

Wrist and Hand Anatomy and Ultrasound Scanning Protocol

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Disclosures

- Consultant: Bioclinica
- Advisor: Philips
- Book Royalties: Elsevier
- Not relevant to this lecture

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Fundamentals of Musculoskeletal Ultrasound are
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Technique: volar

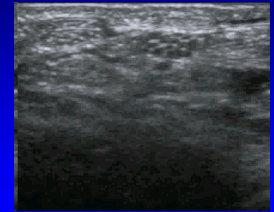
- Median nerve
- Flexor tendons
 - Flexor carpi radialis and radial artery
 - Occult ganglia
- Volar joint recesses



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Normal Peripheral Nerve

- Ultrasound appearance:
 - Hypochoic nerve fascicles
 - Hyperechoic connective tissue
- Transverse:
 - Honeycomb appearance



Silvestri et al. Radiology 1995; 197:291

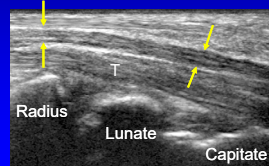
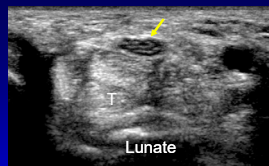
Median Nerve

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Median Nerve

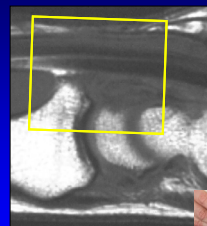
- More coarse compared to tendon
 - Fascicular not fibrillar
 - Less anisotropy unlike tendons
- Transverse
 - Speckled, honeycomb
- Longitudinal: hypochoic nerve fascicles and hyperechoic fascia

Silvestri et al. Radiology 1995; 197:291

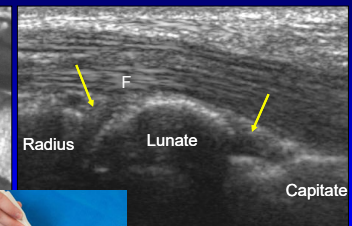


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Volar Wrist: joint recesses



Sagittal T1w



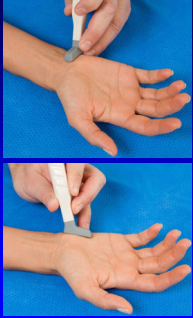
Long Axis



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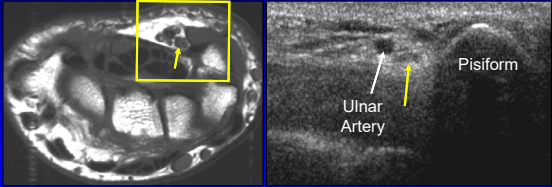
Technique: volar

- Median nerve
- Flexor tendons
- Volar joint recesses
- **Guyon's canal**
 - Ulnar artery and nerve



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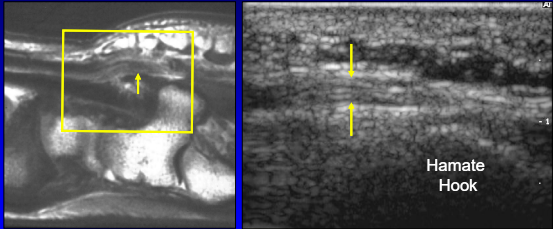
Volar Wrist: Guyon's canal



Axial T1w **Short Axis**

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Volar Wrist: ulnar nerve



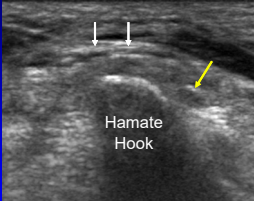
Sagittal T1w **Long Axis**

Hamate Hook

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Ulnar Nerve

- At hook of hamate
- Sensory branch:
 - Superficial to hook
 - One or two trunks
 - White arrows
- Motor branch:
 - Ulnar side of hook
 - Yellow arrow



Hamate Hook

Silvestri et al. Radiology 1995; 197:291

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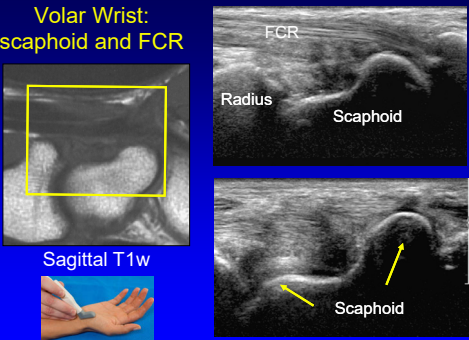
Technique: volar

- Median nerve
- Flexor tendons
- Volar joint recess
- Guyon's canal
- **Scaphoid and flexor carpi radialis**



