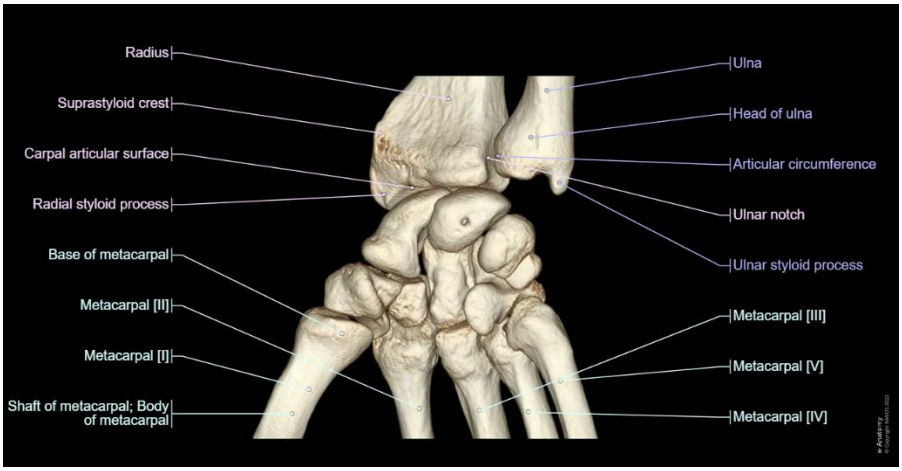
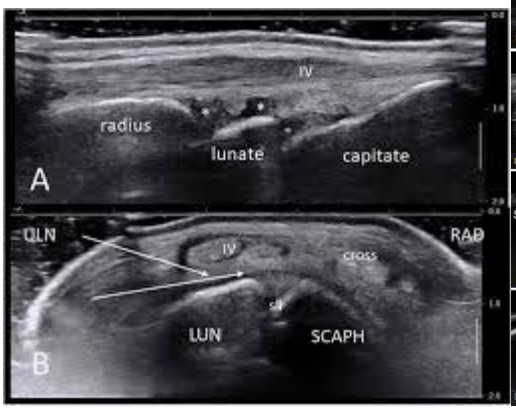
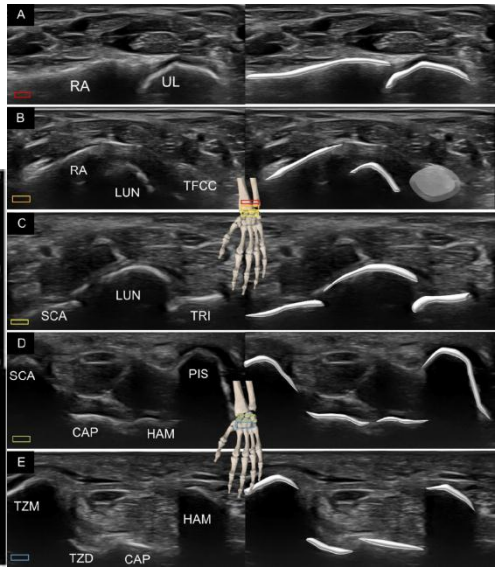
WRIST ANATOMY

The wrist is a complex synovial joint formed by articulations of the radius, the articular disc of the distal radioulnar joint and the carpal bones.




