

Diagnostic Wrist Ultrasound

Rob Nied, MD

KP Santa Rosa

Anatomy Review

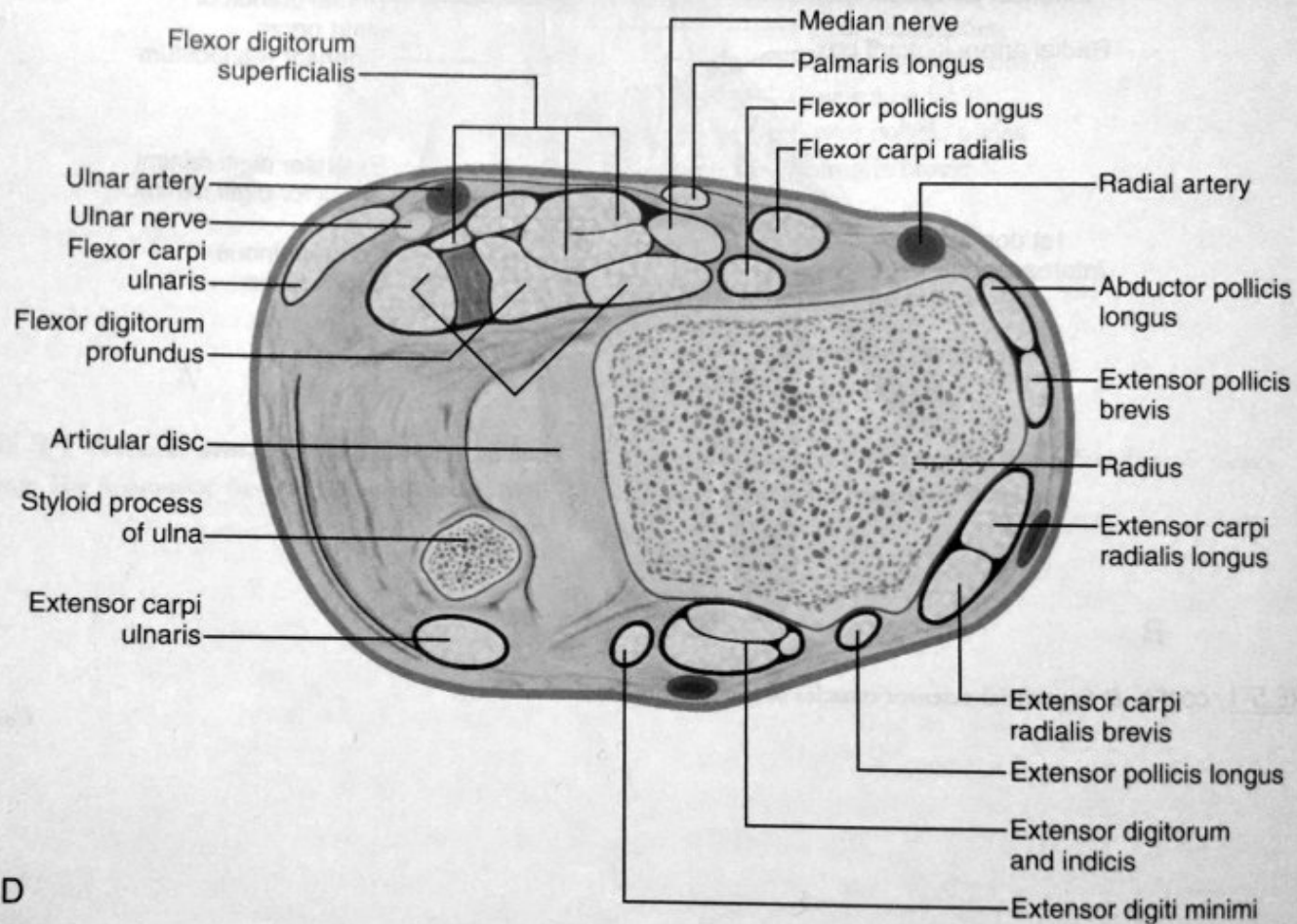


FIGURE 5-1, cont'd C, Palmar aspect of hand including annular (A) and cruciate (C) pulleys of the digit. D, Transverse section through the distal left forearm at the level of the ulnar styloid.

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

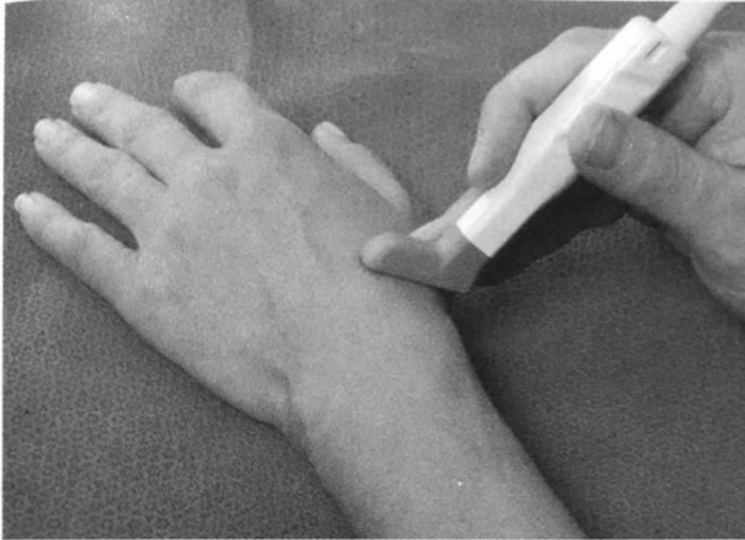
- Dorsal
 - 6 compartments
 - Tenosynovitis, effusion
 - Ganglion
- Radial
 - Dequervain's
 - Intersection syndrome
- Ulnar
 - TFCC
- Volar
 - Median nerve, CTS

What the #&!@ am I looking at?

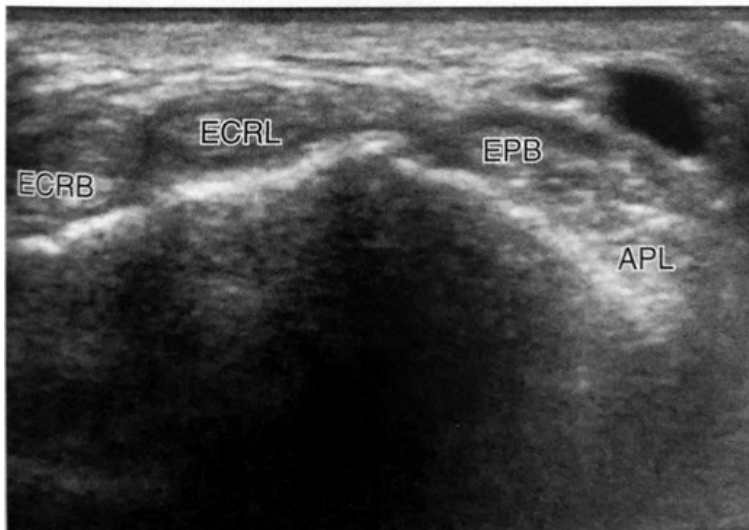
- Wiggle finger to identify
- Know landmarks
- Lister's tubercle good starting spot
 - Divides 2nd and 3rd compartments



Normals

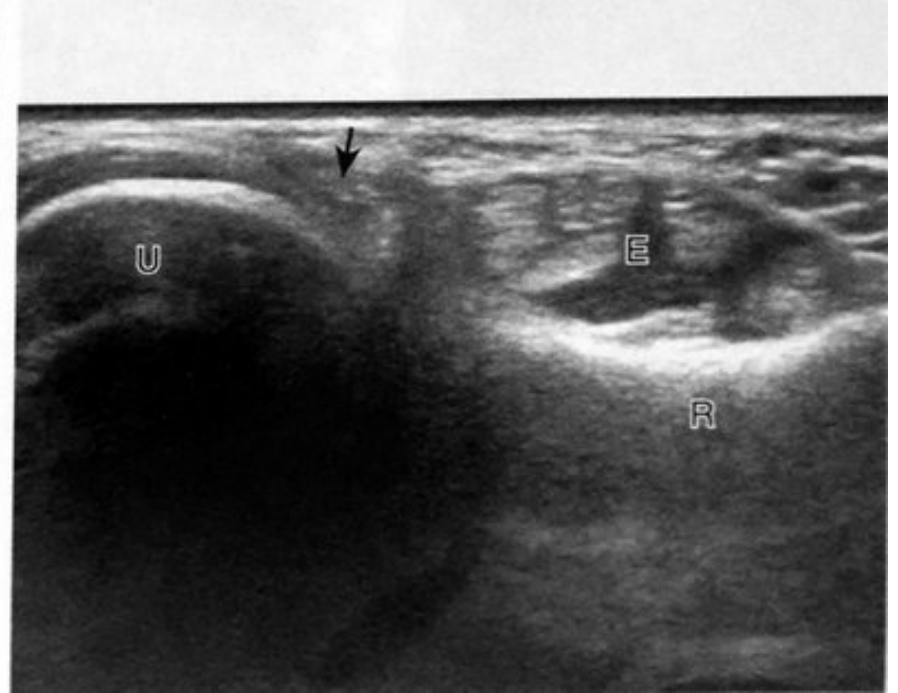
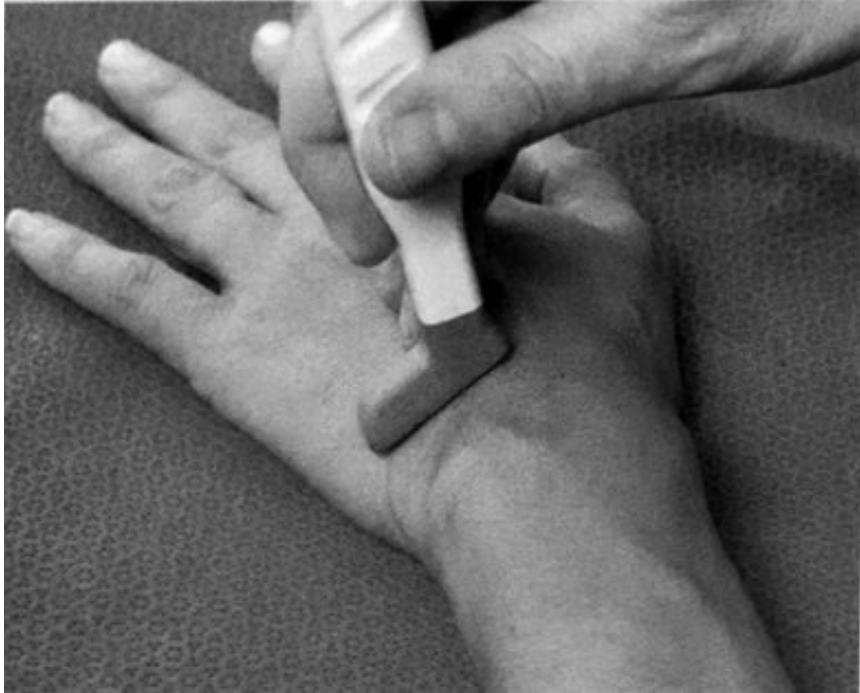


