

Ultrasound of the Lower Extremity with MRI Correlation

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Syllabus PDF

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Outline

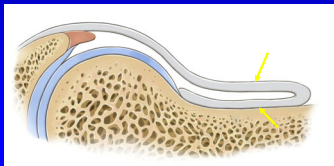
- Hip
 - Effusion
 - Greater trochanteric pain syndrome
 - Iliopsoas snapping
- Knee
 - Extensor mechanism
- Ankle and Foot
 - Achilles and peroneal tendons
 - Gout
 - Intermetatarsal neuroma

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Hip: anterior recess

- Anterior and posterior layers
 - Fibrous tissue + minute layer of synovium
 - Hyperechoic
 - Each 2 - 4 mm thick

Radiology
1999; 210:499

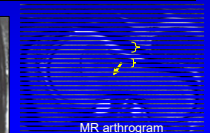
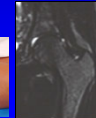
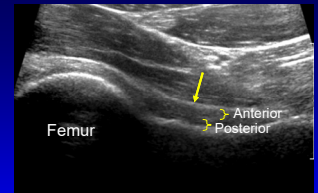


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Hip: anterior recess

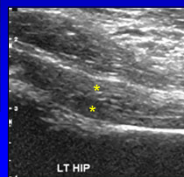
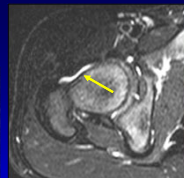
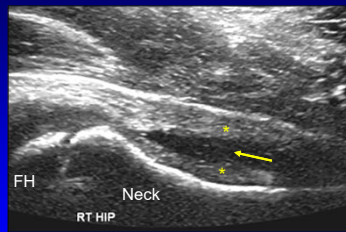
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Radiology
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Hip Joint: septic effusion

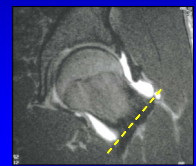
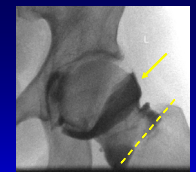


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Hip Effusion: misconception

- It is incorrect to assume that joint fluid may not be seen anterior due to gravity
- Native hip: joint fluid distributes around femoral neck
- In no cases was fluid only seen posterior
- Exception: after hip surgery

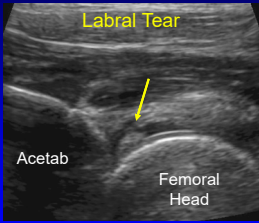
Moss et al. Radiology 1998; 208:43



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Hip Labrum

- Normal:
 - Hyperechoic, triangular
- Degeneration: hypoechoic
- Tear:
 - Anechoic cleft
 - Most common anterior
 - Possible paralabral cyst
 - Sensitivity 82%, specificity 60%*

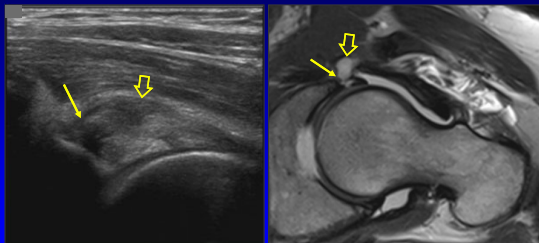


Sagittal-oblique

*Jin W et al. J Ultrasound Med 2012; 31:439

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Labral Tear and Paralabral Cyst

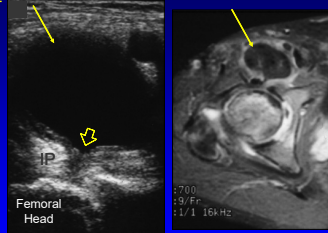


Courtesy of D. Fessell, Ann Arbor, MI

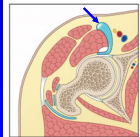
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Iliopsoas Bursa

- Hip joint communication in 10%
 - Increased with hip joint pathology
 - After joint replacement
- May extend cephalad into abdomen
- May be mistaken for psoas abscess
 - Look for hip joint communication



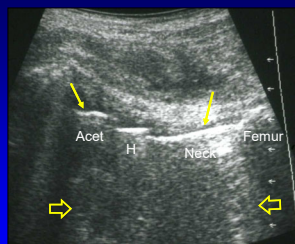
Radiology 1995; 197:853



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Total Hip Arthroplasty:

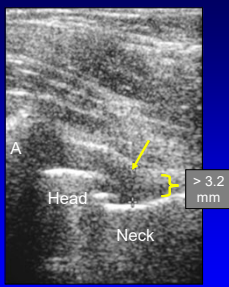
- Metal components demonstrate posterior reverberation
- Artifact occurs deep to prosthesis away from fluid collection (unlike MRI, CT)



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Hip Arthroplasty:

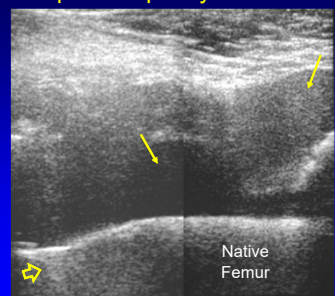
- Ultrasound cannot differentiate small effusion from post-op change¹
- Suspect infection:
 - Pseudocapsule > 3.2 mm: suspect infection²
 - Extra-articular fluid collection
 - Not visualized with arthrography if non-communication



¹Weybright PN et al. AJR 2003; 181:215
²AJR 1994; 163:381

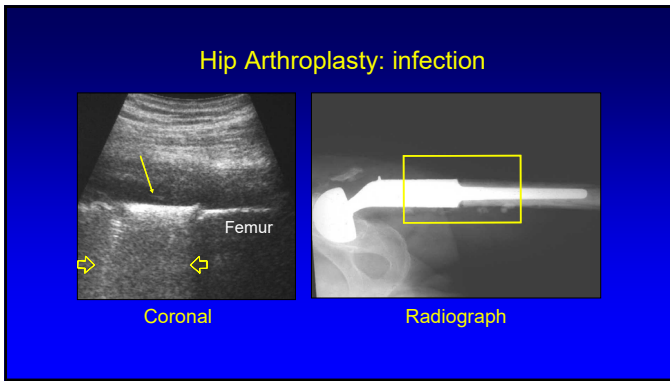
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Hip Arthroplasty: infection



Sagittal

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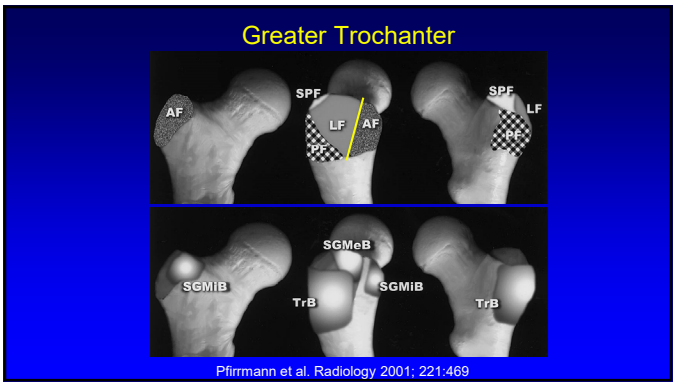
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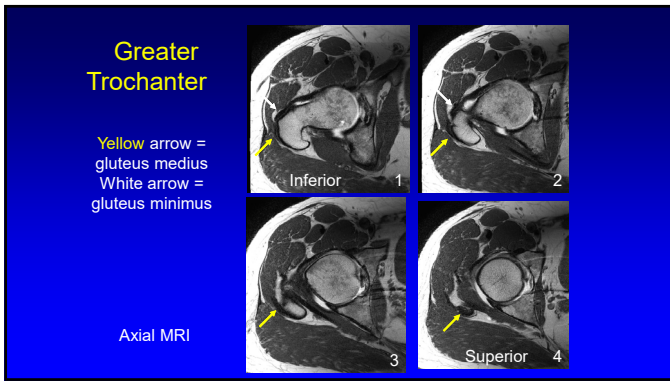
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- ### Greater Trochanteric Pain Syndrome:
- Trochanteric bursitis: uncommon
 - 20% of symptomatic patients²
 - Not actually inflamed³
 - Not associated with pain⁴
 - Most commonly caused by gluteus minimus and medius tendon abnormalities¹
- IT'S NOT BURSITIS**
- ¹Eur Rad 2007; 17:1772
²Long SS et al. AJR 2013; 201:1083
³Clin Rheumatol 2008; 14:82
⁴Skeletal Radiol 2008; 37:903