IV
radius
lunate
capitate
A
ULN
RAD
IV
CROSS
LUN
SCAPH
B


A
RA
UL
B
RA
LUN
TFCC
C
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TRI
D
SCA
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CAP
HAM
E
TZM
HAM
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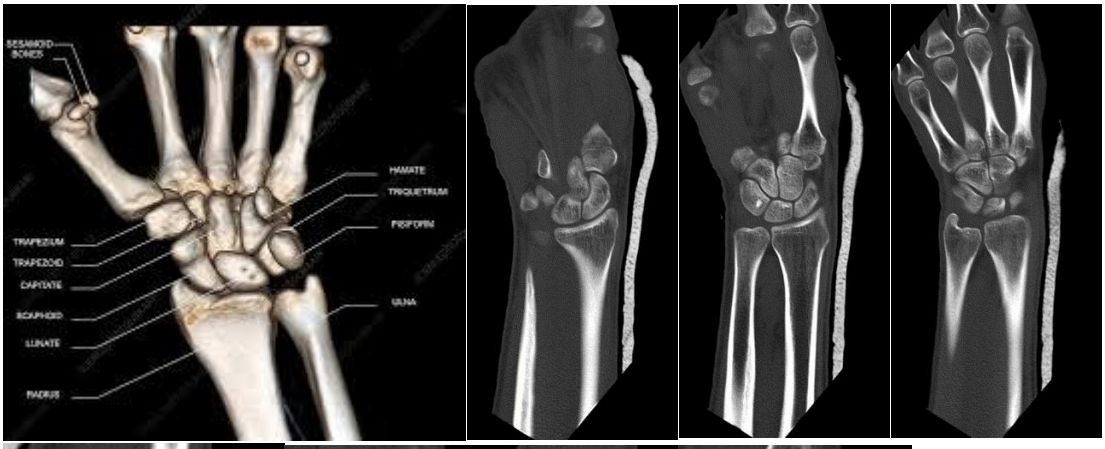
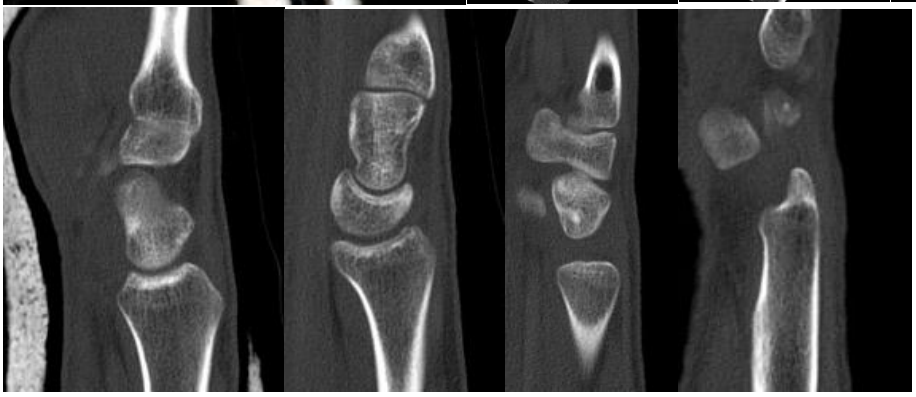
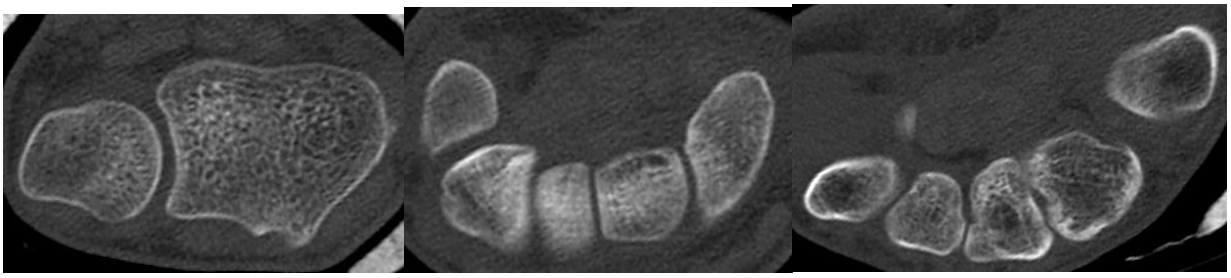
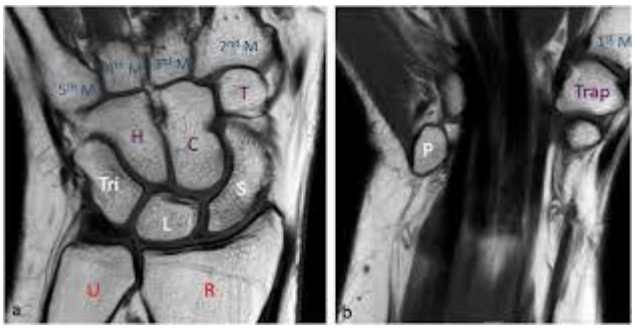
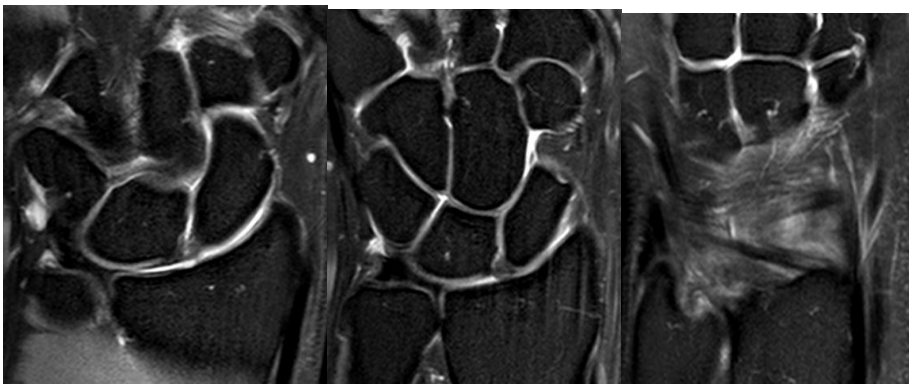