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Volar Wrist: scaphoid and FCR



Sagittal T1w

FCR
Radius
Scaphoid

Scaphoid

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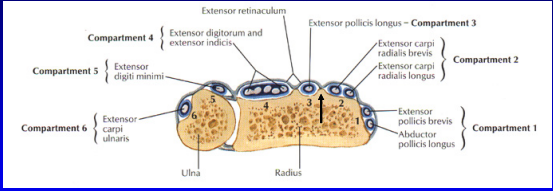
Technique: dorsal

- Extensor tendons



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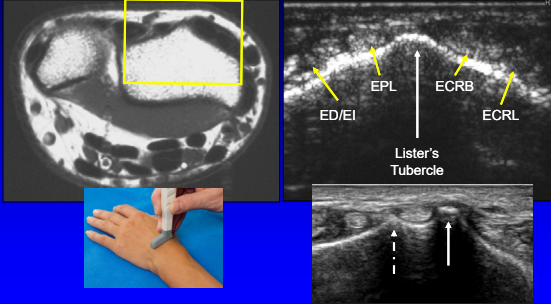
Dorsal Wrist



From: Netter's Atlas of Human Anatomy

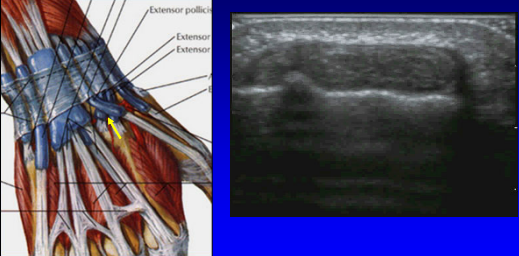
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Dorsal Wrist: extensor tendons



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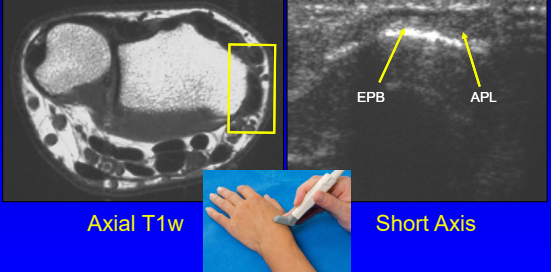
Dorsal Wrist: extensor pollicis longus



From: Netter's Atlas of Human Anatomy

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Dorsal Wrist: 1st compartment

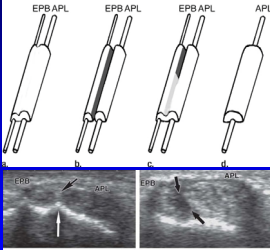


Axial T1w **Short Axis**

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Subcompartmentalization

- First extensor compartment
- Complete or incomplete
- 73% incidence²
- Septum:
 - US: 95% accurate¹
 - Hyperechoic
 - Anisotropy
- Indirect sign:
 - Osseous ridge¹

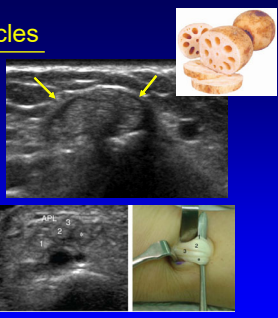


¹Rousset et al. Radiology 2010; 257:427
²Choi et al. Radiology 2011; 260:480

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Multiple Tendon Fascicles

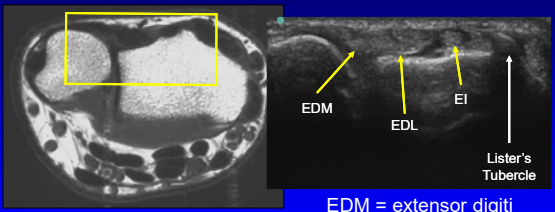
- Abductor pollicis longus
 - Incidence: 80%²
 - Up to 4 fascicles
 - US: 80% accuracy¹
- Extensor pollicis brevis
 - Incidence: 7%²
 - Up to 2 fascicles
 - US: 97% accuracy¹
- "Lotus Root Sign"²
 - Seen best distal to radius



¹Roussel et al. Radiology 2010; 257:427
²Choi et al. Radiology 2011; 260:480

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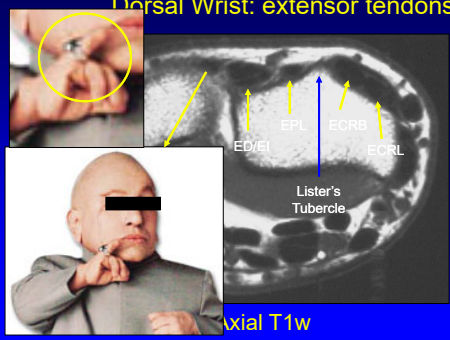
Dorsal Wrist: 4th and 5th compartments