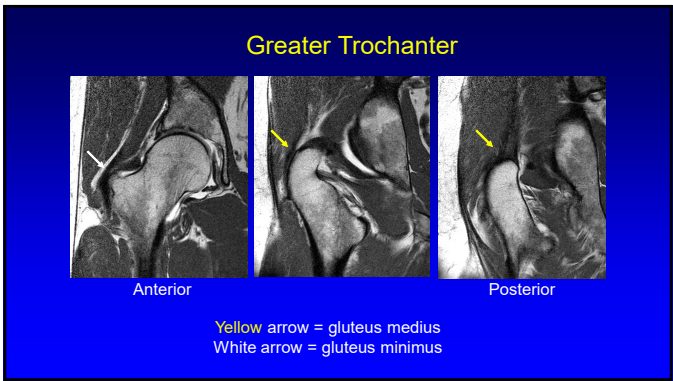
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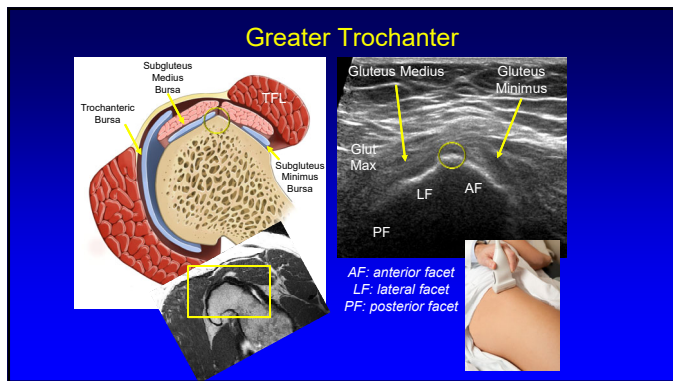
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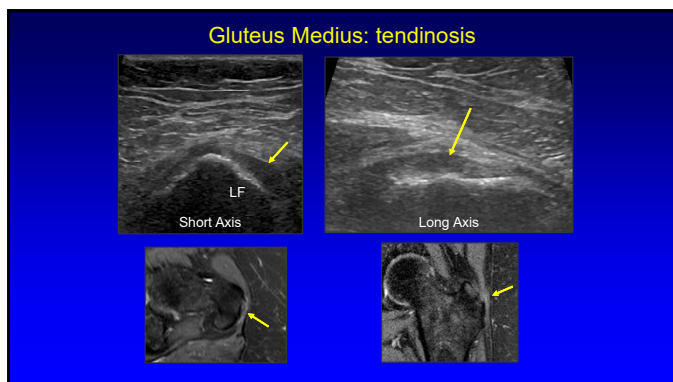
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Gluteal Tendon Pathology:

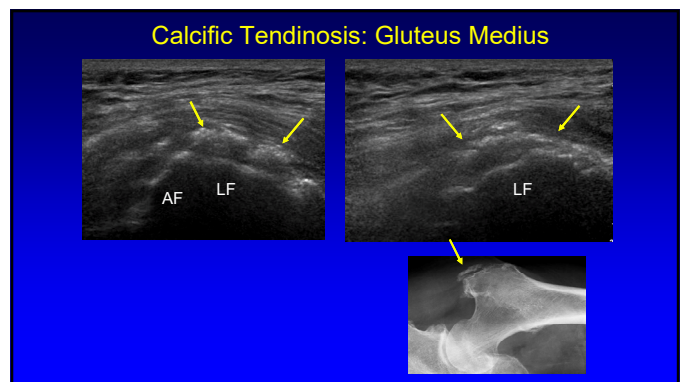
- Tendinosis: hypoechoic, no defects
- Partial tear: anechoic clefts
- Complete tear: discontinuous tendon
- >2 mm cortical irregularity is associated with tendon tear
 - Positive predictive value = 90% (xray)*