SESAMOID BONES
HAMATE
TRIQUETRUM
PISIFORM
TRAPEZIUM
TRAPEZOID
CAPITATE
SCAPHOID
LUNATE
RADIUS
ULNA



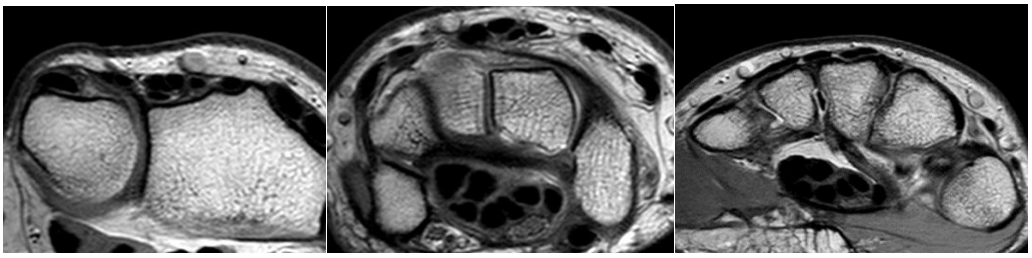




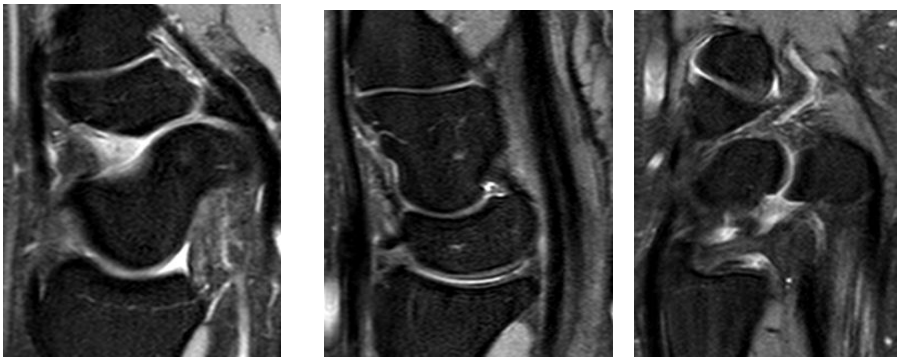
CORONAL
PD



Coronal
PD FS



Axial
PD



Saggital
PD FS

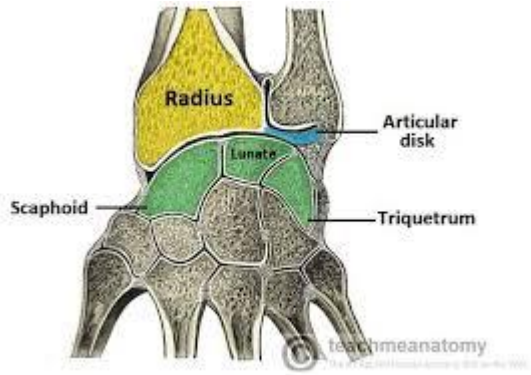
Articulations

The "wrist joint" is really made up of three separate joints :