C



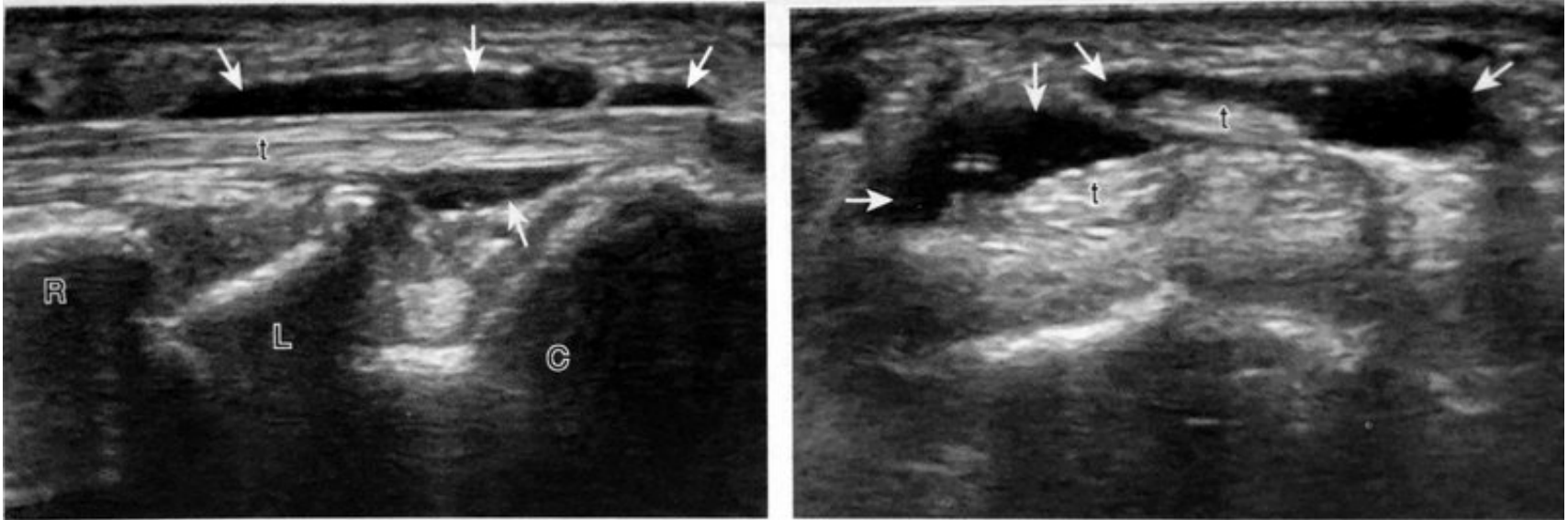
- 1st and 2nd compartments
- SEX LAB is #1

Moving laterally



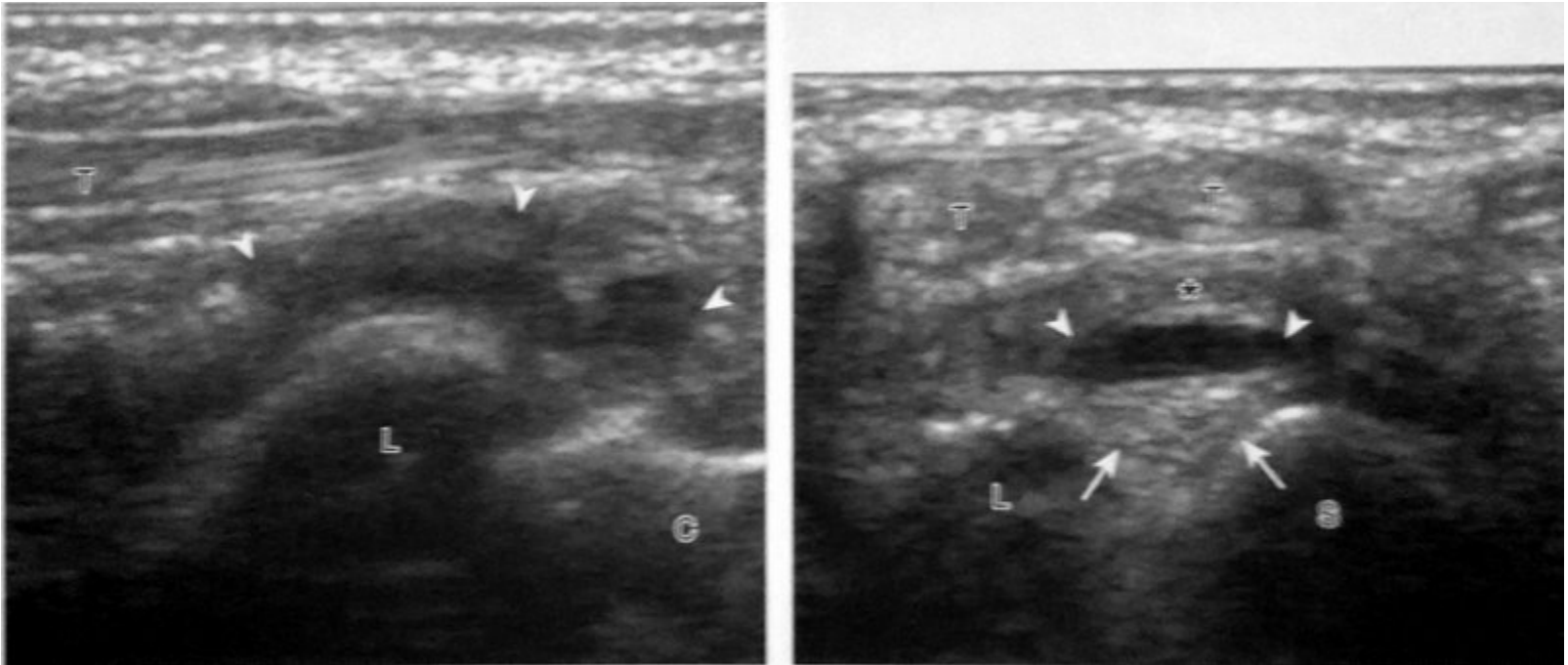
- Compartment 4 has more
- 5th compartment moves 5th finger