*Steinert et al. Radiology 2010; 257:754

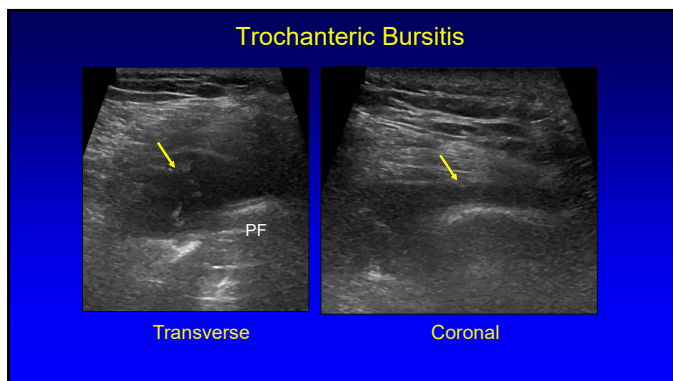
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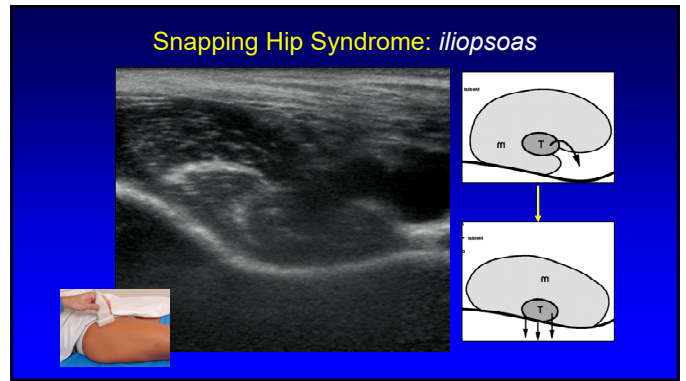
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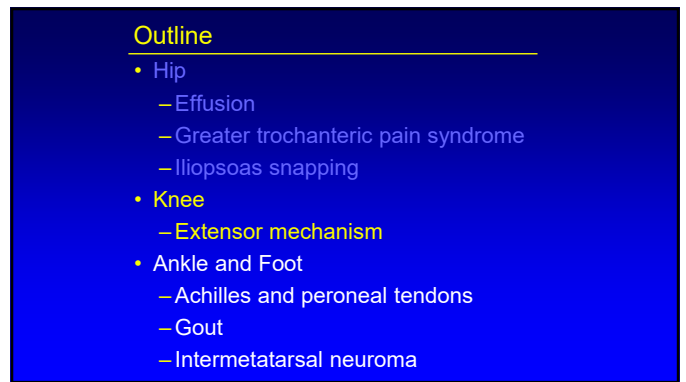
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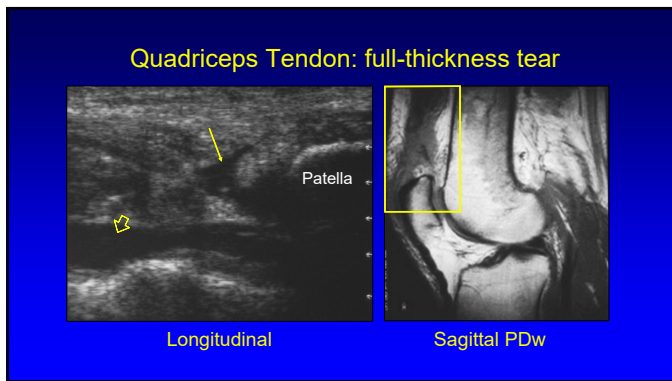
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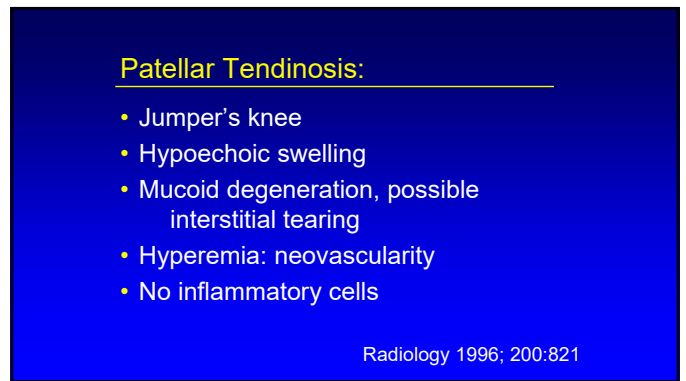
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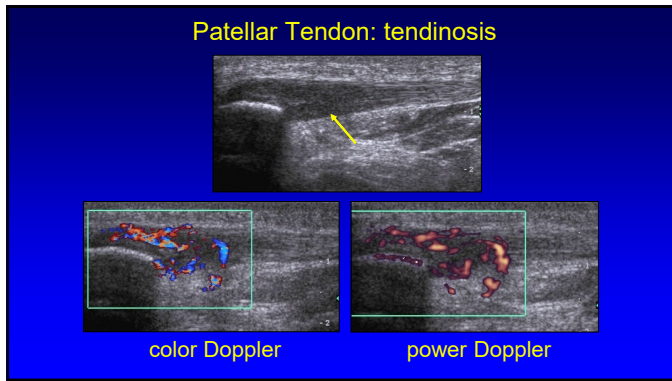