Radiocarpal: concave distal surface of the radius and the attached articular disc of the distal radioulnar joint proximally with the convex surface of the proximal carpal row (the scaphoid, lunate and triquetral bones) distally

Distal radioulnar: ulnar notch of the distal radius with the head of the ulna, united by the articular disc

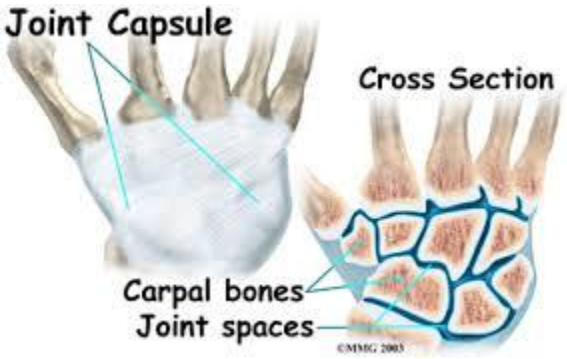
Midcarpal: scaphoid, lunate and triquetrum proximally with the trapezium, trapezoid, capitate and hamate distally



Joint	Proximal articulation	Distal Articulation	Movement
Radiocarpal joint	Radius and articular disc/ concave	Scaphoid, lunate, triquetrum / – convex	Flexion-extension; Abduction-adduc
Midcarpal joint	Scaphoid. Lunate, Triquetrum	Trapezium, Trapezoid, Capitate, Hamate	Flexion-extension; Abduction-adduc
Carpometacarpal joint (thumb)	trapezium	1st metacarpal	Flexion-extension; Abduction-adduc
Carpometacarpal joint (fingers)	trapezoid, trapezium capitate capitate, hamate hamate	2nd metacarpal 3rd metacarpal 4th metacarpal 5th metacarpal	Flexion-extension
Metacarpophalangeal joints	Metacarpals	phalangeal	Flexion, extension, abduction, adduc
Interphalangeal	Proximal phalangeal	Distal phalangeal	Flexion (lots) Extension (minimal

Joint Capsule

The joint capsule of the wrist joint attaches to the radius, ulna and the proximal row of the carpal bones. It is lined internally by a synovial membrane, which produces synovial fluid to reduce friction between the articulating structures.



Ligaments

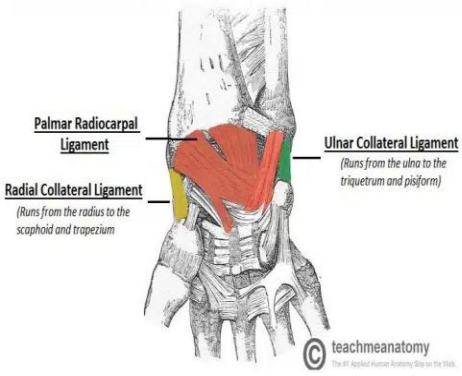
There are four main ligaments located at the wrist joint:

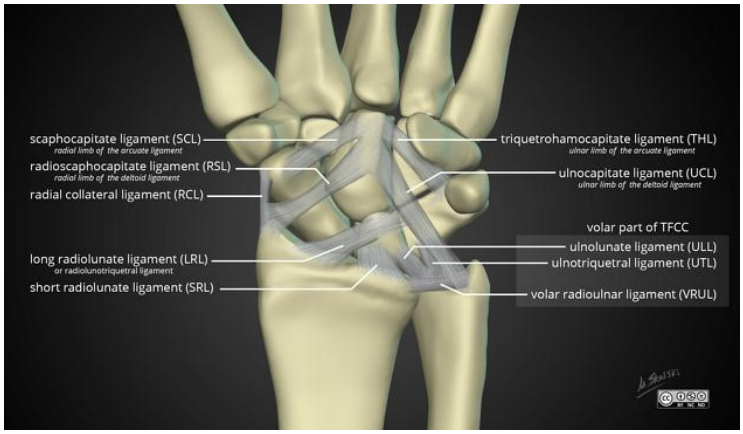
Palmar radiocarpal – located on the palmar (anterior) side of the joint. It passes from the radius to both rows of carpal bones. Its function, apart from increasing stability, is to ensure that the hand follows the forearm during supination.