Tenosynovitis



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

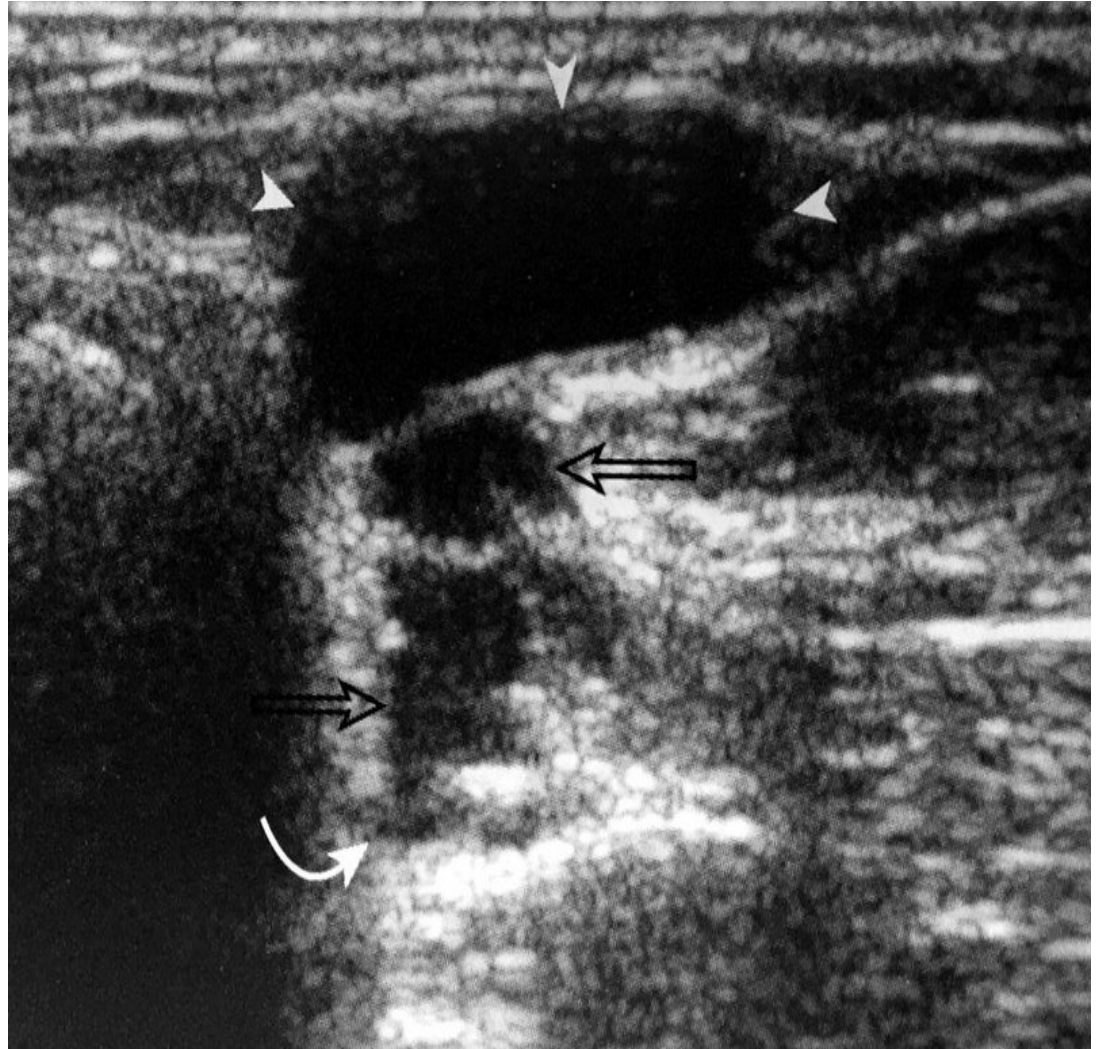
Ganglion cyst



- Hypoechoic area within arrowheads

Lobulated

- Curved arrow indicates where it communicates with joint

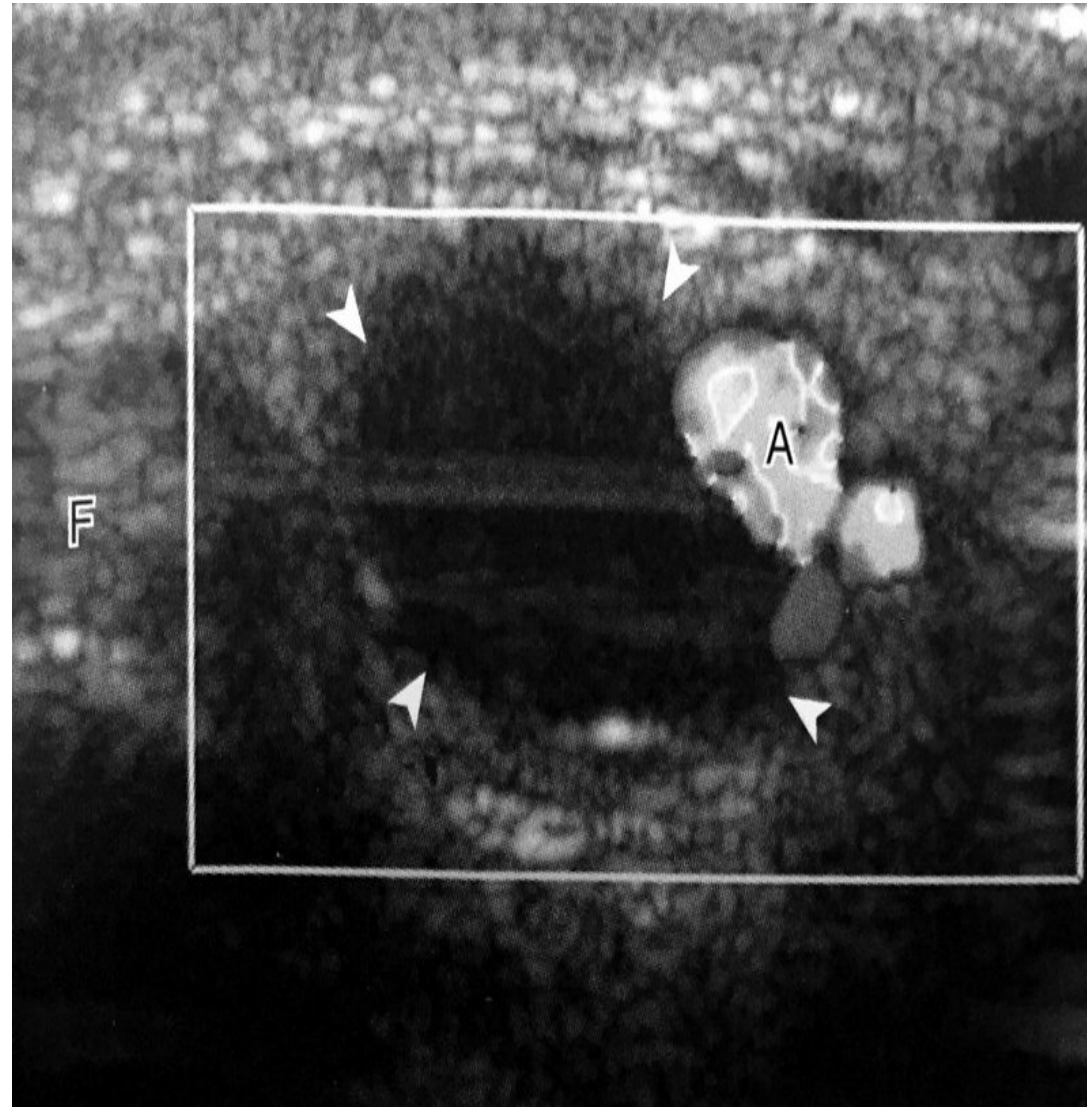


Dorsal wrist ganglion

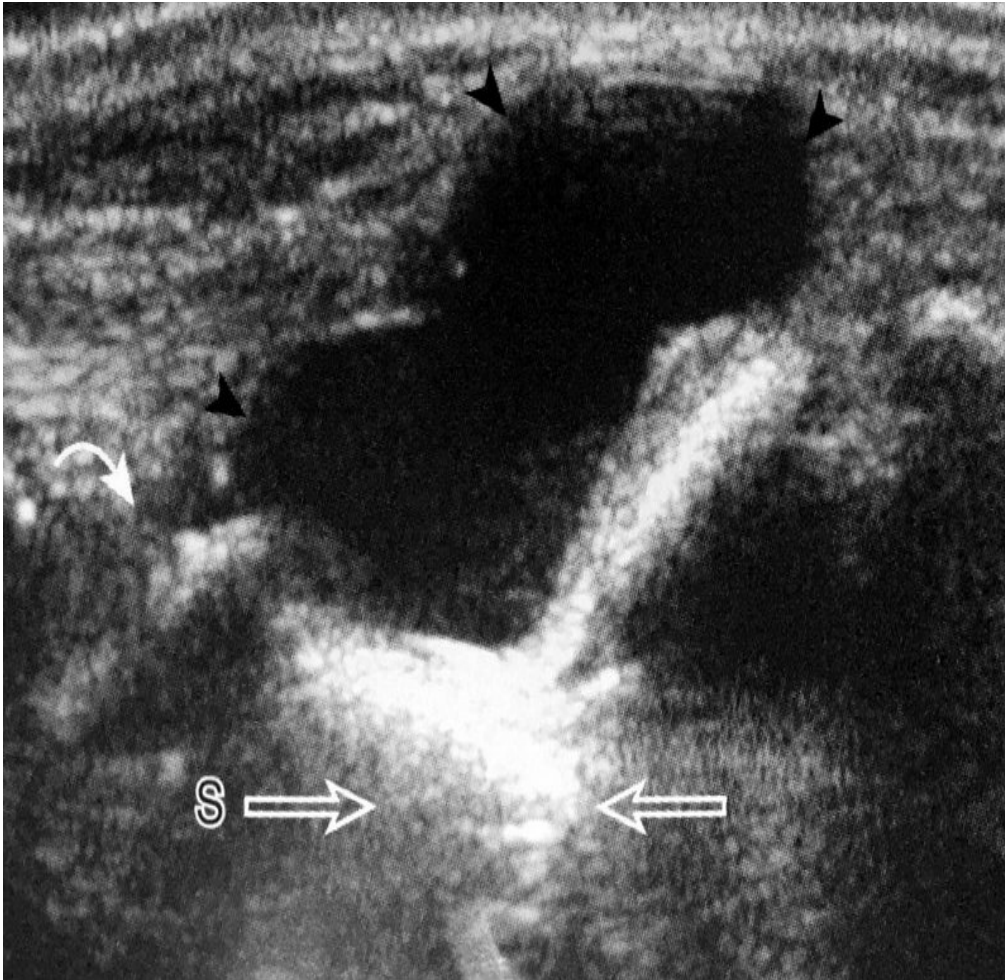


If you see something beating...

- Turn on doppler
- How do you do that?
- How do you change the sensitivity?
- Do not aspirate the radial artery

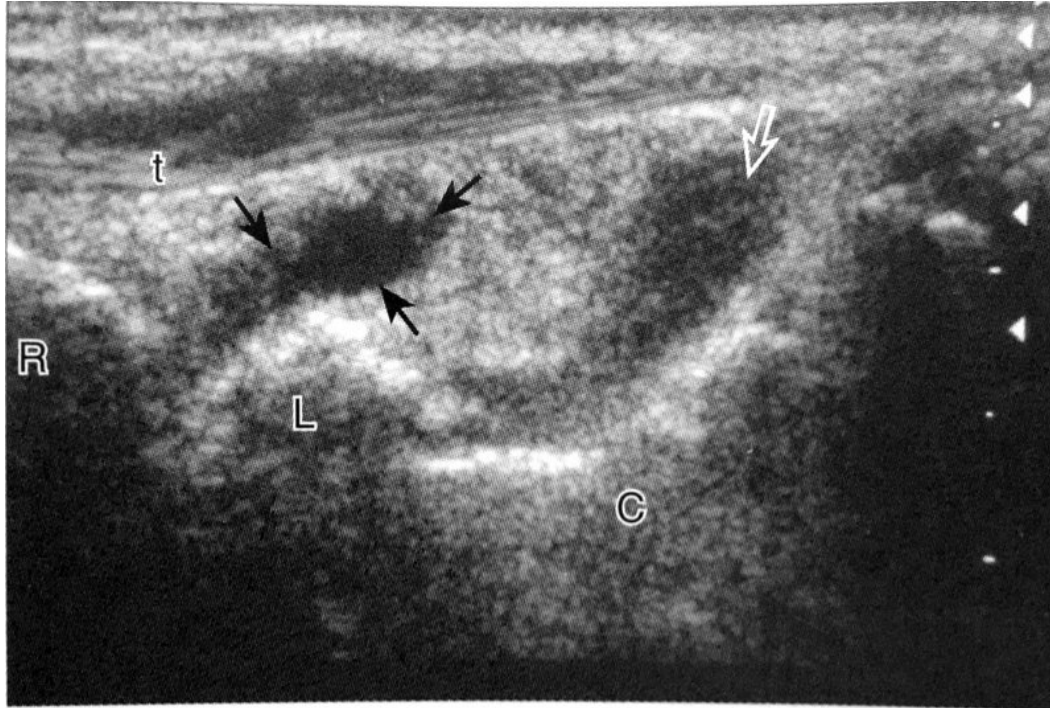


Increased / Enhanced through transmission



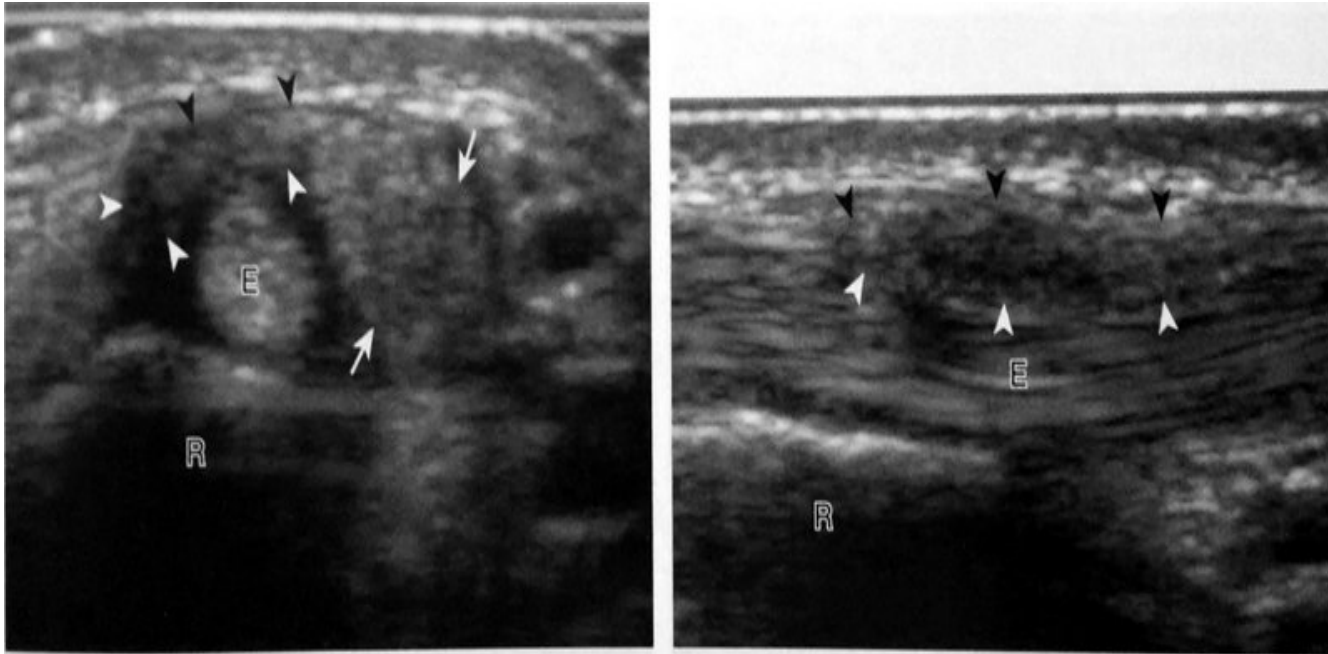
- Seen in structures deep to substances that transmit sound well (cysts, the bladder)
- Appears hyper-echoic
- Time gain compensation over-compensates