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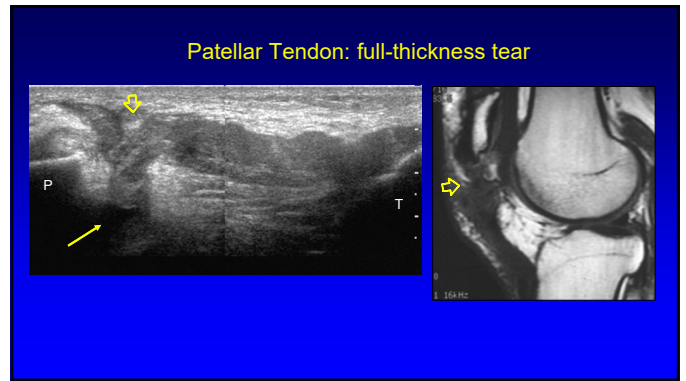
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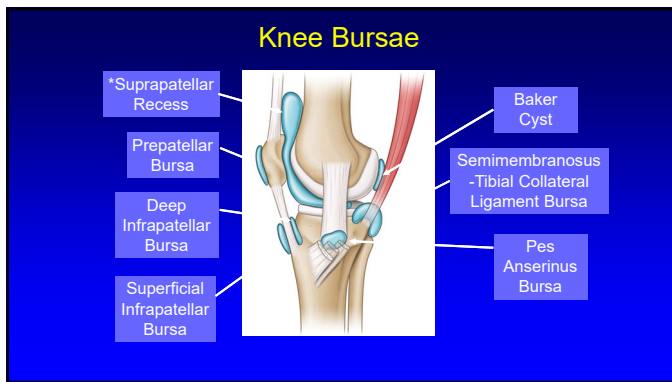
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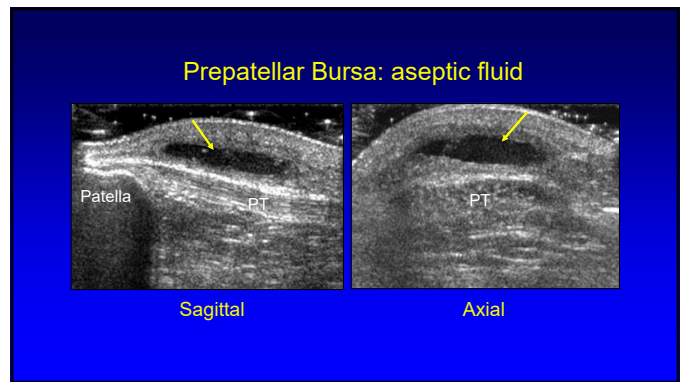
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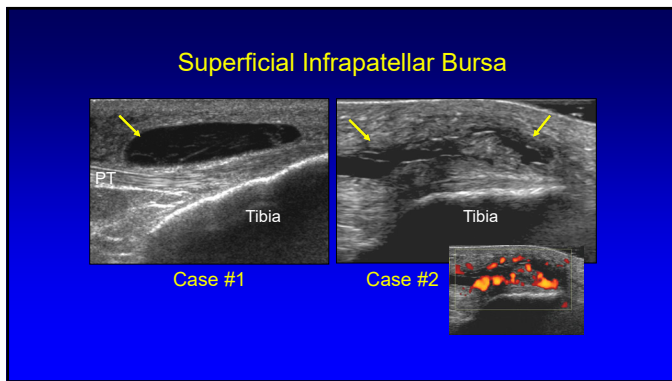
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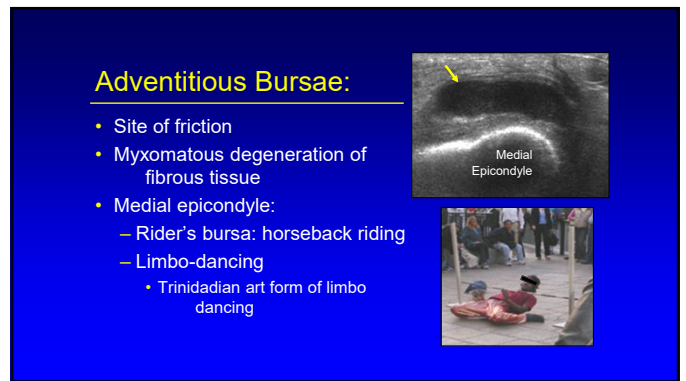
