema-like SI within the pes anserinus or Voshell bursa. Due to the proximity of the MCL, inflammation within the latter may be confused with tear.

The posterolateral corner complex consists of the lateral collateral ligament—spanning from the lateral condyle of the femur to the lateral fibular head—and the biceps femoris,

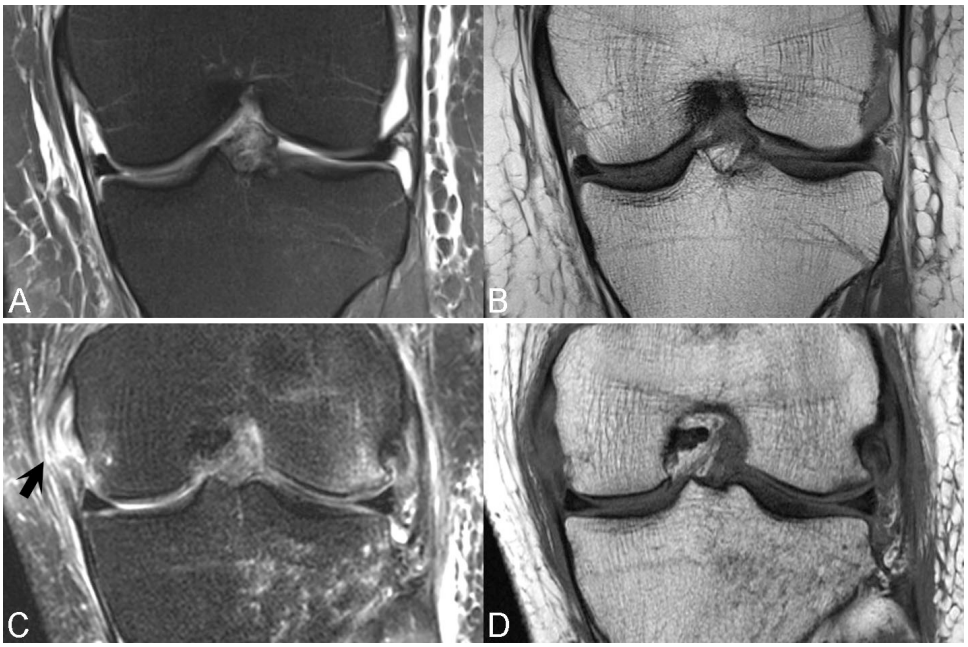

Fig. 80.1

together known as the conjoint tendon, as well as the popliteus muscle and tendon, and the arcuate ligament complex. The latter includes the popliteofibular, fabellofibular, arcuate, and coronary ligaments, posterolateral joint capsule, and the posterior horn of the lateral meniscus. The popliteus arises from the lateral femoral condyle, running obliquely along the posterior knee to insert in the posterior tibia under the condyles. Its tendon runs medial to the lateral collateral ligament (LCL). The popliteofibular ligament extends from the fibular styloid superiorly to the popliteus tendon which courses medially to the LCL. The arcuate ligament, which may be absent with a prominent fabellofibular ligament, arises from a condensation of fibers at the fibular head, crosses the popliteus, and inserts on the posterior capsule. The LCL itself may be difficult to visualize due to its double oblique course, but can be evaluated sufficiently on successive coronal and sagittal images. A tear of the conjoint tendon's fibular insertion is seen in the FS PDWI of Fig. 80.2A-C. The MR gradation of LCL tears is similar to those of the MCL. In this image there is overlying soft tissue edema with clear (A, white arrow) hyperintensity at the conjoint tendon's fibular insertion and superior displacement of portions of the ligament. This structure, however, maintains continuity here and (B) throughout its course including at (C) its insertion at the lateral femoral condyle, consistent with a grade 2 tear. SI changes in LCL injuries generally are of more moderate SI on MR than those of the MCL as the former is more distinct from the capsule and does not elicit as much joint fluid when torn. Popliteus tendon tears, a case of which is partially visualized in Fig. 80.2A as a focus of hyperintensity at the musculotendinous junction, may occur concurrently with other associated injuries including

tears of the biceps femoris and iliotibial band. Findings of iliotibial band syndrome on MR—a chronic condition in runners—includes edema-like or fluid-like SI within the fat subjacent to the iliotibial tract. Lateral meniscal and cruciate ligament tears are common with LCL disruption as are fibular head and Segond fractures—an avulsion of the capsular insertion on the lateral tibial plateau.

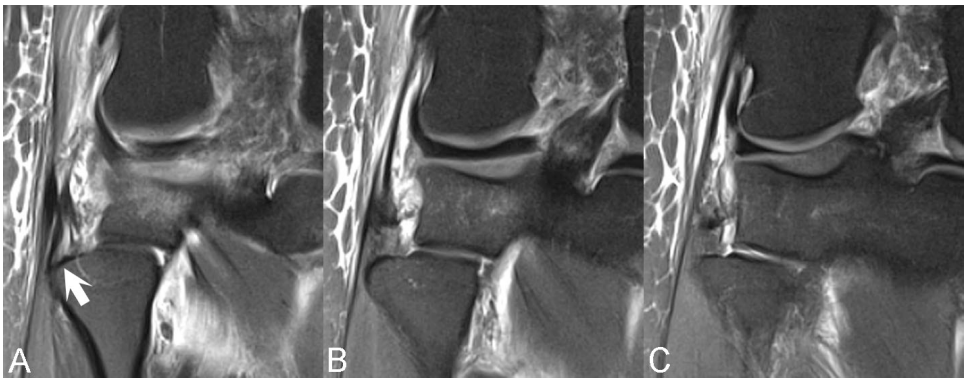

Fig. 80.2