Wrist effusion



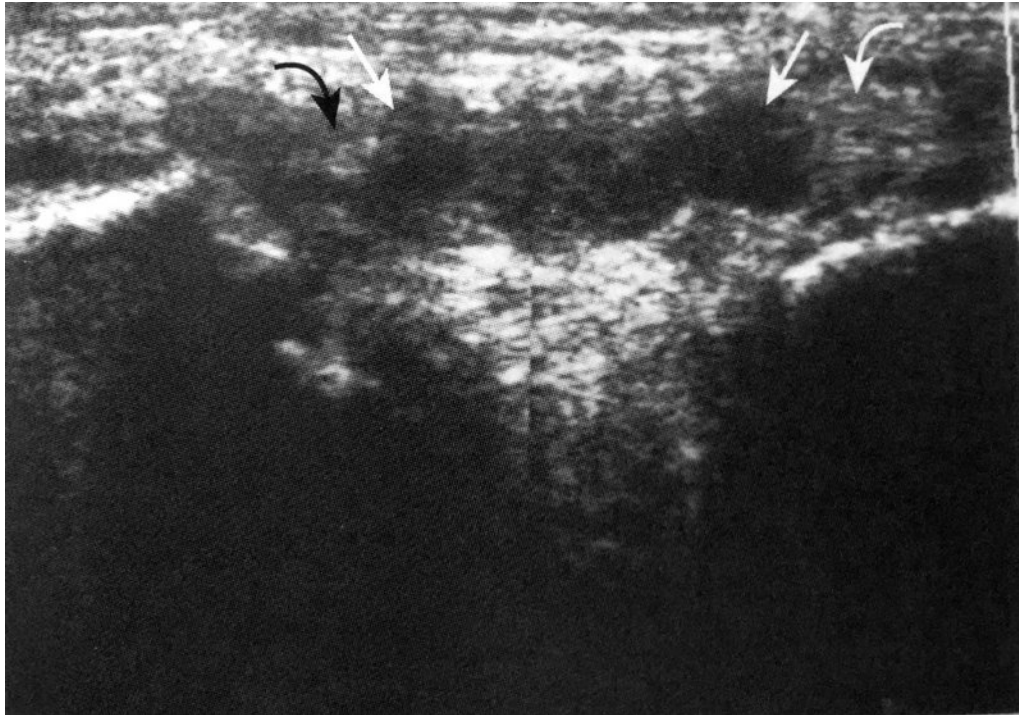
- Anechoic fluid
- Open arrow = synovitis

DeQuervains



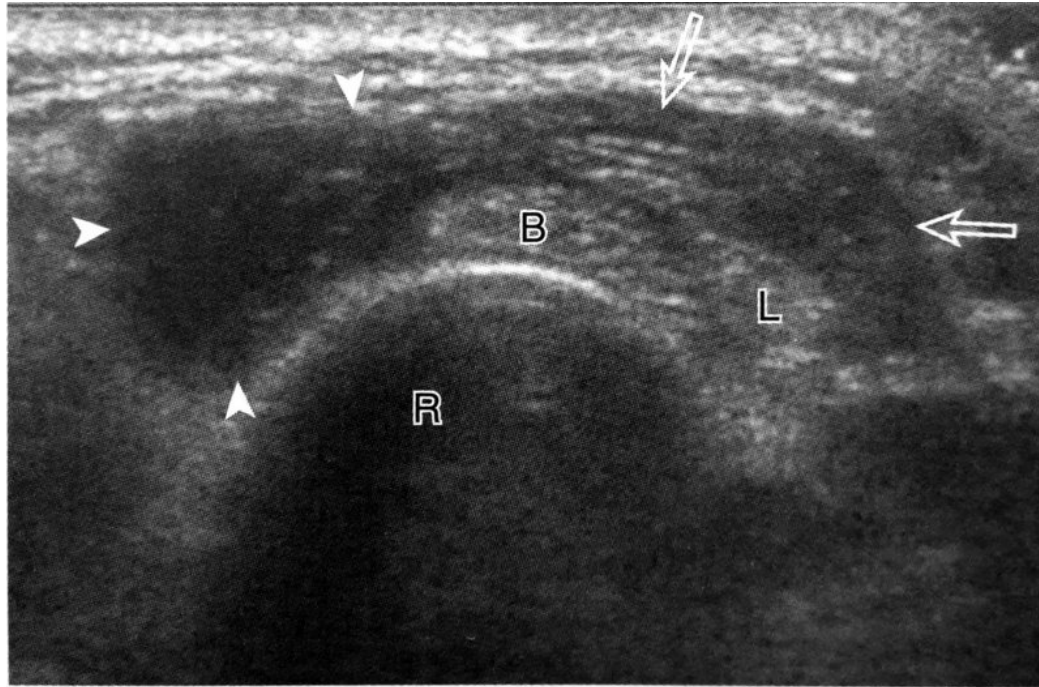
- EPB + APL
- APL and tendon sheath shows hypoechoic thickening of extensor retinaculum

EPL Rupture



- Fiber discontinuity
- Curved arrows: tendon stumps

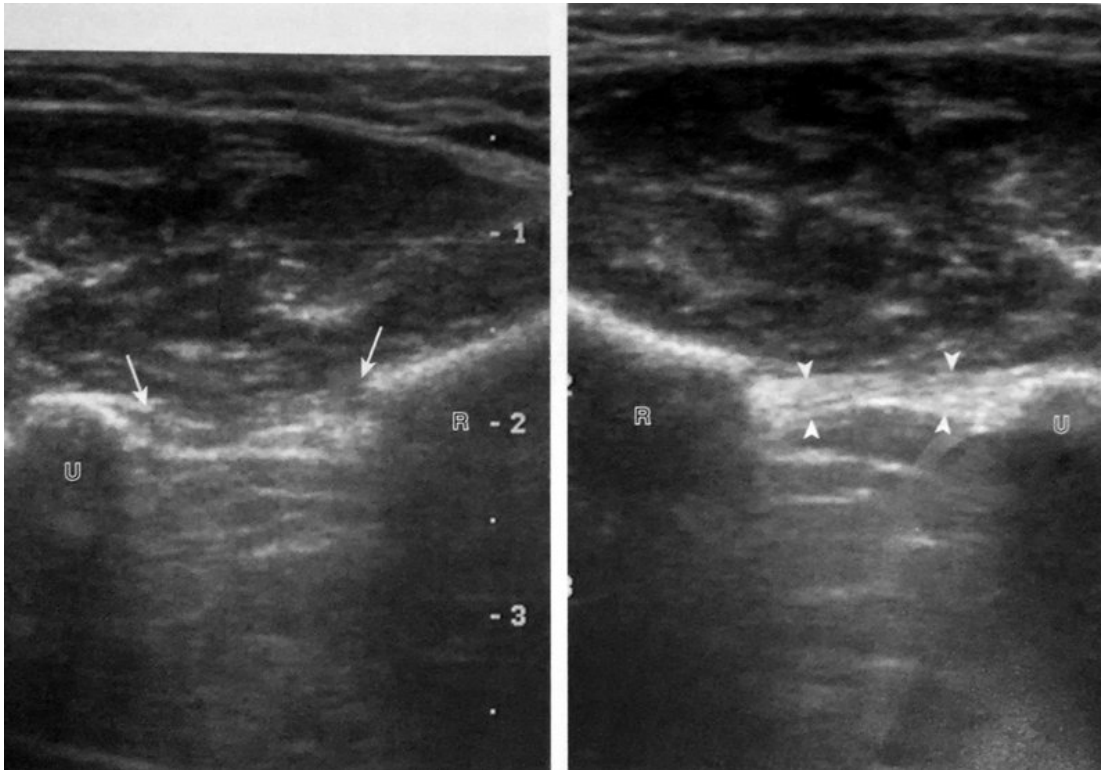
Intersection syndrome



- 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

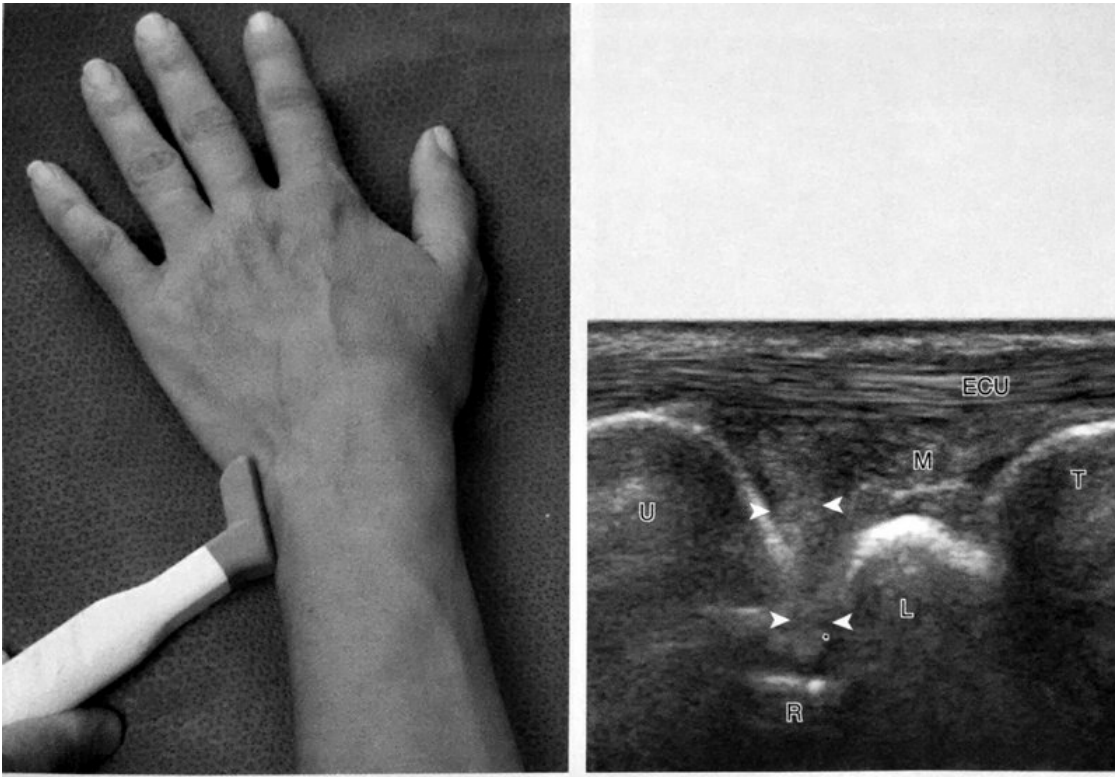
- Lt Elbow pain - Dx with radial head fx
- Sees you on f/u, “My elbow pain is improving, but no one has looked at my wrist yet!”



