

Wrist and Hand: Rheumatologic Disorders

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Disclosures

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

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Fundamentals of Musculoskeletal Ultrasound
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Inflammatory Arthritis: role

- Identify synovitis and erosions
 - Prior to initiating treatment
- Determine activity: hyperemia
- Aspirate or inject
- Follow-up after therapy
 - Decreased hyperemia
 - Decreased synovial thickness

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Arthritis: synovitis

- Synovial locations:
 - Joint recess, bursa, tendon sheath
- Hypoechoic compared to adjacent subcutaneous fat
 - May be isoechoic or hyperechoic
- Hyperemia: variable
 - Represents activity of inflammation
 - Decreased: treatment (even NSAIDS)

Backhaus M, Arthritis and Rheum 1999; 42:1232

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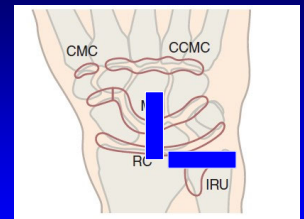
Joint Assessment: dorsal

- Radiocarpal joint
- Midcarpal joint
- Distal radioulnar joint
- MCP and IP joints

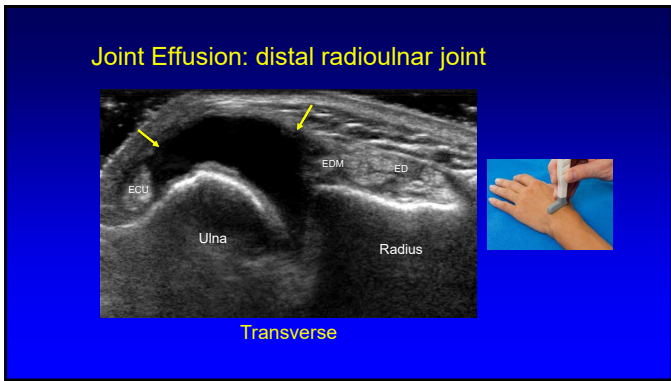
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Joint Assessment: dorsal

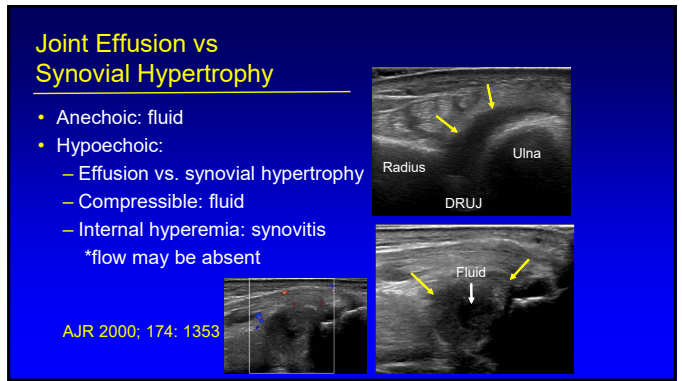
- Wrist:
 - Radiocarpal joint (RC)
 - Midcarpal joint (MC)
 - Distal or inferior radioulnar joint (IRU)
- Hand:
 - MCP and PIP joints
 - 1st CMC (if symptomatic)