EDM = extensor digiti minimi
Not Electronic Dance Music

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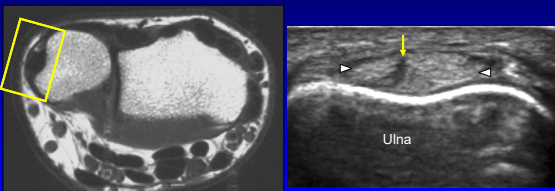
Dorsal Wrist: extensor tendons



Axial T1w

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Dorsal Wrist: 6th compartment



Note: normal hypochoic cleft

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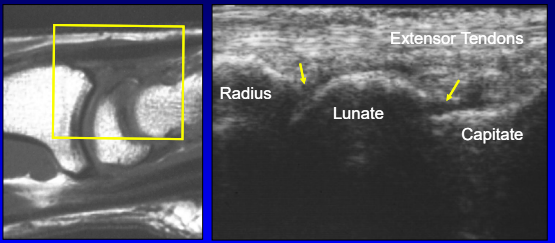
Technique: dorsal

- Extensor tendons
- Dorsal joint recesses



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Dorsal Wrist: joint recesses




Sagittal T1w Longitudinal

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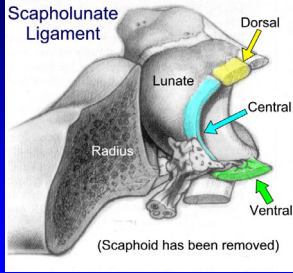
Technique: dorsal

- Extensor tendons
- Dorsal joint recesses
- Scapholunate ligament



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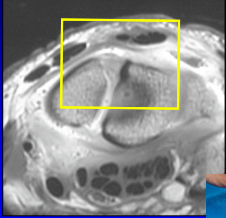
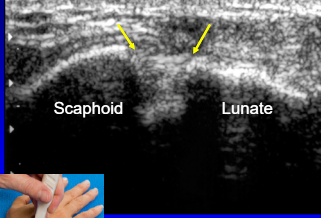
Scapholunate Ligament



From: Linkous MD, et al. Radiology 2000; 216:846


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Dorsal Wrist: scapholunate ligament

Scaphoid Lunate


Axial T1w Transverse



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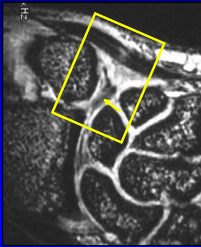
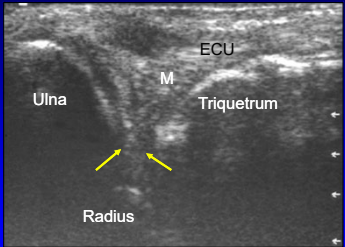
Technique: dorsal

- Extensor tendons
- Dorsal joint recesses
- Scapholunate ligament
- Triangular fibrocartilage complex



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Dorsal Wrist: TFCC

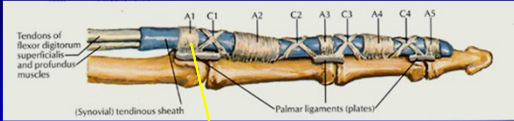
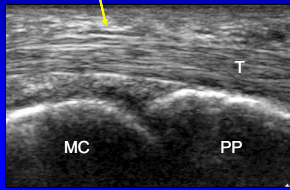



ECU
M
Triquetrum
Radius

Coronal PDw Coronal


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Digit Pulley System

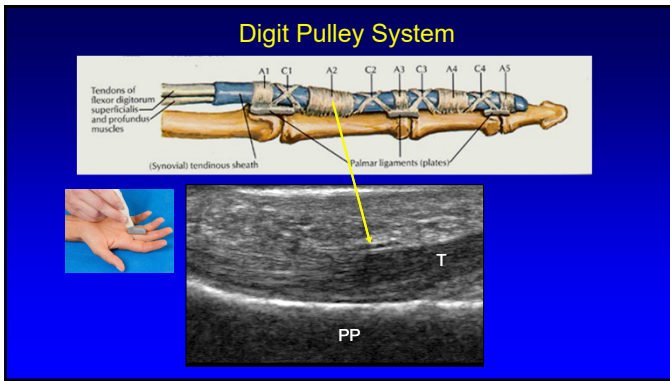



Tendons of flexor digitorum superficialis and profundus muscles
(Synovial) tendinous sheath
Palmar ligaments (plates)