- Ttp at DRUJ
- Left: torn interosseous membrane
- Right: normal

Coronal view of Normal TFCC

- ECU
- Meniscus homolog
- Arrowheads – triangular fibrocartilage

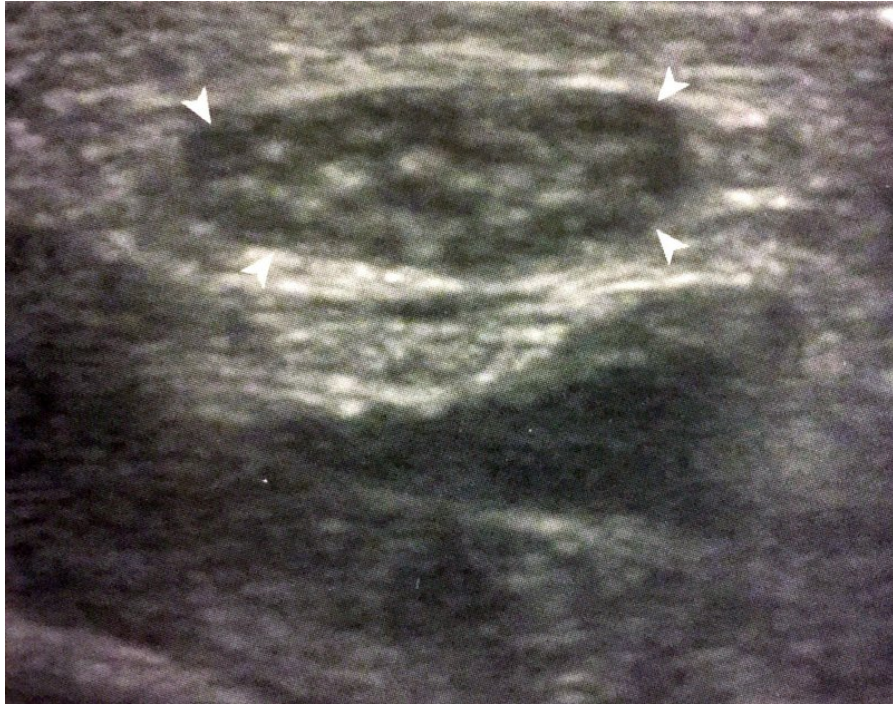


Volar Wrist: Median Nerve



- 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)

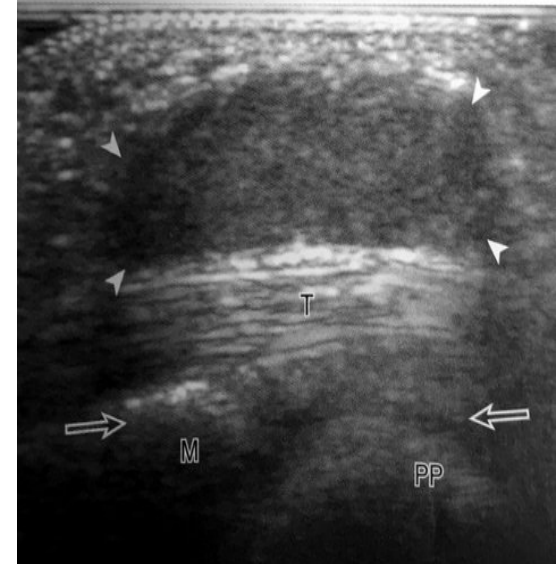
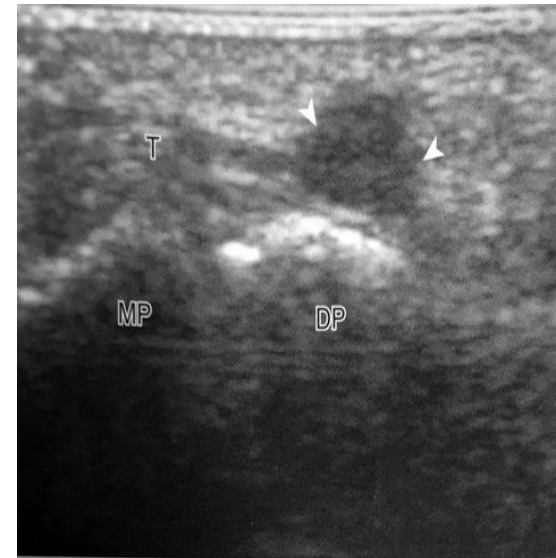
Pathologic, CTS



- Hypoechoic swelling
- $> 10 \text{ mm}^2$ is abnormal?
- Wiesler 2006: avg was 14, normal is 9
- How do I measure this?

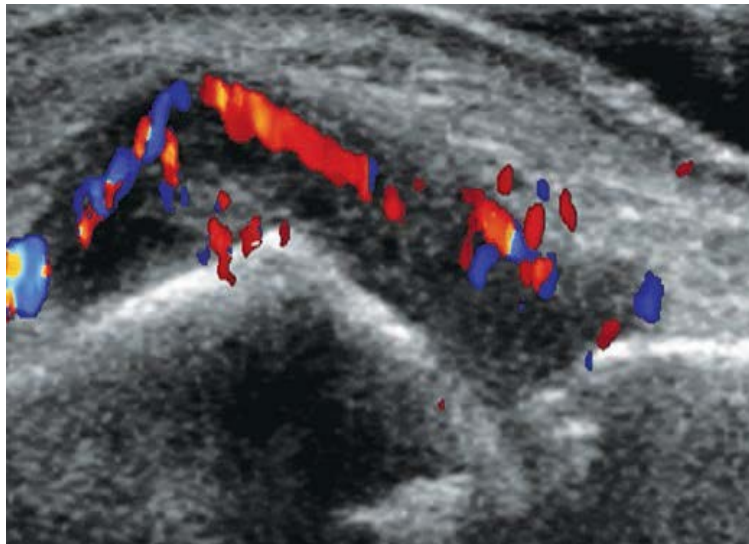
Giant Cell tumor

- 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

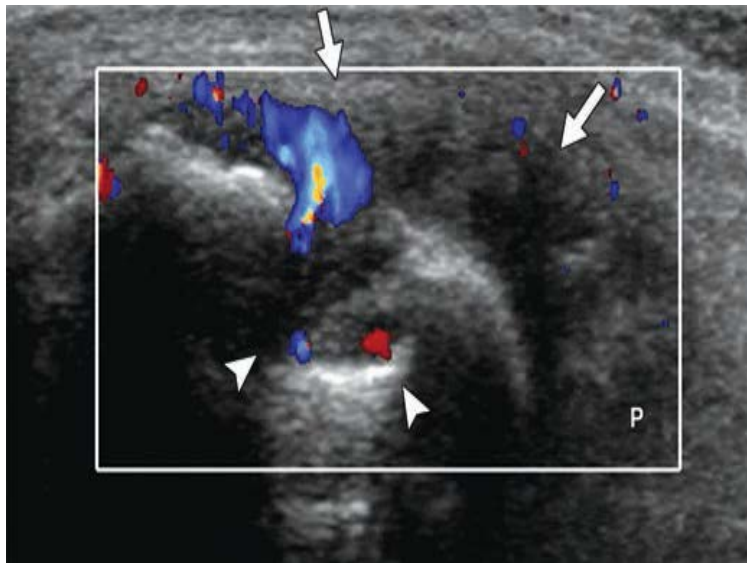
2nd MCP Longitudinal



- Doppler ultrasound of previous image of 2nd MCP
- Hypoechoic synovial hypertrophy (arrows) with hyperemia distending dorsal recess