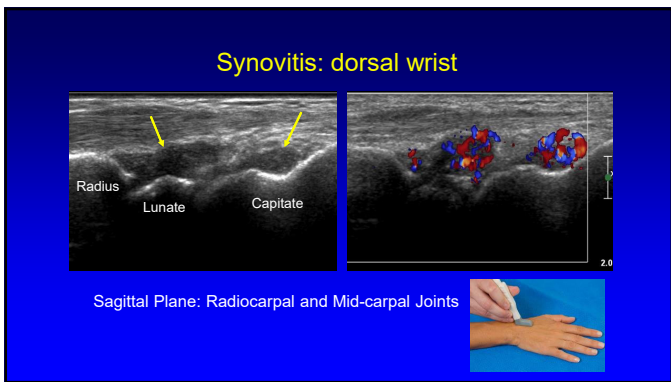
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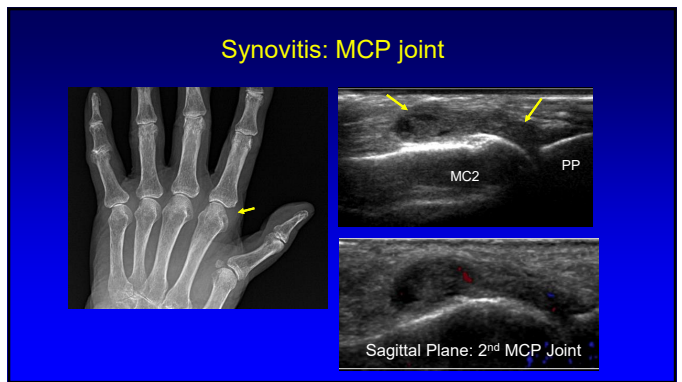
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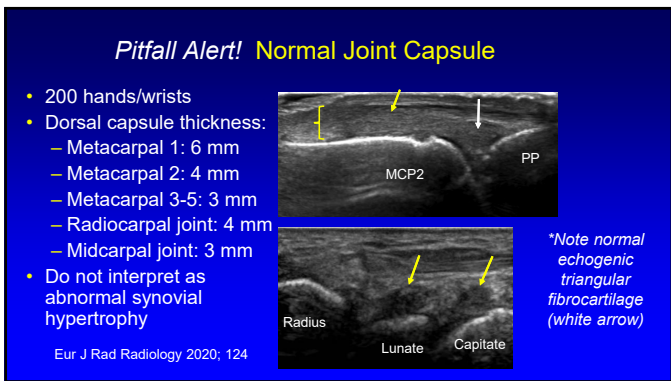
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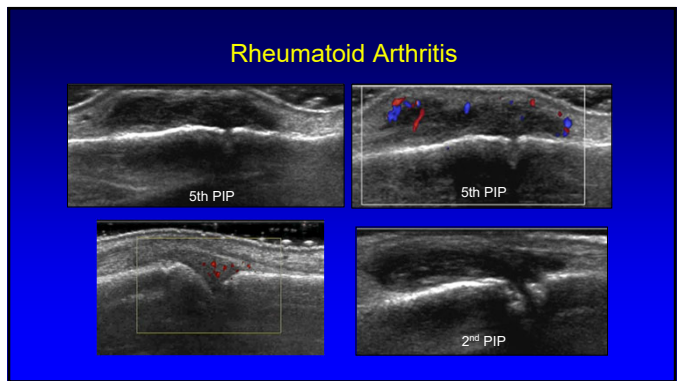
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Arthritis: bone

- Erosions: disrupted cortex in 2 planes
- Ultrasound not very good for erosions:
 - Better than radiographs
 - 40% sensitivity¹, 29% false positives²: wrist/hand compared with CT
 - Very non-specific, time consuming
- Adjacent synovitis adds specificity
- Correlate with radiographs, labs, distribution

¹Dohn UF M, Arthritis Res Ther 2006; 8:1
²Finzel S. et al. Arth Rheumatism 2011; 63:1231

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Rheumatoid Arthritis

The image shows two views of the 2nd MCP joint. On the left, an ultrasound image displays a cortical erosion (yellow arrow) and adjacent synovitis (color Doppler). On the right, a radiograph shows a similar erosion (yellow arrow) at the 2nd MCP. The label '2nd MCP' is visible at the bottom right of the radiograph.

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Rheumatoid Arthritis

The image shows two views of the wrist. On the left, an ultrasound image shows erosions at the ECU, Ulna, and Triquetrum (yellow arrows). On the right, a radiograph shows a yellow box highlighting the same anatomical areas.

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Pitfall Alert! Pseudoerosion

- Metacarpal head: dorsal
- Up to 37% of metacarpal heads: 2nd most common
- Bare area: no hyaline cartilage
- Unlike erosion:
 - Smooth
 - Maximum depth: 2 mm
 - No adjacent synovitis

Boutry N. et al. Radiology 2004; 232:716

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Pseudoerosion: dorsal metacarpal head

The image shows two views of the dorsal metacarpal head. On the left, an ultrasound image shows a pseudoerosion (yellow arrow) with labels 'ET', 'ca', 'P', and 'M'. On the right, a radiograph shows a pseudoerosion (yellow arrow) with labels 'ET', 'P', and 'M'. A diagram below shows the anatomy of the dorsal metacarpal head with labels 'a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o', 'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z'. The label 'Radiology 2004; 232:716' is at the bottom.

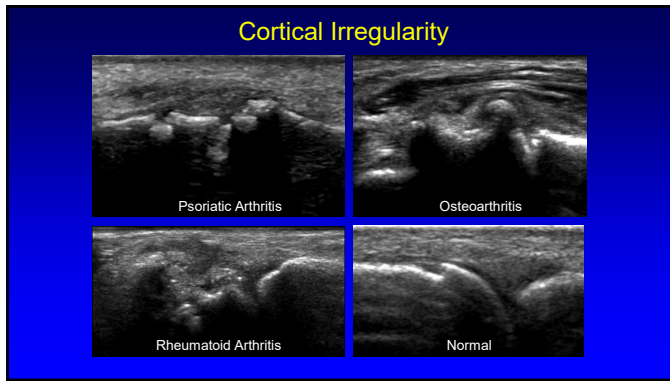
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Pitfall Alert! Pseudoerosions Are Everywhere!