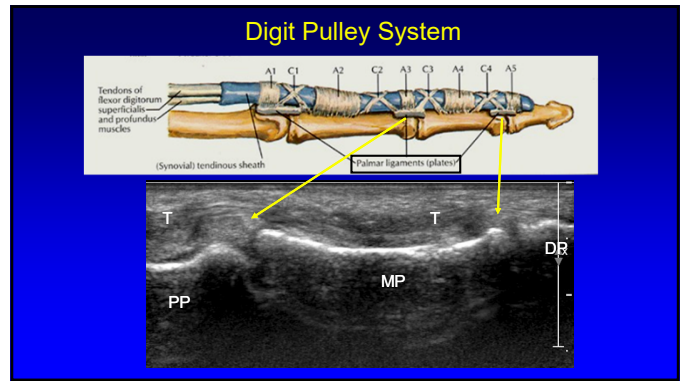
MC PP



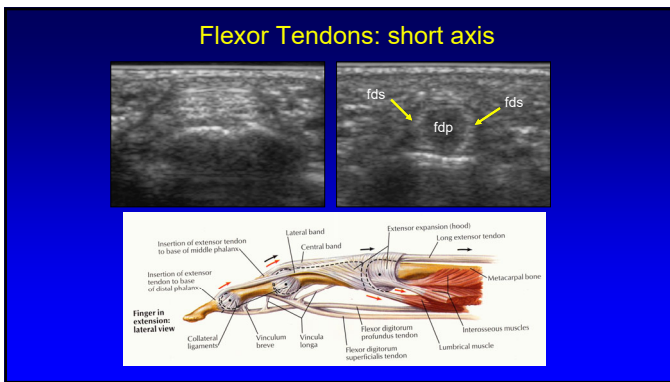
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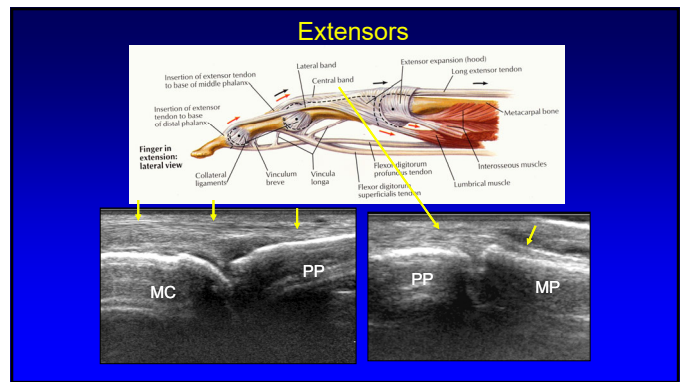
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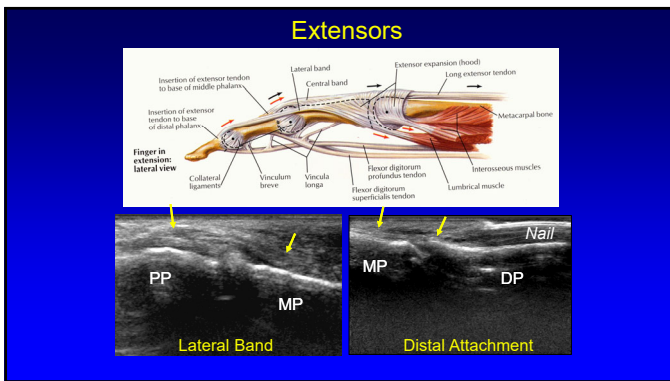
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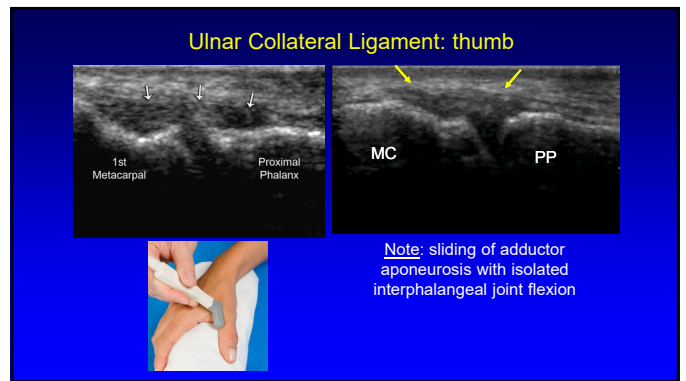
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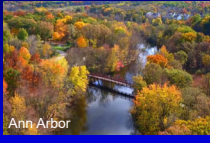


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Thank you!



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Syllabus on line and other educational material:
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