Dorsal radiocarpal – Found on the dorsum (posterior) side of the hand. It passes from the radius to both rows of carpal bones. It contributes to the stability of the wrist, but also ensures that the hand follows the forearm during pronation.

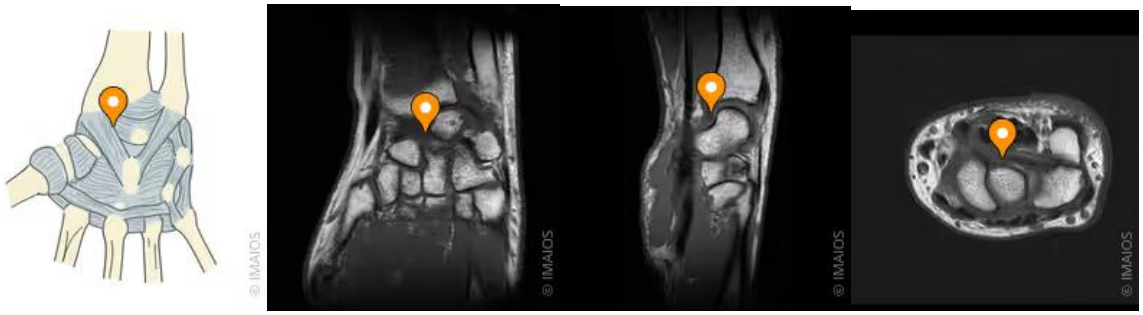
Ulnar collateral – Runs from the ulnar styloid process to the triquetrum and pisiform. It acts to prevent excessive radial (lateral) deviation of the hand.

Radial collateral – Runs from the radial styloid process to the scaphoid and trapezium. It acts to prevent excessive ulnar (medial) deviation of the hand.