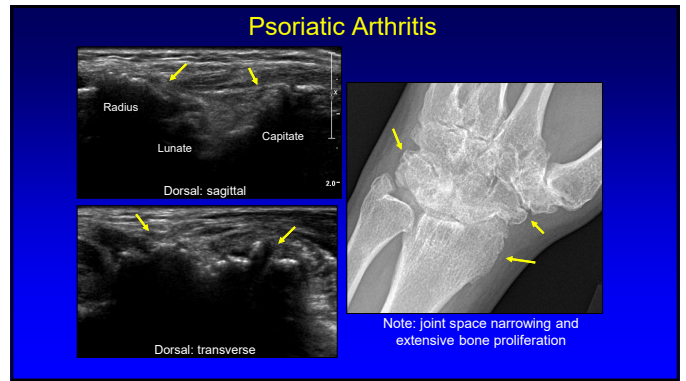
- 200 hands/wrists
- Pseudoerosions: 100%
 - Metacarpal heads: all
 - 2nd: 92%
 - 3rd: 86%
 - Carpal bones:
 - Lunate: 82%
 - Triquetrum: 84%
 - Distal ulna: 22%

The image shows four ultrasound views of pseudoerosions: 3rd MCP: sagittal, Lunate, 3rd MCP: transverse, and Ulna. The label 'Eur J Rad Radiology 2020; 124' is at the bottom left, and '*Note lack of adjacent synovitis' is at the bottom right.

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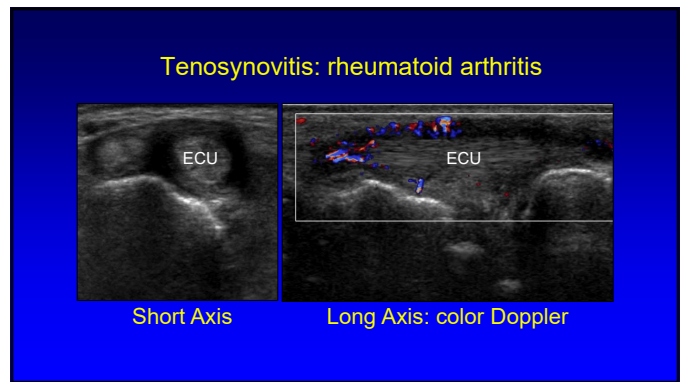


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Erosions: specificity

- To add specificity to bone irregularity:
 - Correlate with history
 - Correlate with lab values
 - Review radiographs!
 - Look at distribution
 - Evaluate for adjacent synovitis (if acute)

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Rheumatoid Nodules

- Up to 20 - 30% of patients with rheumatoid arthritis
- Autoimmune response
- Sites of mechanical repetitive trauma
- Females, often asymptomatic
- Hypoechoic mass
 - Several mm to 4 cm

Mutlu H. et al. Clin Rheumatol 2006; 25:734

PIP 3

2nd MC

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Psoriatic Arthritis: extensor tendon

- Enthesitis:
 - Thick tendon
 - Irregular bone
 - Hyperemia

*Correlation with radiography is helpful to show "fuzzy" cortex with inflammatory enthesitis

Proximal phalanx Middle phalanx

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Inflammatory Arthritis: wrist / hand

- Rheumatoid: synovial
 - Wrist: radioulnar, radiocarpal, midcarpal
 - MCP/PIP: dorsal
 - Tendon sheaths: especially ECU
- Psoriatic: synovial + enthesitis
 - Ligament and tendon attachments
 - Focus where symptomatic
- Osteoarthritis: DIP, first CMC

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Synovitis: screening (<10 minutes)

- Hand and wrist: (6 joints – actually 10)
 - Radiocarpal, midcarpal, distal radioulnar (dorsal)
 - MCP2 and 3 (dorsal): transverse and sagittal
 - Any symptomatic site
 - Cine: flexor and extensor tendons (short axis)
- Ankle and Foot:
 - Ankle joint
 - MTP5 (dorsal and plantar)
 - Any symptomatic site

Rosa J et al. J Clin Rheumatol 2016; 22: 179

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Take Home Points

- Synovitis:
 - Dorsal recesses: wrist and hand
 - Tenosynovitis
 - Hyperemia: activity
- Erosions: less reliable
- Correlate with radiographs, history, serology, distribution of findings

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Thank you!

Syllabus on line and other educational material:
www.jacobsonmskus.com

Twitter handle: @jjacobsn

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