

Anatomy Primer of the Wrist Ligaments

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Introduction

The wrist ligaments are complex and not easily accessible. They are concealed volarly by the contents of the carpal tunnel and dorsally by the extensor tendons and the extensor retinaculum. Knowledge of the anatomy of the various ligaments is essential to understanding wrist instability patterns and treatment.

Types of Ligaments

Volar Ligaments

The volar ligaments are best seen during wrist arthroscopy. (Figure 1) The radio-scapho-capitate (RSC) ligament extends from the radial styloid to the capitate. It extends over the scaphoid waist but does not attach to it. It functions as a scaphoid stabilizer. The long radio-lunate (LRL) ligament extends from the radial styloid to the lunate. The short radio-lunate (SRL) ligament extends from the distal radius to the lunate. The ulno-carpal (UC) ligament extends from the volar ulnar capsule to the carpus and contains the space of Poirier. (Figure 2a: black dot) The volar radial ligaments are responsible for stabilizing the hand and wrist to the forearm. (Figure 2b)

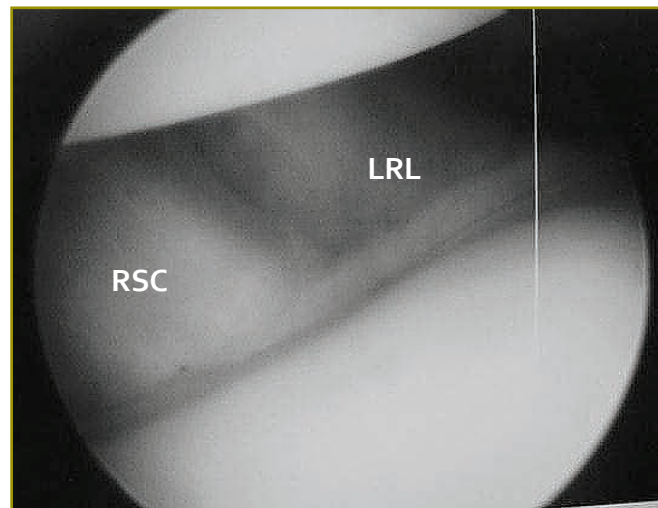
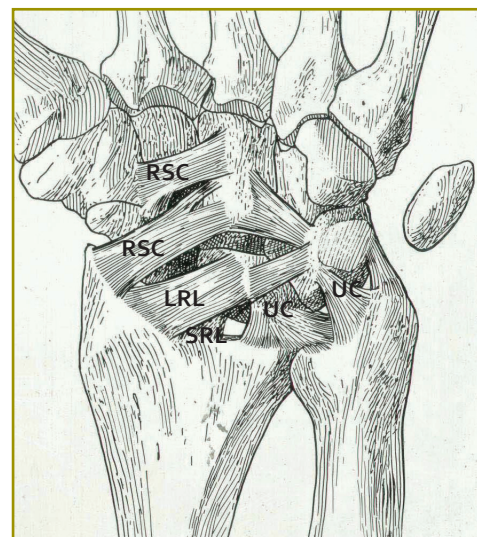


Figure 1: Arthroscopic view of the volar wrist ligaments.
RSC: radioscaphocapitate
LRL: long radiolunate

Figure 2a (left): Anatomical cadaveric rendering of the volar wrist ligaments with the black dot representing the space of Poirier.

Figure 2b (right): Artist rendition of the volar ligaments.

- RSC: radioscaphocapitate
- LRL: long radiolunate
- SRL: short radiolunate
- UC: ulnocarpal



Dorsal Ligaments

The dorsal ligaments (Figures 3a, 3b) are less distinct due to the presence of the extensor retinaculum. The dorsal inter-carpal ligament extends across the carpus from the triquetrum radially to the scaphoid and radial styloid. The dorsal luno-triquetral ligament extends from the lunate to the triquetrum. A tear of the dorsal inter-carpal ligament and luno-triquetral ligament results in volar intercalated segmental instability (VISI) deformity.



Figure 3a: Anatomical cadaveric dissection of the dorsal wrist ligaments

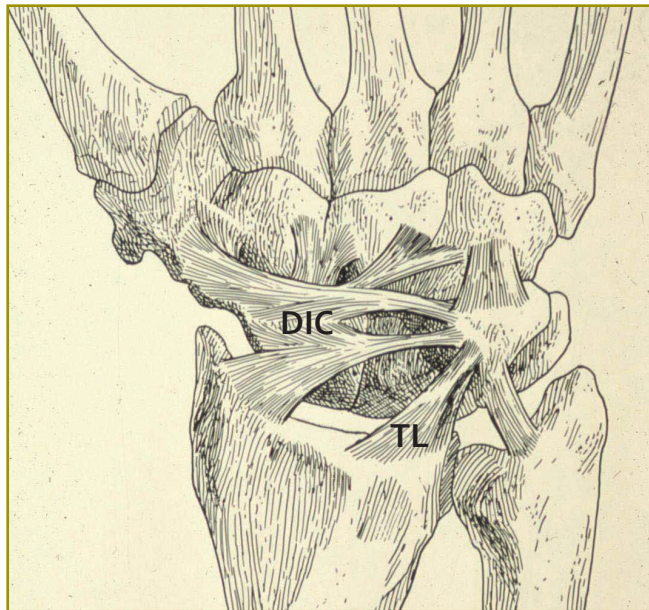


Figure 3b: Artist rendition of the dorsal ligaments.
DIC: dorsal intercarpal ligament
TL: triquetral ligament

Intercarpal Ligaments (Figures 4 & 5)

The scapholunate ligament is C-shaped with dorsal, proximal and volar portions. It is not a true interosseous ligament as it does not lie between the two bones. It functions to hold the scaphoid and the lunate together. A tear of the scapholunate ligament results in the most common pattern of wrist instability and leads to dorsal intercalated segmental instability (DISI).

