

88. Triangular Fibrocartilage Complex Tears

The high-resolution thin-section imaging afforded by high-field MR allows for accurate assessment of the triangular fibrocartilage (TFC) complex of the wrist—a key stabilizer of the radiocarpal and radioulnar joints. This complex consists of the triangular fibrocartilage, the extensor carpi ulnaris tendon sheath, and the meniscal homologue (fibrous tissue between the ulnar styloid and triquetrum) as well as the dorsal and volar radioulnar and ulnocarpal ligaments. The proximal portion of the TFC complex arises from the lunate fossa of the radius and inserts at the ulnar styloid tip and fovea. Distal insertions include the triquetrum, hamate, and fifth metacarpal base, while the complex inserts volarly on the triquetrum and lunate, and dorsally upon the extensor carpi ulnaris tendon sheath. The TFC proper (also known as the articular disk) cushions the radiocarpal and radioulnar joints and is the most commonly injured portion of the complex. It is best-visualized as a hypointense (due to its fibrocartilaginous composition) biconcave structure on coronal images. On axial scans, the TFC appears triangular, its apex at the ulnar styloid. Its anterior and posterior boundaries are the radioulnar ligaments (dorsal and volar, respectively).



Fig. 88.1

TFC defects are characterized as traumatic or degenerative under the Palmer classification. The former, often caused by a direct blow, are more likely to occur at the TFC's thicker radial attachment. Due to normal poor vascularity of this area such tears are unlikely to heal, and the injured TFC is often resected. Such defects constitute Palmer class 1 lesions, one type of which (class 1A) is illustrated on the MR

arthrogram in Fig. 88.1. On this FS T1WI, the hypointense TFC demonstrates a 1 mm region of complete discontinuity (black arrow) that is filled with enhancing gadolinium chelate. This central, full-thickness disruption is present several millimeters medial to the TFC's radial insertion, as is typical. MR arthrography for suspected TFC injury is most commonly performed with a single radiocarpal joint injection followed by triplanar image

acquisition with GRE to facilitate thin slice imaging. This type of injection allows, as seen in Fig. 88.1, demonstration of contrast leakage from the distal radiocarpal space across the disrupted TFC into the proximal radioulnar space. Partial tears bordering the radiocarpal space exhibit intravasation of contrast. As this technique does not afford evaluation of partial undersurface (proximal) TFC tears, FS T2WI are also frequently obtained. The abnormally intravasated triquetral contrast in Fig. 88.1 is consistent with the patient's history of a remote fracture of that structure (white arrow). Class 1B Palmer lesions are marked by ulnar TFC avulsion with or without styloid fractures. A TFC tear at the insertion of the ulnolunate or ulnotriquetral ligament constitutes a Class 1C lesion, while a lesion tearing the TFC from its radial attachment (with or without osseous avulsion) is classified as Class 1D.

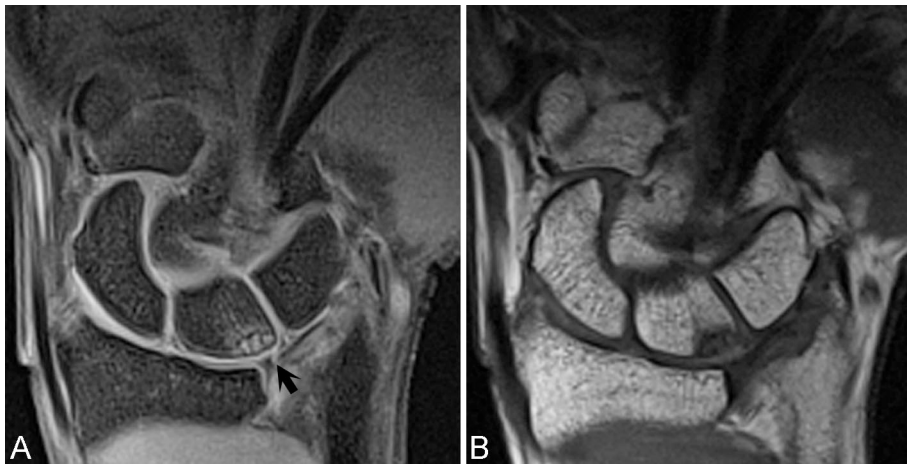


Fig. 88.2

Degenerative tears of the TFC are much more common, but may be only distinguishable by clinical history (i.e. no trauma), a predilection for the elderly, and associated findings. Of the latter, an ulna positive configuration is most common. This is demonstrated in Fig. 88.2A,B. The presence of joint effusion, in distinction, suggests a more acute process. Fluid due to an effusion may be distinguished from that of a normal joint by its propensity to enhance on CE MRI. Degenerative TFC defects affect the thinner, more central or ulnar portions of the TFC. The ulnar aspects of the TFC are vascularized, and surgical repair of such lesions is commonly attempted. High SI within the ulnar aspect of the TFC may be nonspecific due to the striations in this area or the presence of the nearby, moderate SI meniscal analogue. Arthrography may be useful in further delineating such lesions. Class 2A and 2B degenerative lesions consist of degenerative changes of the TFC without tear. 2B lesions include concurrent lunate or ulnar chondromalacia. Degenerative changes within the TFC may appear as hyperintensity on T1 and PDWI, correlating with myxoid or

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mucinous infiltration, and commonly involve the proximal TFC surface centrally. Intrasubstance TFC tears may occasionally occur and are best detected on GRE T2WI. High SI of the nearby radial articular cartilage on this sequence may, however, confuse the diagnosis. A Class 2C lesion is illustrated in Fig. 88.2A,B. Here, the TFC is clearly torn as demonstrated by the high SI at its distal surface on (A, arrow) FS T2WI. As only one surface is involved, the tear is partial. Within the proximal lunate on the T1WI of Fig. 88.2 B, low SI is prominent against normal hyperintense fatty marrow. The (A) FS T2WI more clearly depicts subchondral cysts surrounded by high SI edema, consistent with ulnocarpal abutment. Associated lunotriquetral perforation would constitute a Class 2D lesion, while class 2E lesions demonstrate such perforations and severe ulnocarpal arthritis. Ulnocarpal impaction differs from ulnar impingement, in which the distal portion of a shortened ulna articulates with the radius, and ulnar styloid impaction where an elongated styloid process extends and contacts the carpal bones, usually the triquetrum. Further considerations for ulnar wrist pain include avascular necrosis of the lunate, hamate fracture, triquetropisiform arthritis, and tendonitis of the extensor carpi ulnaris—the latter which may also be associated with TFC injury.