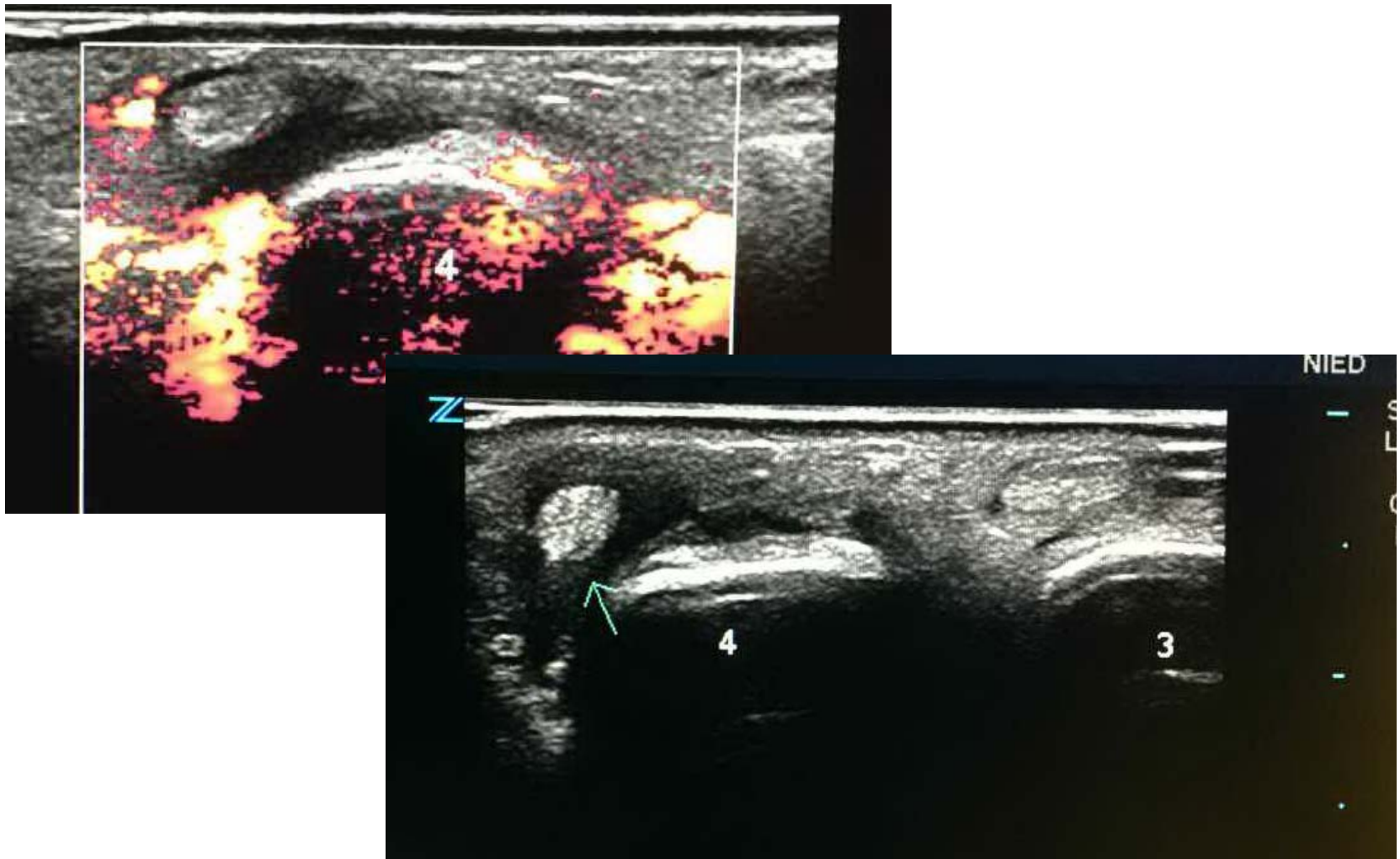
Rheumatoid Arthritis

2nd MCP Transverse



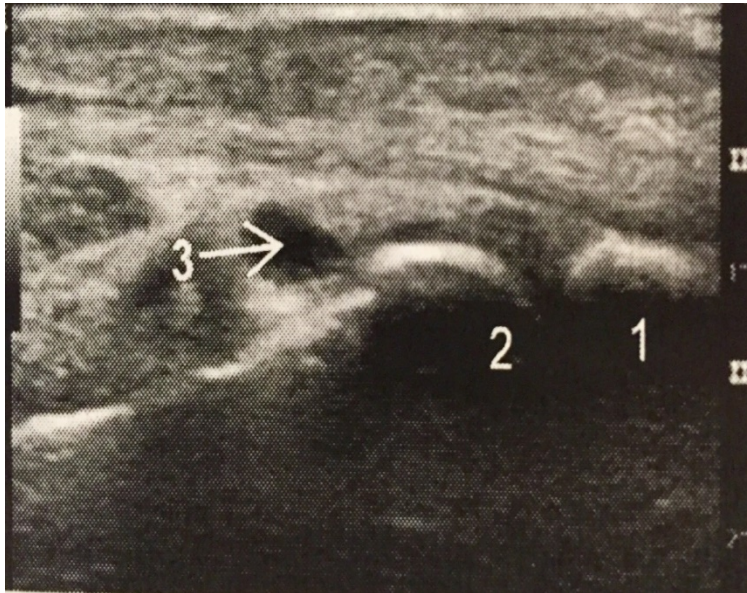
- 2nd MCP in transverse plane
- Hypoechoic synovial hypertrophy with hyperemia (arrows)
- Cortical erosion (arrowheads) of radial aspect of 2nd MCP

Rheumatoid with volar subluxation from sagittal band rupture

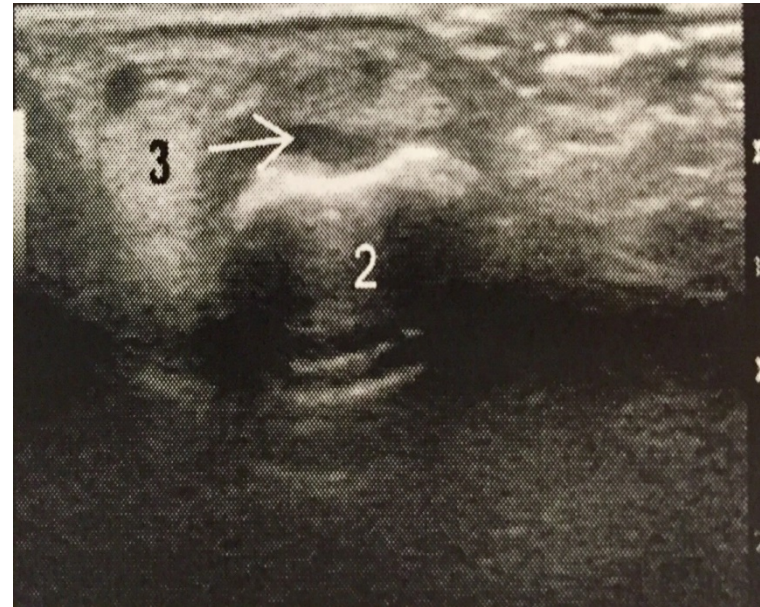


Small MCP Effusion

Volar Longitudinal



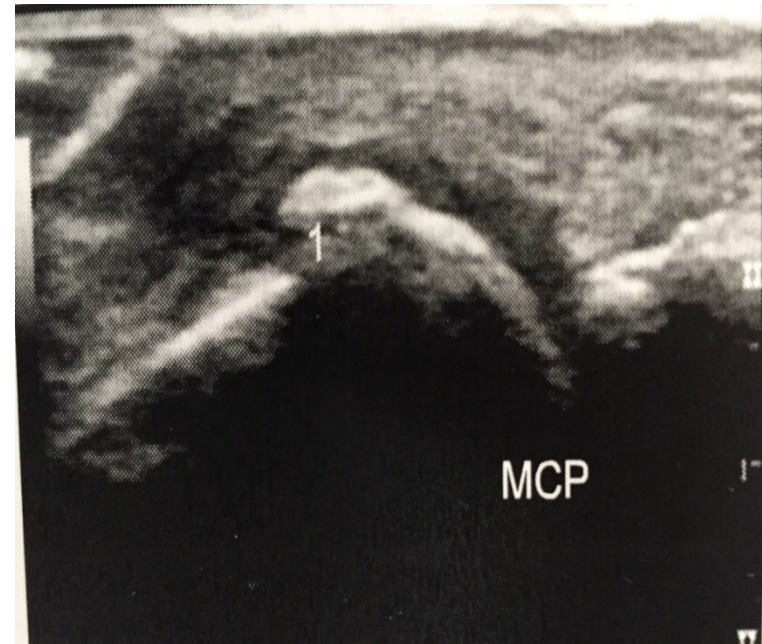
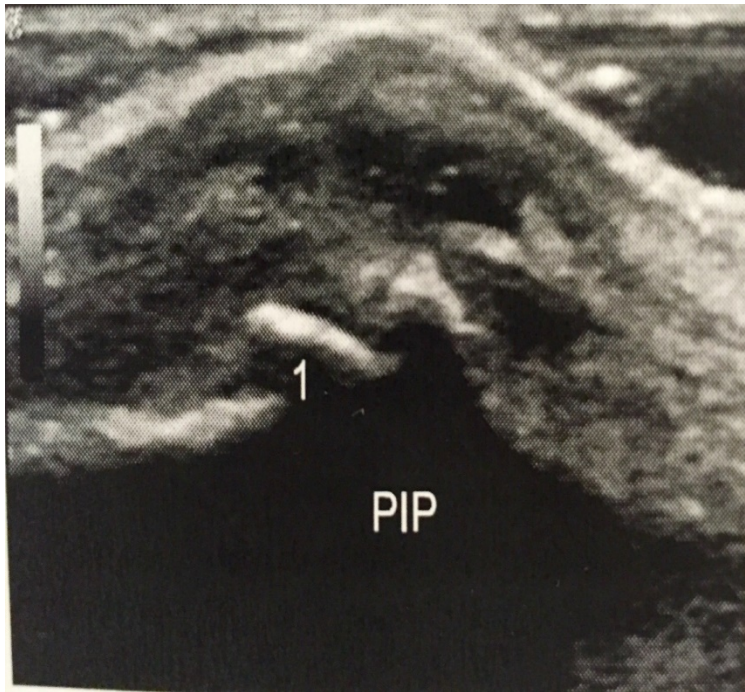
Volar Transverse