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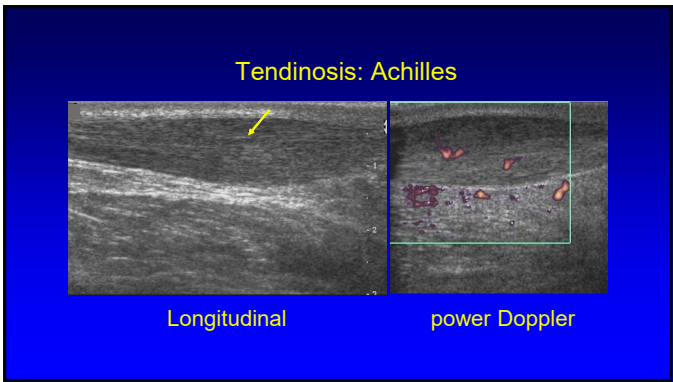
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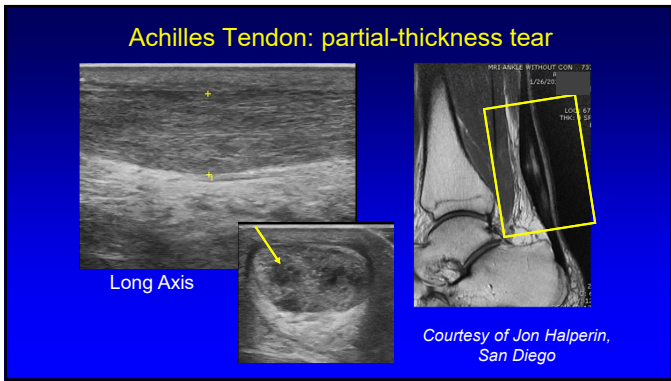
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- Achilles Tendon**
- Locations:
 - 2 – 6 cm proximal to insertion
 - Calcaneal attachment: less common
 - Haglund syndrome
 - Pathology:
 - Paratendinitis: no tendon sheath
 - Tendinosis: hypoechoic, enlarged
 - Partial tear: anechoic clefts
 - Full-thickness tear: retraction