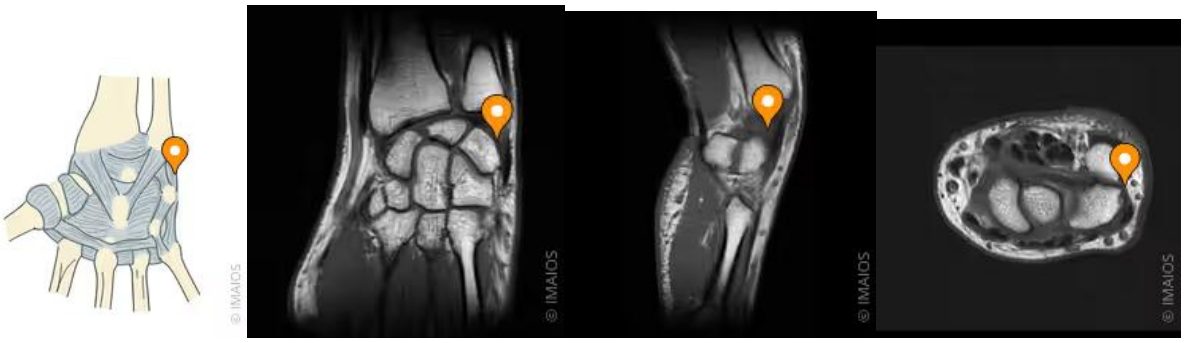


Palmar radiocarpal ligament



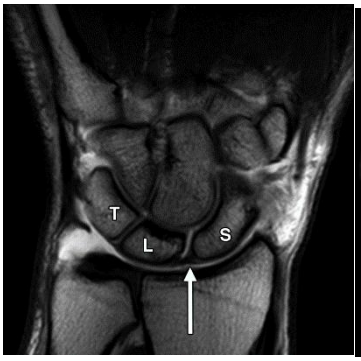
Dorsal radiocarpal ligament

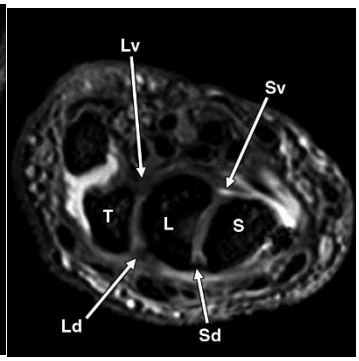
Ulnar collateral ligamnent



Radial collateral ligament

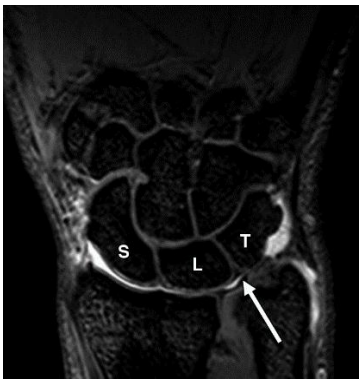
Intrinsic Ligaments of the Wrist





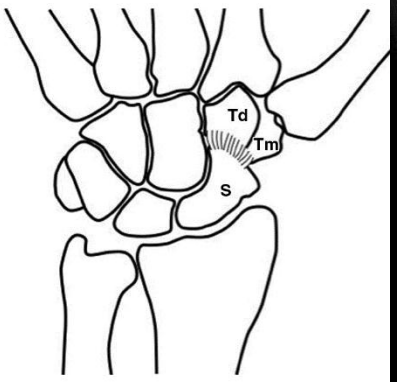
Normal scapholunate ligament (arrow) is seen on coronal T1-weighted MR arthrogram of wrist. L = lunate, S = scaphoid, T = triquetrum.

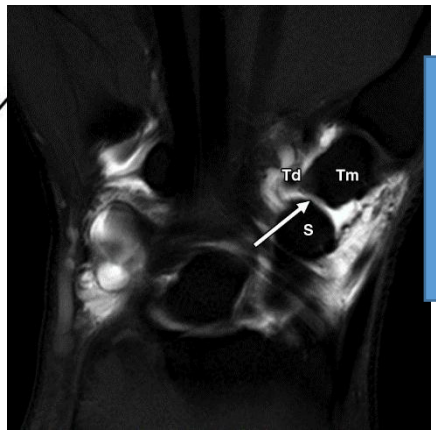
Normal scapholunate ligament (Sd = dorsal band of scapholunate ligament, Sv = volar band) and lunotriquetral ligament (Ld = dorsal band of lunotriquetral ligament, Lv = volar band) are seen on axial 3D gradient-recalled echo sequence from MR arthrogram of wrist



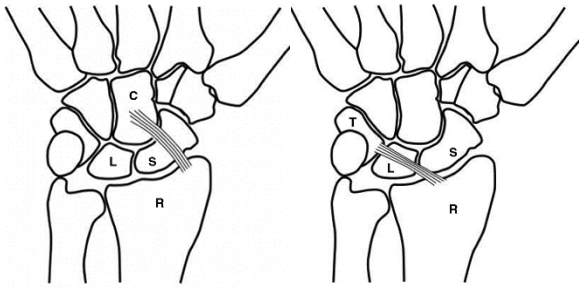
Normal lunotriquetral ligament (arrow) is seen on coronal 3D gradient-recalled echo MR arthrogram of wrist. L = lunate, S = scaphoid, T = triquetrum

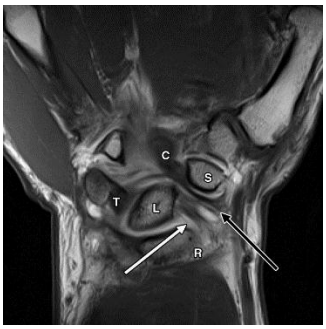
Volar Extrinsic Ligaments of the Wrist



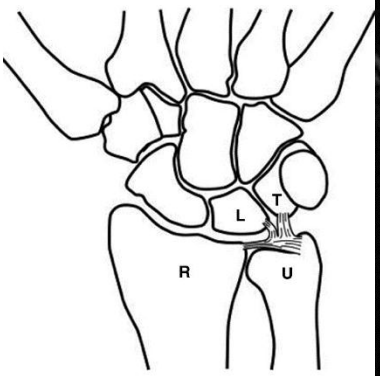


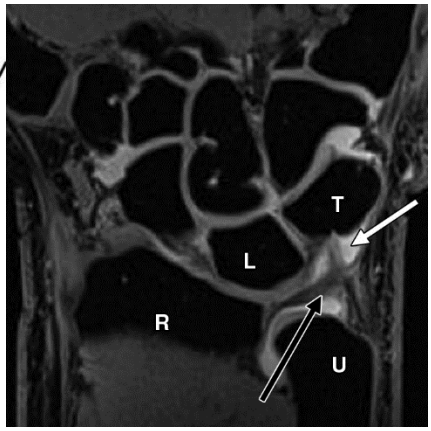
normal appearance of scaphotrapeziotrapezoid ligament (arrow) seen on coronal T1-weighted fat-saturated MR arthrogram of volar wrist.