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

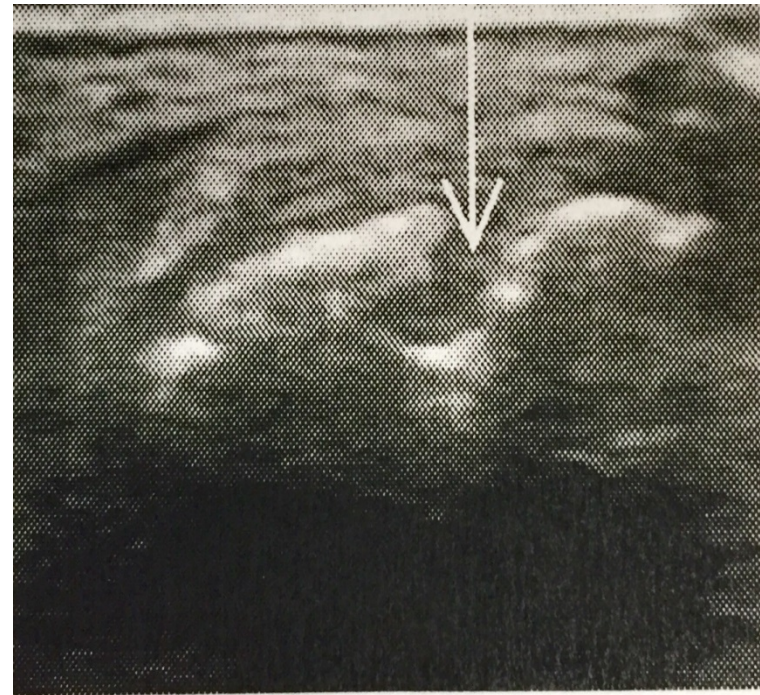


Rheumatoid Arthritis- MCP Erosion

Longitudinal



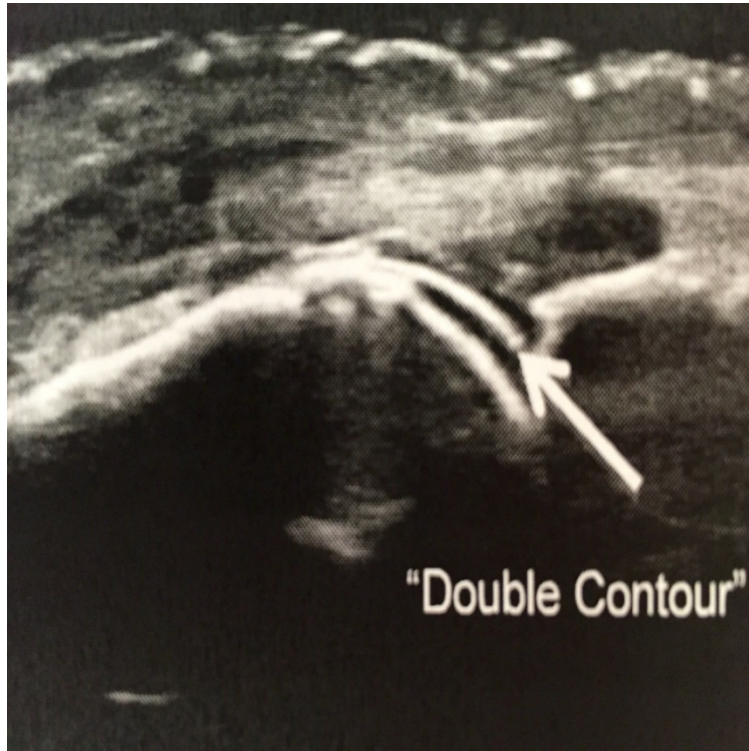
Transverse



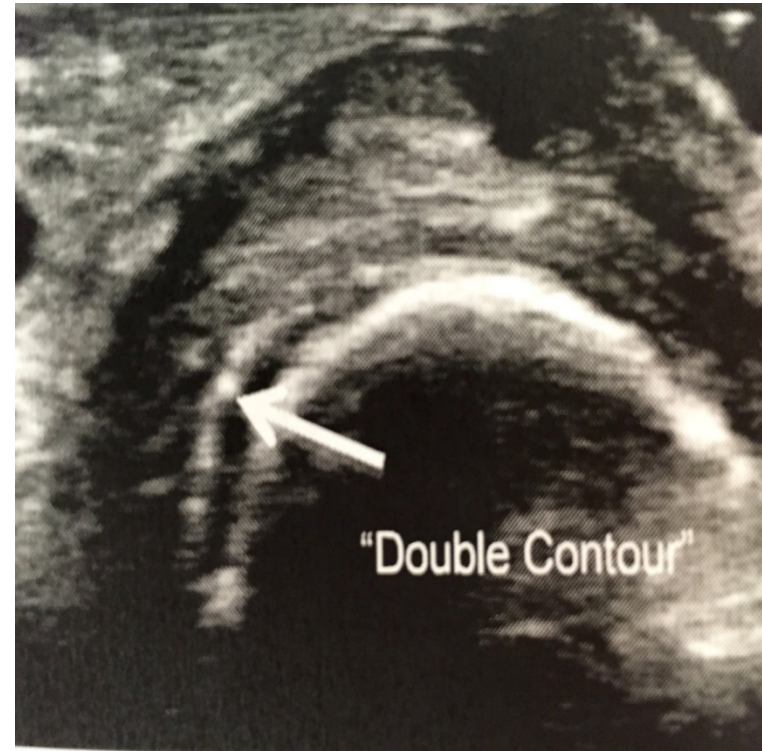
Bone erosions best seen in 2nd and 5th MCPs—ultrasound access better in the lateral and medial views
OMERACT definition- “intraarticular discontinuity of the bone surface visible in 2 perpendicular views”

Hand- MCP Gout

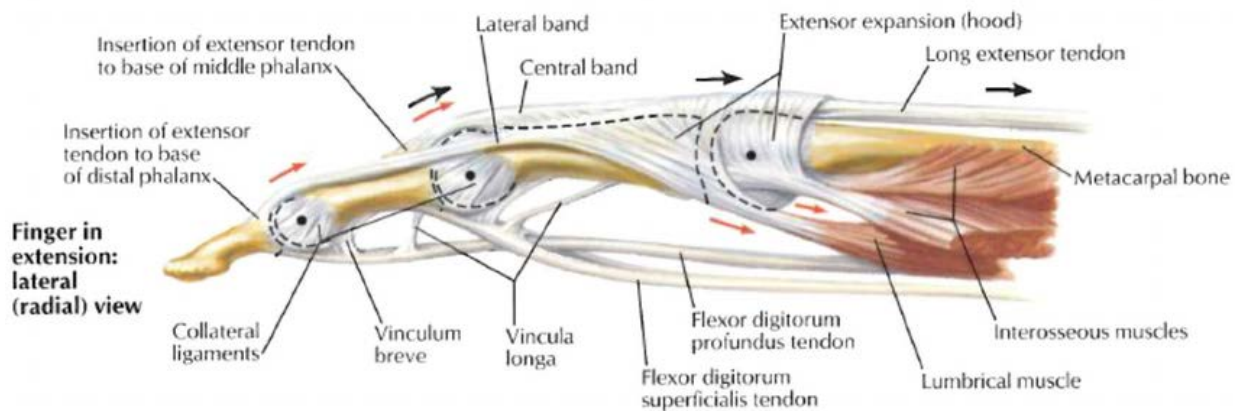
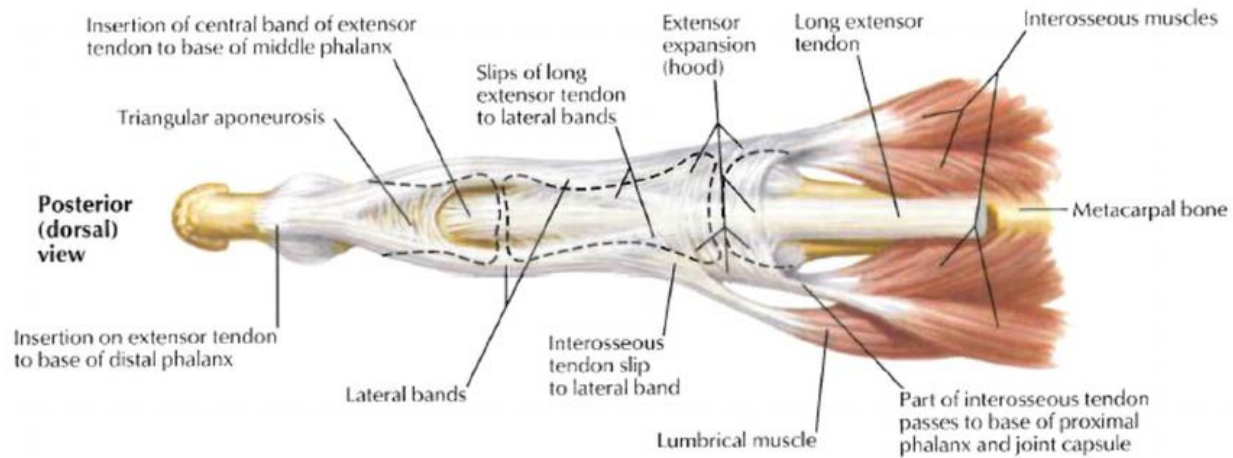
MCP Dorsal Longitudinal



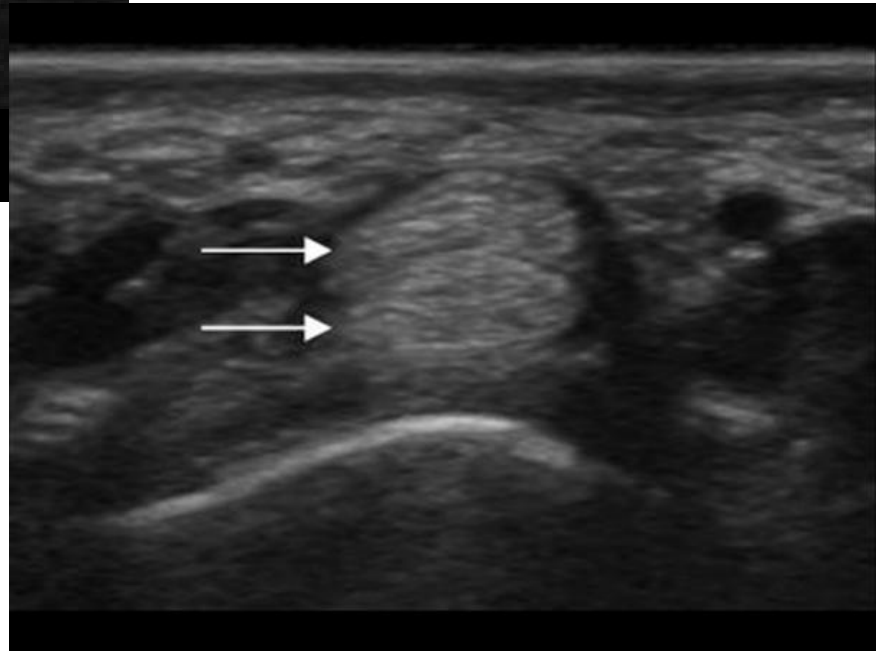
MCP Dorsal Transverse



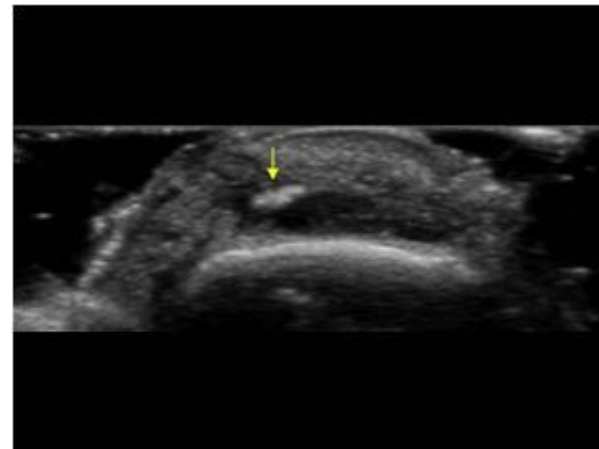
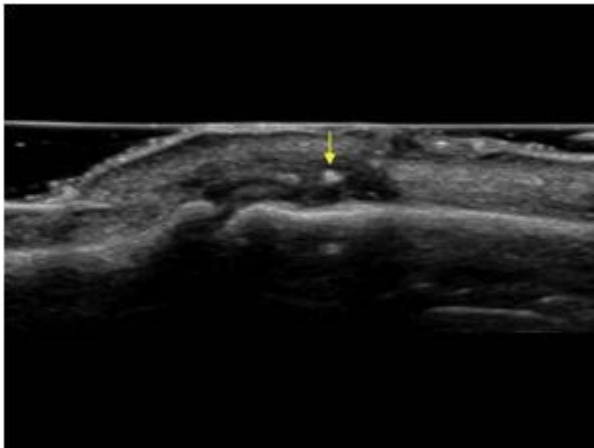
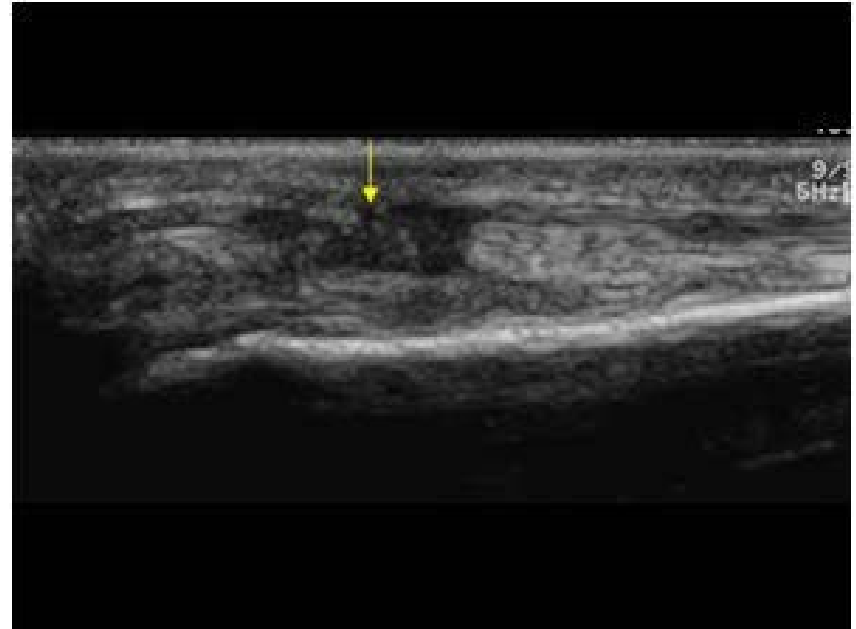
"Double Contour" distinct layer of hyperechoic material over anechoic hyaline cartilage and hyperechoic material. Produced by MSU deposits which reflect sound waves of the surface of hyaline cartilage



