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Classification of TFCC lesions according to Atzei

In the radiological MSK community, disorders of the TFCC are currently categorised according to the Palmer classification differentiating traumatic (class 1) and degenerative (class 2) causes. However, this approach is suffering from several limitations: First, traumatic lesions can often not be distinguished from (pre-existing) degenerative causes in imaging and arthroscopy. Second, an exact borderline is not drawn to distinguish lesions of the avascular central disc (TFC proper) from lesions of the vascularised TFCC periphery. Third and most important, the ulnar TFCC insertion is anatomically not subdivided for precisely assessing type 1-B lesions in the Palmer classification. However, the ulnar site of the TFCC is a complex three-dimensional structure consisting of these components:

- the **deep TFCC layer (dl-TFCC)**, also called the "proximal triangular ligament", inserts at the fovea of the ulnar head and provides stability in the distal radioulnar joint,
- the **superficial TFCC layer (sl-TFCC)** is a hammock-like structure that supports the axial force transition at the ulnar wrist together with the ulnar collateral ligament,
- the **"ligamentum subcruentum"** is an adipose structure interposed between the two TFCC layers.

Already in 2011, Atzei and Luchetti (Italy) introduced a new classification system with respect to the dedicated TFCC anatomy and treatment options. This approach covers not only the different vascular TFCC zones, but also differentiates a deep (dl-TFCC) and a superficial (sl-TFCC) layer at its ulnar insertion. The Atzei's classification system of TFCC lesions are summarized in the following table and figures:

Atzei Class	Pathoanatomy of the TFCC	DRUJ condition
0	Fracture of the styloid apex without a TFCC tear	stable
1	Isolated tear of the sl-TFCC	stable
2	Combined tears of the sl-TFCC and dl-TFCC	instable
3	Isolated tear of the dl-TFCC	instable

3-A	Fracture of the styloid base with dl-TFCC tear	instable
4	Nonrepairable central TFCC disorder	instable
5	DRUJ osteoarthritis following a TFCC tear	instable
Tab. 1: Classification of TFCC lesions according to Atzei and Luchetti (2011).		

The dl-TFCC and sl-TFCC are built of the radioulnar ligaments both surrounding the central triangular disc (TFC) at its dorsal and palmar sites and converging with separate ligamentous extensions at the fovea of the ulnar head (dl-TFCC) and at the ulnar styloid process (sl-TFCC). Biomechanically, the dl-TFCC is very strong structure at the foveal insertion which therefore plays a key role in stability of the distal radioulnar joint.

The dl-TFCC and sl-TFCC are well vascularized providing moderate healing chances and being responsible for focal contrast enhancement in MRI during the healing period. High-resolution MRI of the TFCC can be applied in three different approaches: a) Plain MRI (tear detection dependent on the presence of a focal effusion), b) contrast-enhanced MRI (focal enhancement at the vascularized rupture site), and c) direct MR arthrography (standard of reference in detecting and characterizing peripheral TFCC lesions).

From the anatomical, biomechanical and therapeutical points of view, it is favourable and thus recommended for MSK radiologists to apply the new Atzei classification in cases of peripheral (ulnar) TFCC lesions.

References

Atzei A, Luchetti R. Foveal TFCC tear classification and treatment. Hand Clin 2011;27:263-272

Kirchberger MC et al. Update TFCC: histology and pathology, classification, examination and diagnostics. Arch Orthop Trauma Surg 2015;135:427-437

Figure legend

Figure 1: Illustration of the peripheral TFCC lesions according to the classification of Atzei. The deep TFCC layer (dl-TFCC) is drawn in dark grey, the superficial layer (sl-TFCC) in light grey.