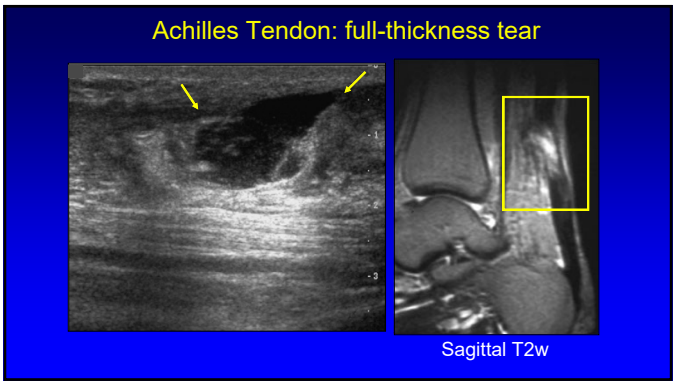
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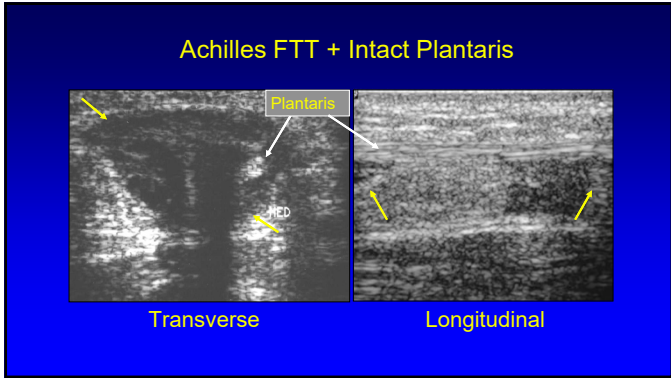
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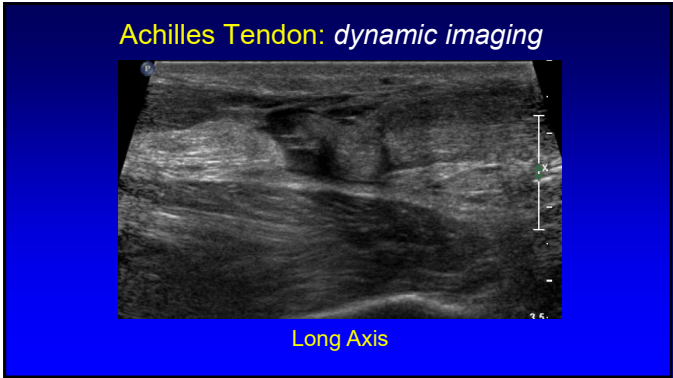
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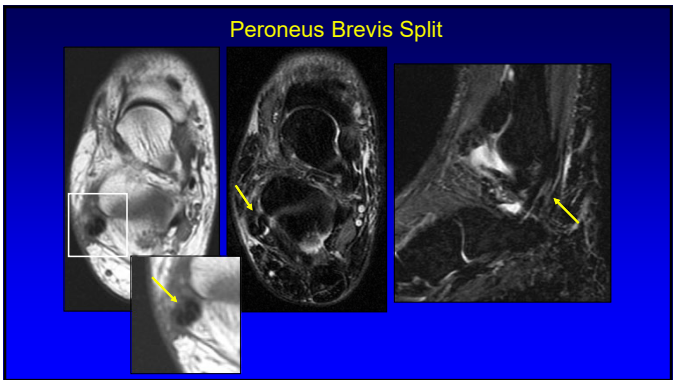
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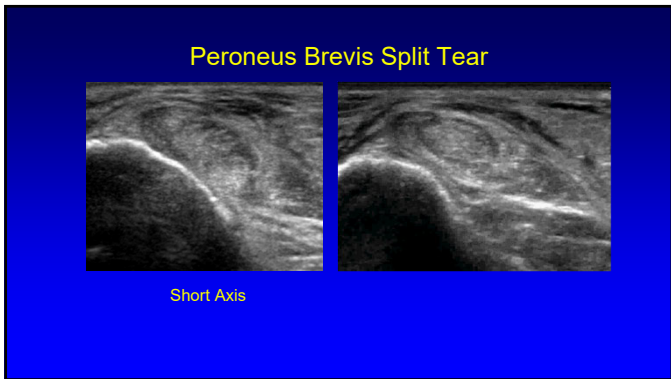
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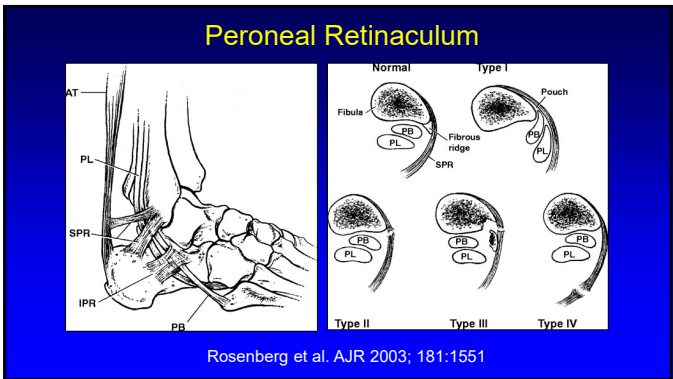
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Peroneal Tendon Subluxation

