Ultrasound of Inflammatory Arthritis

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Fundamentals of Musculoskeletal Ultrasound are copyrighted by Elsevier Inc.

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

Synovitis: dorsal wrist

Sagittal Plane: Radiocarpal and Mid-carpal Joints

Arthritis: bone
• 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
Outline: arthritis

- Rheumatoid arthritis
- Seronegative spondyloarthritis
- Gout

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

Synovitis: MCP joint

Sagittal Plane: 2nd MCP Joint

Rheumatoid Arthritis

Erosion + Synovitis

2nd MCP

5th MT
Outline: arthritis

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Seronegative Spondyloarthritis

- Synovial joints:
  - Erosions, uniform joint space narrowing
  - Periostitis
- Cartilaginous joints: erosions
- Entheses:
  - Tendon and ligament attachment
  - Fluffy enthesophytes, erosions, hyperemia
Psoriatic Arthritis

- Dorsal: transverse
- Dorsal: sagittal

Note: joint space narrowing and extensive bone proliferation

Psoriatic Arthritis: extensor tendon

- Enthesitis:
  - Thick tendon
  - Irregular bone
  - Hyperemia

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

Outline: arthritis

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Gout: intra-articular

- Monosodium urate crystal deposition in joint
- Joint effusion\(^1\):
  - Microtophi
  - Cartilage icing: double contour sign (ultrasound)
- Synovitis
- Erosions
- Knee: common site\(^2\)

\(^1\)Thiele RG, Rheumatol Int 2010; 30:495

Gout: Double Contour Sign

Tibiotalar Joint Effusion: gout

Tibia

Axial

Talus

Sagittal

1st MTP Joint

Ankle Joint
**Tophi**

- Hyperechoic heterogeneous with hypoechoic rim
- Tiny internal speckles*
- "wet clump of sugar" appearance
- Variable shadowing: even without calcification

Fernandes et al. Skeletal Radiol 2011; 40:309

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**Gout: patellar tendon**

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**Gout: popliteus**

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**Gout: olecranon bursa**

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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


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

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