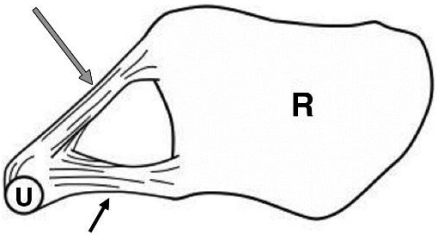


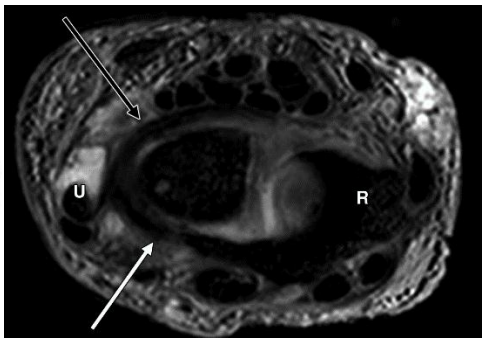
normal volar radioscaphocapitate ligament (black arrow) and volar radiolunate ligament (white arrow) seen on coronal T1-weighted MR arthrogram from volar aspect of wrist. Fluid within radiocarpal joint from arthrogram is seen intervening between volar radioscaphocapitate ligament and volar radiolunate ligament, allowing delineation between two





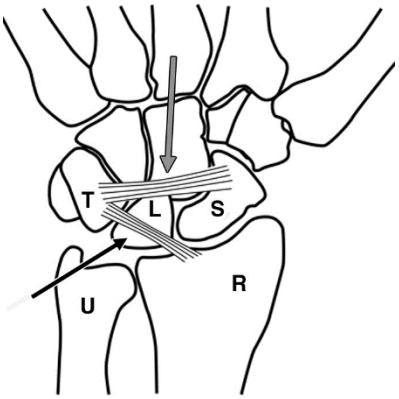
normal volar ulnotriquetral ligament (white arrow) seen on coronal 3D GRE MR arthrogram image of wrist. Ligament extends from volar radioulnar ligament (black arrow) to triquetrum

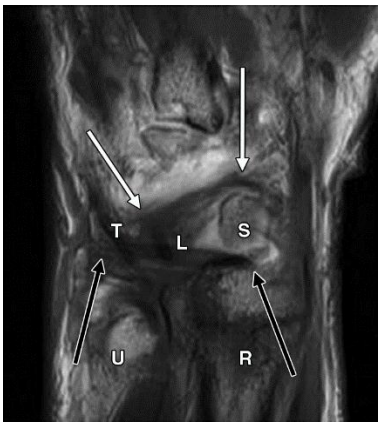




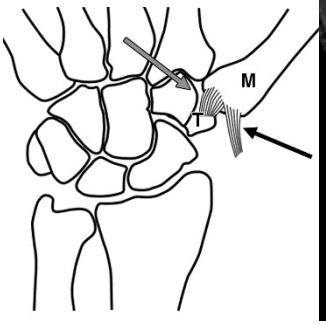
normal volar radioulnar ligament (black arrow) and dorsal radioulnar ligament (white arrow) seen on axial 3D gradient-recalled echo MR arthrogram

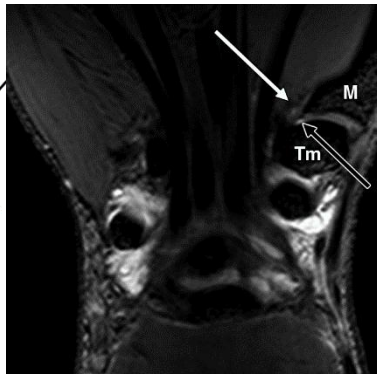
Dorsal Extrinsic Ligaments of the Wrist





normal dorsal radiotriquetral ligament (black arrows, sites of attachment on dorsal radial styloid and dorsal tubercle of triquetrum) and dorsal intercarpal ligament (white arrows, attachment sites on scaphoid and triquetrum) on coronal T1-weighted MR arthrogram





