91. Ligamentous/Tendinous Elbow Injuries

Stress injury to the medial and lateral ligamentous and tendinous structures of the elbow is common. The annular, lateral ulnar collateral, and the radial collateral ligaments comprise the lateral ligamentous structures. The normal appearance of the latter is demonstrated on the coronal oblique T1WI of Fig. 91.1A (black arrow), images acquired in a plane bisecting the epicondyles thus allowing optimal visualization of the elbow's ligaments and tendons. As illustrated, the radial collateral ligament originates from the lateral humeral epicondyle and joins with the annular ligament surrounding the radius. The common extensor origin (white arrow), which gives rise to the muscles of hand and wrist extension, also originates from the lateral epicondyle and, as shown in Fig. 91.1A, runs superficial to the radial collateral ligament. In the FS T2WI of Fig. 91.1B, this tendon demonstrates abnormal fluid-like hyperintensity with discontinuity representing a tear of the common extensor tendon origin. Degenerative tendinosis with or without a partial tear also demonstrates increased tendinous SI, but does not show a full thickness defect; thickening and thinning of the tendon are most suggestive of tendinosis while focal intratendinous fluid-like signal supports the diagnosis of a partial tear. Full tendinous disruption with intervening hyperintensity on FS T2 or PDWI indicates a complete tear. The radial collateral ligament also demonstrates fluid-like hyperintensity and discontinuity in Fig. 91.1B, consistent with a full thickness tear. Along with the more posteriorly located lateral ulnar collateral—which transverses the radiocapitellar joint superficial to the annular ligament—the radial collateral ligament prevents posterolateral rotatory elbow instability—a condition leading to perching of the trochlea upon the coronoid, a predisposition to further injury.

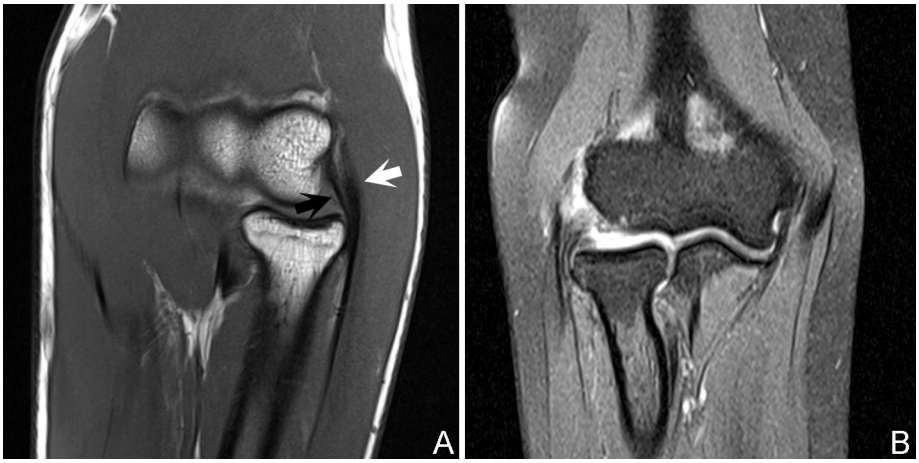

Fig. 91.1

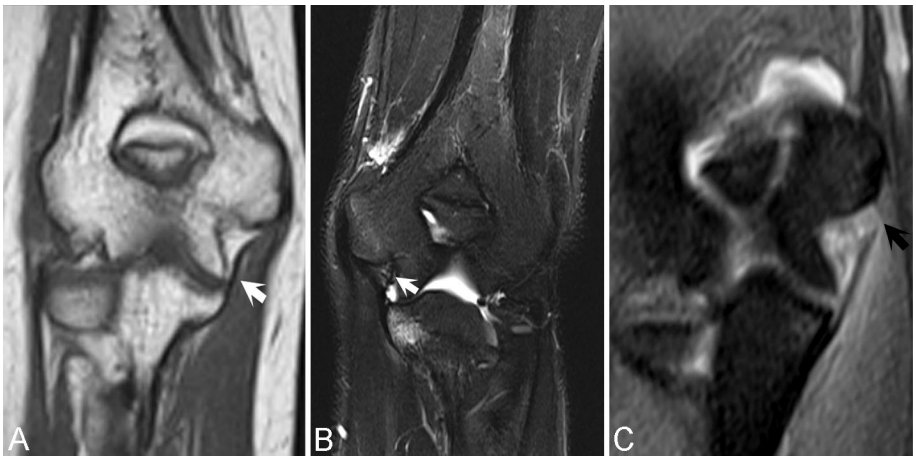

Fig. 91.2

A normal medial (ulnar) collateral ligament is illustrated in the coronal T1WI of Fig. 91.2A (white arrow). This ligament typically connects the inferior medial epicondyle of the humerus to the sublime tubercle of the medial coronoid process of the ulna, running deep to the flexor tendons. Medial epicondylitis is less common than lateral. Regional osseous SI abnormalities warrant careful evaluation of nearby ligaments and tendons. For example, the coronal FS T2WI of Fig. 91.2B demonstrate bone marrow edema-like signal with minimal hyperintensity of the medial epicondyle and marked hyperintensity of the sublime tubercle of the ulna—findings suggestive of bone contusion. However, the visualized portions of (from lateral to medial) the flexor tendon origin, the anterior, and posterior medial (white arrow) collateral ligaments demonstrate uniform hypointensity and are apparently intact, although these structures are best evaluated with MR arthrography. Tears of the anterior bundle of the medial collateral ligament are most common, classically occurring in baseball pitchers, presenting with a T-sign reflecting partial detachment from the sublime tubercle. Medial epicondylitis is typified by edema within and thickening of the flexor and pronator tendons arising at the medial humeral condyle, with adjacent bone marrow edema also common. Findings of associated ulnar neuritis such as neuronal hyperintensity and thickening are well-visualized on axial images. A full-thickness ulnar collateral ligament tear is illustrated in the FS T2WI of Fig. 91.2C. Here, continuity of the low SI ligament is interrupted at its proximal origin by a hyperintense gap (black arrow). Chronic tears are associated with calcification (marked ligamentous hypointensity on all pulse sequences) or fatty ligamentous infiltration (hyperintensity on T1 and PDWI). Extravasation of contrast may be seen with MR arthrography in full thickness tears, while partial undersurface tears may be identified by the so-called T-sign. This appearance refers to contrast extending between sublime tubercle and distal attachment of the anterior band of the superficial ligament perpendicular to the contrast normally seen within the ulnohumeral joint. Medial

collateral ligament tears may also avulse a portion of the medial epicondyle—a finding identifiable on the radiograph of the patient in Fig. 91.2C but not on MR. A similar condition may occur in children—known as little leaguer's elbow—consisting of stress fractures through the medial epicondylar epiphysis or medial epicondylar apophysitis. Chronically, the valgus stress causing medial epicondylitis may lead in lateral impaction and resulting radiocapitellar osteochondritis dissecans. As in other joints, fluid on T2WI or contrast with MR arthrography encircling an osteochondral fragment denotes instability. GRE T2WI may aid in identification of free joint fragments. Osteochondritis dissecans involves the epicondylar epiphysis in children between 5-10 years old but does not necessarily result in osseous fragmentation. Finally, tears of the biceps tendon may be visualized on elbow MR—best seen on images obtained in elbow flexion and abducted shoulder with supinated forearm (FABS position)—as edema-like SI often surrounding a retracted tendon. Axial MR imaging must thus include the radial tuberosity—the tendon's insertion—while coronal and sagittal fields of view must include sufficient portions of the superior arm so as to identify a significantly retracted tendon.