Finger flexor tendons



Extensor tendon “mallet finger”

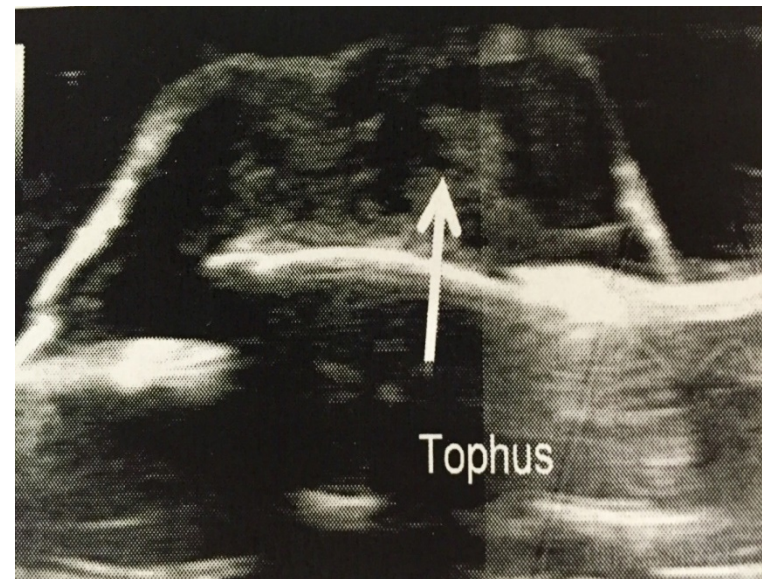


Hand-Gouty Tophi

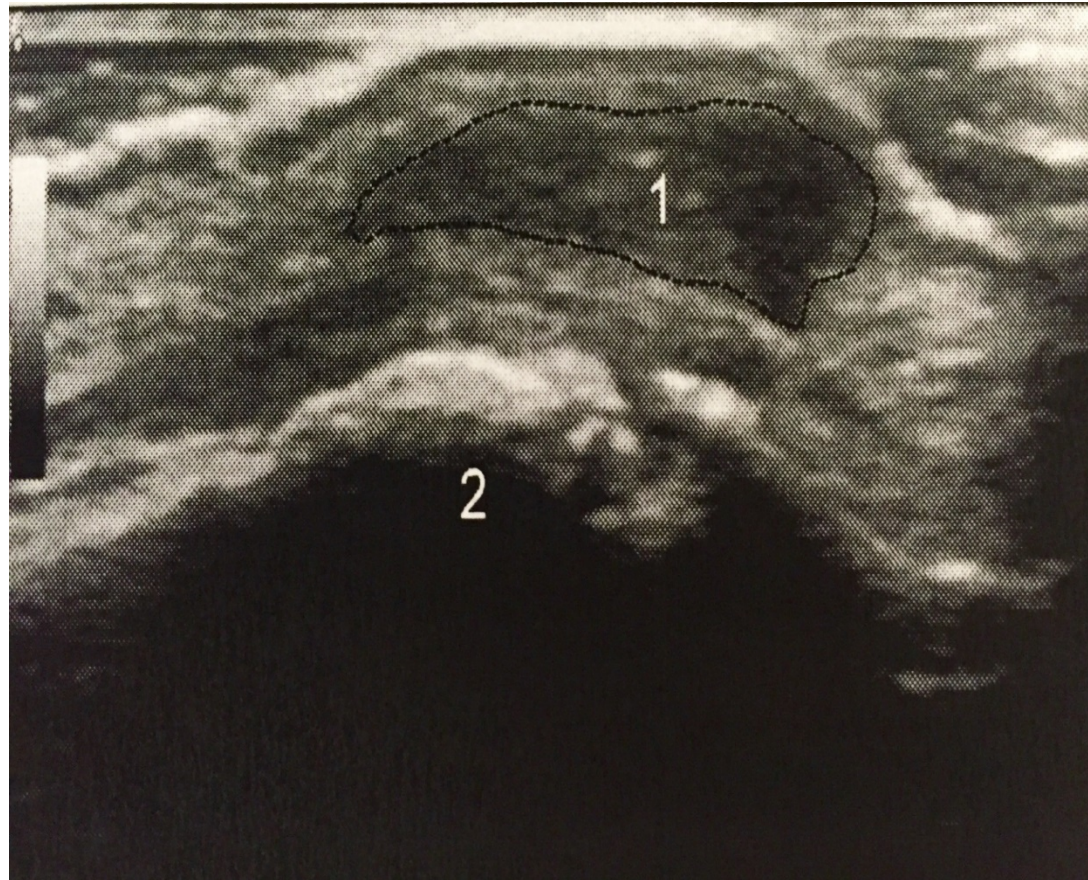
DI P Dorsal Longitudinal



DIP Dorsal Transverse



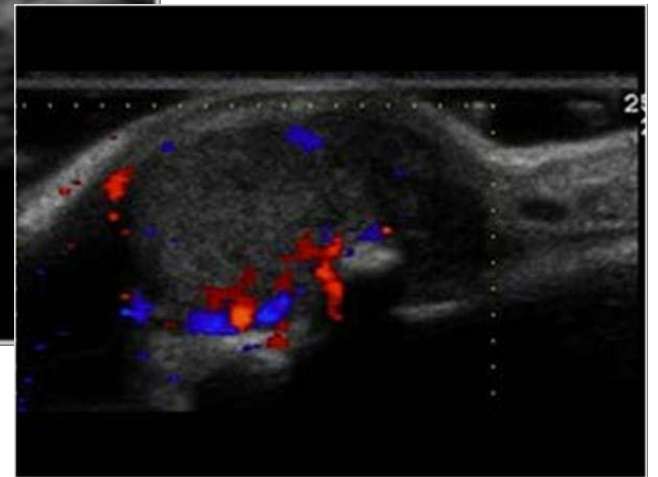
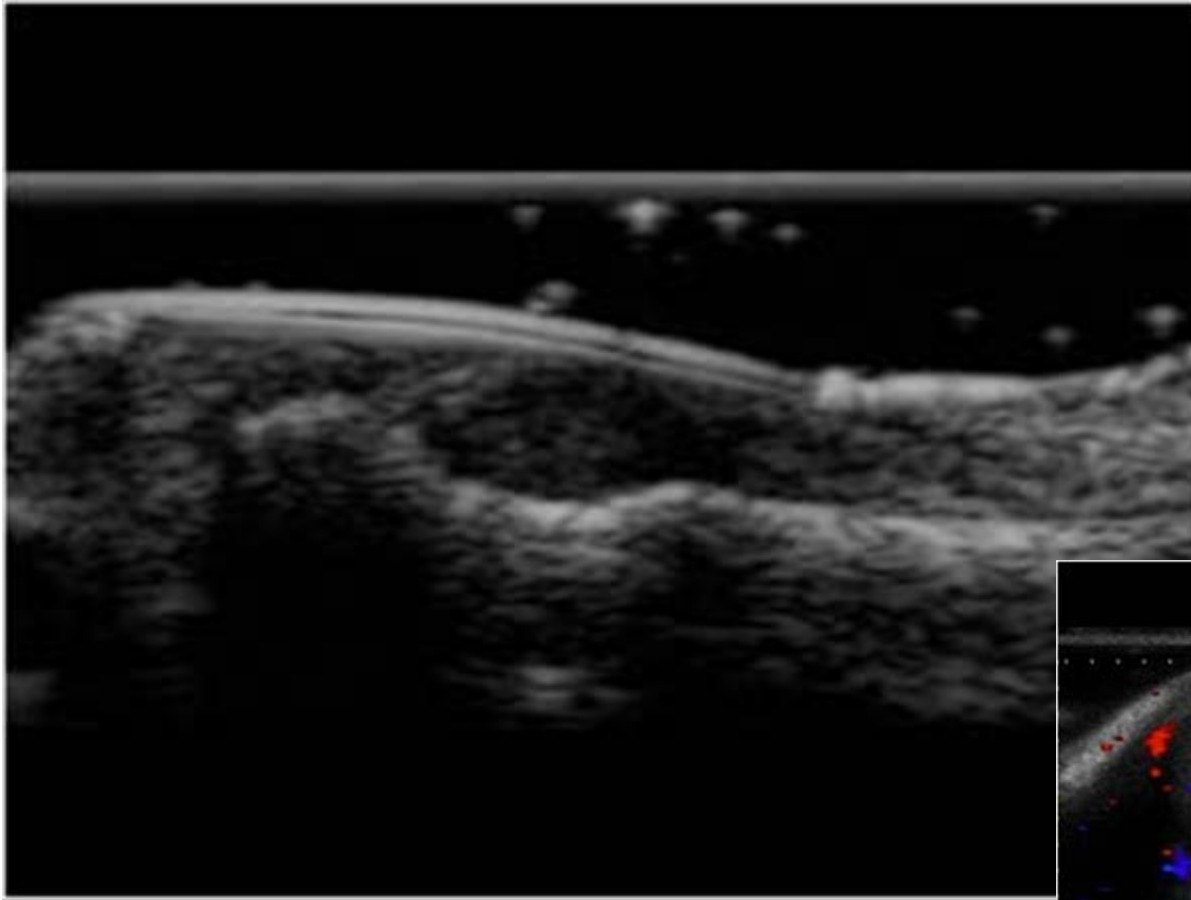
Hand-Rheumatoid Nodule



1. Rheumatoid nodule
2. Metacarpal head

No anechoic center but tissue is homogenous and hypoechoic

Glomus tumor



References

- Chiavaras MM, Jacobson JA, Yablon CM, et al. Pitfalls in wrist and hand ultrasound. *AM J Roentgenol* 2014 Sep;203(3):531-40.
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