Normal deep (black arrow) and superficial (white arrow) anterior oblique ligaments of first carpal metacarpal joint are seen on coronal 3D GRE MRI

Blood Supply

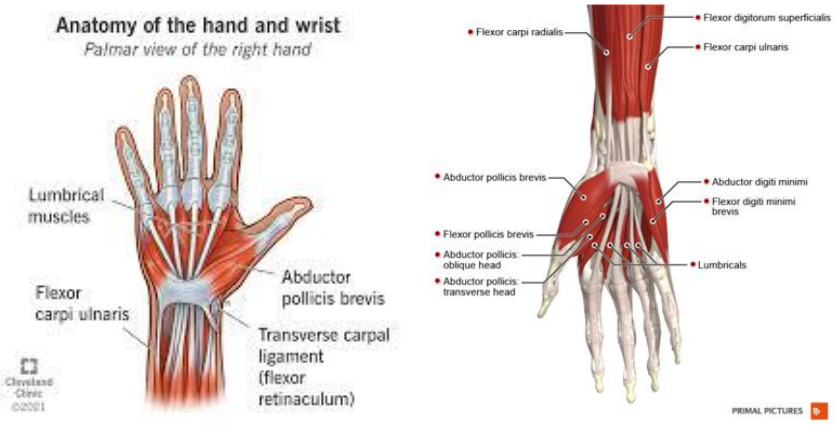
The wrist joint receives blood from branches of the dorsal and palmar carpal arches, which are derived from the ulnar and radial arteries (for more information, see Blood Supply to the Upper Limb)

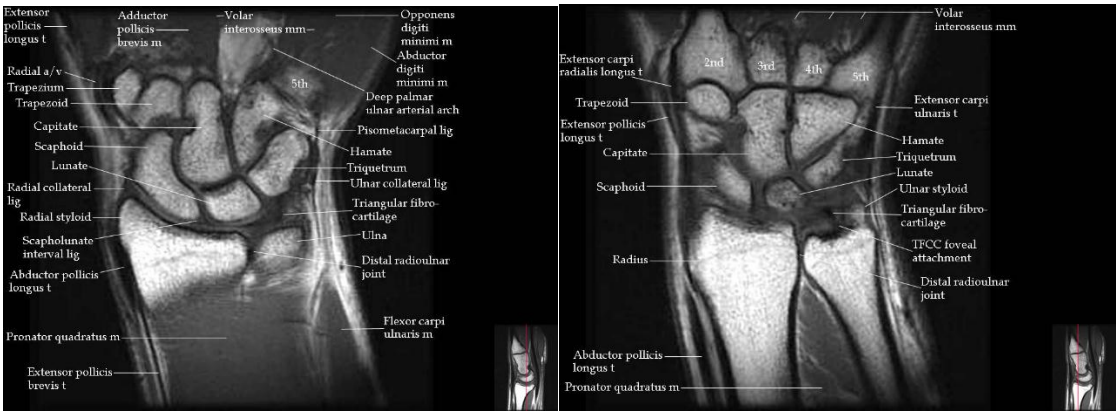
Innervation: Innervation to the wrist is delivered by branches of three nerves:

Median nerve – Anterior interosseous branch.
Radial nerve – Posterior interosseous branch.
Ulnar nerve – deep and dorsal branches

Movements Movements at the condyloid radiocarpal joint of the wrist include [1]:

- flexion
  - primary: flexor carpi radialis and flexor carpi ulnaris
  - secondary: palmaris longus, flexor pollicis longus, flexor digitorum superficialis and flexor digitorum profundus
- extension
  - primary: extensor carpi radialis longus and brevis, extensor carpi ulnaris
  - secondary: extensor digitorum
- adduction (ulnar deviation)
  - simultaneous contraction of flexor and extensor carpi ulnaris
- abduction (radial deviation)
  - simultaneous contraction of extensor carpi radialis longus and brevis in addition to flexor carpi radialis
- circumduction
  - the sequential occurrence of the above four movements produces circumduction





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