Fractures of the distal radius: controversies in treatment, rehabilitation and management of complications
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ANATOMY OF THE DISTAL RADIUS
The distal radius has been described as the osseous foundation of the wrist(1). It can be understood as a structure with a dorsal and ventral surfaces and an anterior, distal and biconcave articular area that receives the convex surfaces conformed by the scaphoid and lunate. Anatomically, the thickness of the cortical bone of the radius decreases at the metaphyseal flare while the amount of cancellous bone increases. This structural transition of the bone tissue forms a weaker zone predisposing this region to fracture, especially in osteoporotic patients(2).

The dorsal surface of the distal end of the radius is thin and convex serving as a fulcrum for the extensor tendons. Lister’s tubercle represents an additional long prominence functioning as a fulcrum for the extensor pollicis longus (EPL).(3) The volar aspect of the radius is flat and extends palmarly in a gentle curve. The pronator quadratus covers most of the distal metaphyseal flare extending to insert on the volar surface of the distal ulna.

The extrinsic ligaments of the wrist, dorsal and palmar groups, originate from its respective rim: The dorsal radiocarpal ligaments originate from the dorsal one and course obliquely and ulnarly towards the triquetrum attaching distally on its
dorsal aspect. (Fig. 1) In the volar side, the palmar group distributes as follows: The radioscapoholunate ligament arises from a tubercle in the middle of this radiopalmar aspect while the short radioscapoholunate arises from the volar radial styloid. In addition, the radial collateral ligament and radiotriquetral ligament originate from the volar ridge at the volar styloid(1).(Fig. 2)

The articular end of the radius characteristically slopes in an ulnopalmar direction and as a result the proximal carpal row has a natural tendency to slide in an ulnar direction.(3) The distal radial articular surface has three articular facets covered by hyaline cartilage: the scaphoid fossa, the lunate fossa and the sigmoid notch. A central ridge, traversing from the dorsal to the palmar surface, divides the scaphoid and the lunate facets. Each facet is concave in both anteroposterior and radioulnar planes.(4) (Fig 3)

The third distinct articular surface of the distal radius is the sigmoid notch. It is semicylindric in shape and is orientated parallel to the seat of the ulnar head. It articulates with the ulnar head whose articular surface (2/3 of circumference or 270
(degrees) is covered by hyaline cartilage. (Fig. 4) This trochoid articulation is responsible for pronosupination of the distal forearm and wrist. (5) Rotation of the radius about the ulna and its axes is accompanied by a translation displacement of the ulna. During supination, the ulnar head displaces anteriorly in the sigmoid notch while during pronation it moves dorsally.

**Figure 3.** Distal Articular Aspect of the Radius. S=Scaphoid Fossa; L=Lunate Fossa; TFCC=Triangular Fibrocartilage Complex; 1=Radioscaphocapitate Ligament; 2=Long Radiolunate Ligament; 3=Interosseous Ridge; 4=Short Radiolu- nate Ligament; 5=Palmar Radioulnar Ligament; 6=Ulnolunate Ligament; 7=Ulnocapitate Ligament; 8=Ulnotriquetral Ligament; 9=Prestyloid Recess; 10=Dorsal Radioulnar Ligament; 11=Dorsal Radiocarpal Ligament; 12=Lister T.

The final relevant structure is the triangular fibrocartilage. This important stabilizer originates from the ulnar side of the lunate fossa and extends to the base of the ulnar styloid process (6). (Fig. 3) Its palmar and dorsal edges are thickened, blending into the dorsal and volar radioulnar ligaments, which represent the major stabilizers of the distal radioulnar joint.

The flexor and extensor systems are important musculotendinous structures responsible of the wrist and hand motion. The flexor and extensor tendons pass across the distal aspect of the radius to reach their final point of insertion at the carpal bones or the base of the metacarpals. The only tendon that inserts on the distal radius is that of the brachioradialis muscle which can act as a deforming force upon the fracture fragments.
The extensor system is organized into six retinacular compartments through which the extensor tendons run. Although rarely injured in acute settings, total or partial ruptures of the extensor pollicis longus (EPL) has been well recognized in association with distal radial fractures (4).

REFERENCES
