Diagnostic Wrist Ultrasound

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Anatomy Review

**FIGURE 5-1, cont'd**  C, Palmar aspect of hand including anular (A) and cruciate (C) pulleys of the digit. D, Transverse section through the distal left forearm at the level of the ulnar styloid.
Wrist basics

• Hockey stick or similar small footprint
  – 12mHz or higher
• Float transducer, don’t apply too much pressure.
  – Odd angles and superficial = more gel or a standoff pad
• Patient positioning
  – Seated or supine “Superman” position
Wrist

• Dorsal
  – 6 compartments
  – Tenosynovitis, effusion
  – Ganglion
• Radial
  – Dequervain’s
  – Intersection syndrome
• Ulnar
  – TFCC
• Volar
  – Median nerve, CTS
What the #&!@ am I looking at?

- Wiggle finger to identify
- Know landmarks
- Lister’s tubercle good starting spot
  - Divides 2\textsuperscript{nd} and 3\textsuperscript{rd} compartments
Normals

- 1\textsuperscript{st} and 2\textsuperscript{nd} compartments
- SEX LAB is #1
Moving laterally

- Compartment 4 has more
- 5\textsuperscript{th} compartment moves 5\textsuperscript{th} finger
Tenosynovitis

- Float transducer
- Longitudinal on left and transverse on right
- Check power doppler
Ganglion cyst

- Hypoechoic area within arrowheads
Lobulated

- Curved arrow indicates where it communicates with joint
Dorsal wrist ganglion
If you see something beating...

• Turn on doppler
• How do you do that?
• How do you change the sensitivity?
• Do not aspirate the radial artery
Increased / Enhanced through transmission

- Seen in structures deep to substances that transmit sound well (cysts, the bladder)
- Appears hyper-echoic
- Time gain compensation over-compensates
Wrist effusion

- Anechoic fluid
- Open arrow = synovitis
DeQuervains

- EPB + APL
- APL and tendon sheath shows hypoechoic thickening of extensor retinaculum
EPL Rupture

- Fiber discontinuity
- Curved arrows: tendon stumps
Intersection syndrome

• Where EPB (arrowhead) + APL (arrows) crosses over ECRL + ECRB
• ~ 4 cm proximal to Lister’s
• Like violin bow on strings
44 y/o F s/p fall at work

- Lt Elbow pain - Dx with radial head fx
- Sees you on f/u, “My elbow pain is improving, but no one has looked at my wrist yet!”

- Ttp at DRUJ
- Left: torn interosseous membrane
- Right: normal
Coronal view of Normal TFCC

- ECU
- Meniscus homolog
- Arrowheads – triangular fibrocartilage
Volar Wrist: Median Nerve

- At wrist crease, oval shape
- Left is radial, F = FCR, P = palmaris longus
- ‘dances’ on top with short axis slide scanning
- “honeycomb” or probe tilt trick (less anisotropy than tendon)
Pathologic, CTS

- Hypoechoic swelling
- > 10 mm² is abnormal?
- Wiesler 2006: avg was 14, normal is 9
- How do I measure this?
Giant Cell tumor

- Benign tumor of tendon sheath
- Hypoechoic solid mass (arrowheads),
- In contact with tendon, but not in the tendon (T)
- Does not move with tendon on dynamic exam
- Relatively common
Rheumatoid arthritis – MCP Joint Synovitis

- Doppler ultrasound of previous image of 2\textsuperscript{nd} MCP
- Hypoechoic synovial hypertrophy (arrows) with hyperemia distending dorsal recess
Rheumatoid Arthritis

- 2nd MCP in transverse plane
- Hypoechoic synovial hypertrophy with hyperemia (arrows)
- Cortical erosion (arrowheads) of radial aspect of 2nd MCP

Chivaras MM, et al. AJR Am J Roentgenol 2013 Sep
Rheumatoid with volar subluxation from sagittal band rupture
Small MCP Effusion

Synovial Effusion- OMERACT definition- “hypoechoic or anechoic intraarticular material that is displaceable and compressible with no Doppler signal

1. Phalanx
2. Metacarpal
3. Synovial effusion
Hand- Osteophyte
Rheumatoid Arthritis- MCP Erosion

Bone erosions best seen in 2\textsuperscript{nd} and 5\textsuperscript{th} MCPs—ultrasound access better in the lateral and medial.

OMERACT definition—“intraarticular discontinuity of the bone surface visible in 2 perpendicular planes.”

Dohn et al, Arthritis Research and Therapy
“Double Contour” distinct layer of hyperechoic material over anechoic hyaline cartilage and hyperechoic subchondral bone. Produced by MSU deposits which reflect sound waves of the surface of hyaline cartilage.
Finger flexor tendons
Extensor tendon
“mallet finger”
Hand-Gouty Tophi

DI P Dorsal Longitudinal

DIP Dorsal Transverse
Hand-Rheumatoid Nodule

1. Rheumatoid nodule
2. Metacarpal head

No anechoic center but tissue is homogenous and hypoechoic
Glomus tumor
References