The lunotriquetral ligament is also not a true interosseous ligament as it does not lie between the two bones.

The capito-hamate, capito-trapezoid, and trapezoid-trapezium ligaments are true interosseous ligaments as they lie between the corresponding bones. The capito-hamate ligament allows the capitate and the hamate to move together as a single unit.

Types of Injuries

There are two main types of wrist ligament injuries; greater arc and lesser arc (Figure 6). In greater arc injuries, there is a fracture through the scaphoid and in some cases there is a fracture through the capitate. Trans-scaphoid, perilunate dislocation is an example of a greater arc injury. In lesser arc injuries, the injury is purely ligamentous. Lunate and perilunate dislocations are examples of lesser arc injuries.

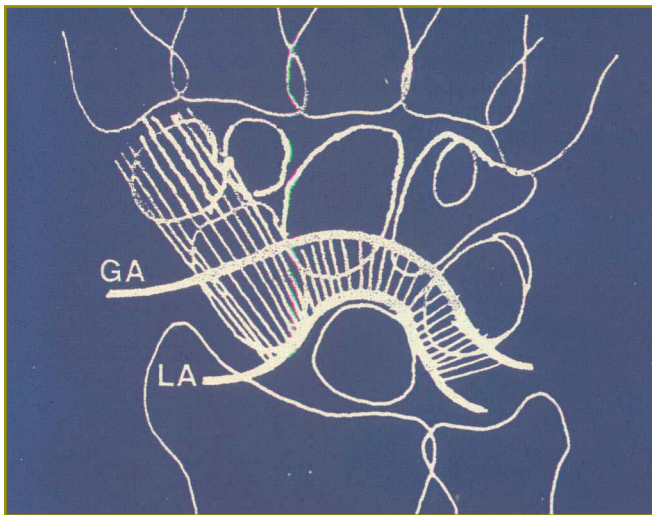


Figure 6: Wrist ligament injury patterns.

GA: greater arc
LA: lesser arc

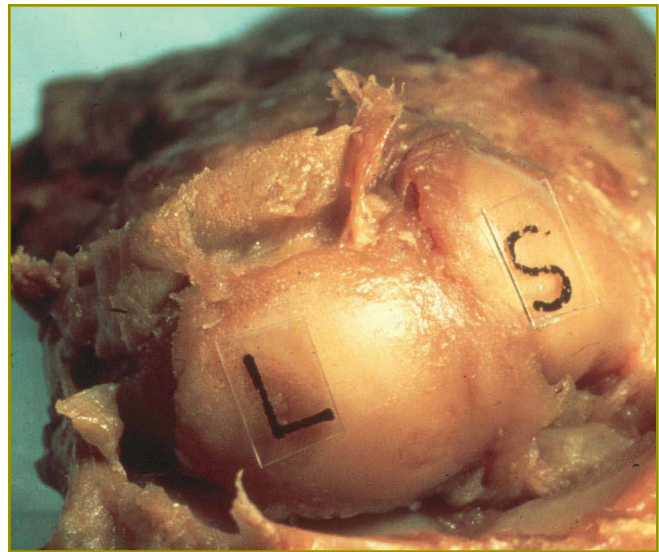


Figure 4: Cadaveric representation of the scaphoid (S), lunate (L), and scapholunate interval between the two carpal bones.

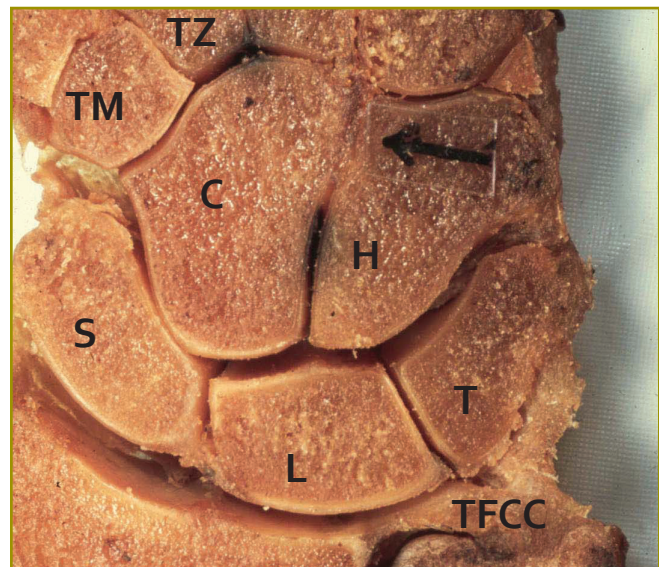


Figure 5: Cadaveric cross section of wrist carpal bones and ligaments.

TM: trapezium
S: scaphoid
TZ: trapezoid
C: capitate
L: lunate
H: hamate
T: triquetrum
TFCC: triangular fibrocartilage complex

Black arrow denotes the stout capitolunate ligament which allows the capitate and the lunate to move together as a single unit