- Abnormal movement may only occur dynamically
- Predisposes to peroneal tendon tears
 - Longitudinal split of peroneus brevis
- US: examine with dorsiflexion / eversion
 - 100% accurate US diagnosis





Neustadter et al. AJR 2004; 183:985

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Intrasheath Subluxation

- Abnormal snapping of peroneal tendons
- No lateral displacement, intact retinaculum
- Associations:
 - Convex posterior fibula: 92%
 - Tendon tear in 86%
 - Low lying peroneus brevis muscle: 71%



J Bone Joint Surg Am 2008; 90:992
J Foot Ankle Surg 2009; 48:323

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A rare image of shark stepping on a lego.



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Gout:

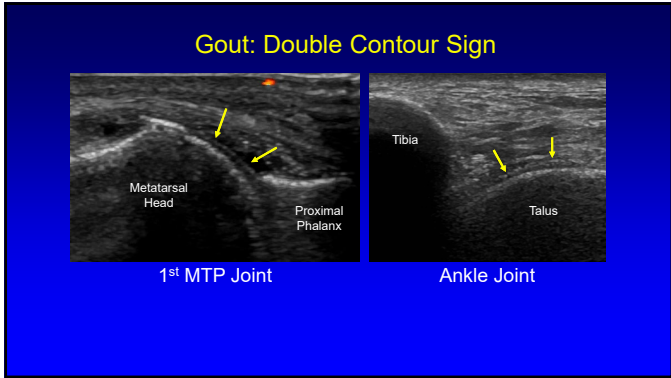
- Monosodium urate crystals:
 - Negative birefringence
- Stages:
 - Asymptomatic hyperuricemia
 - Acute gouty arthritis
 - Interval asymptomatic phase
 - Chronic tophaceous gout

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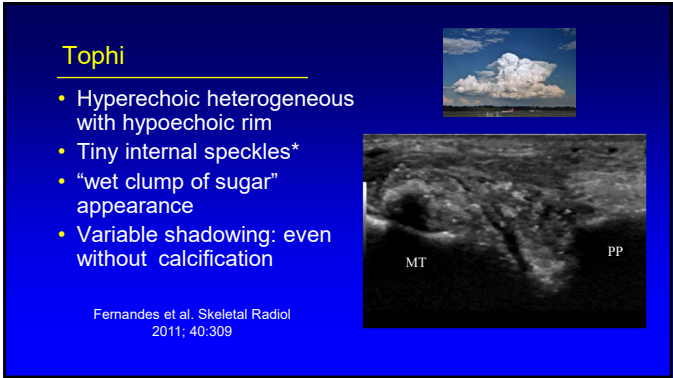
Gout:

- Joint effusion / synovial hypertrophy
- Double contour sign:
 - Monosodium urate crystal icing on cartilage
- Tophi:
 - Hyperechoic with hypoechoic rim
- Erosions:
 - Adjacent to tophi
 - Medial 1st metatarsal head

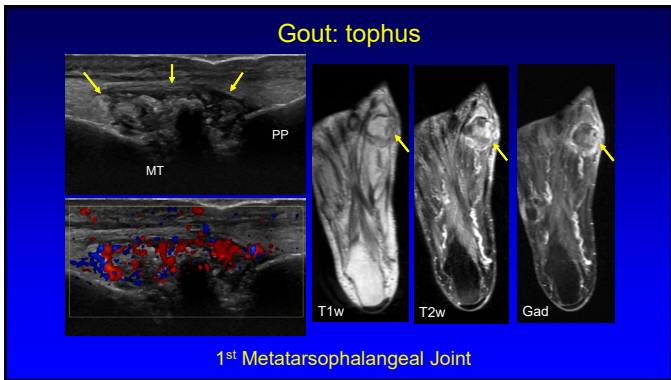
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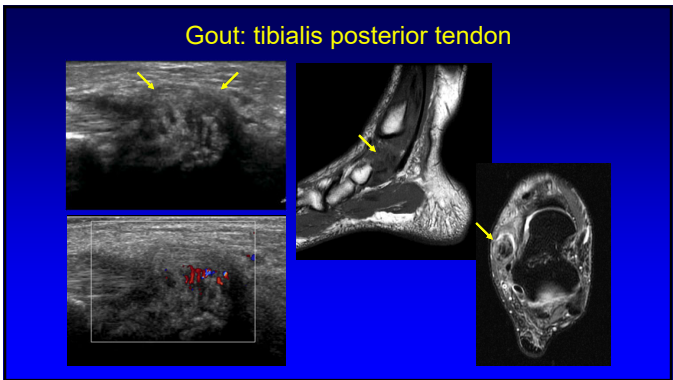
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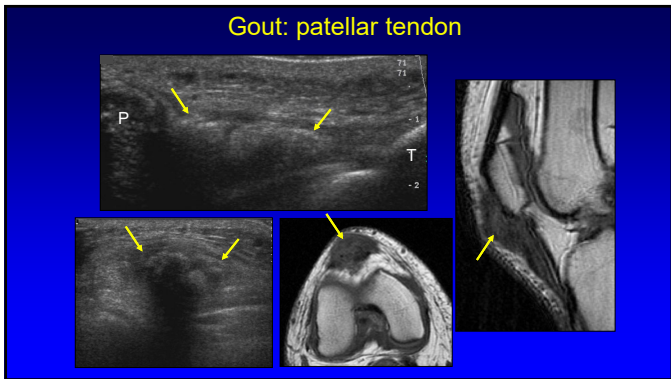
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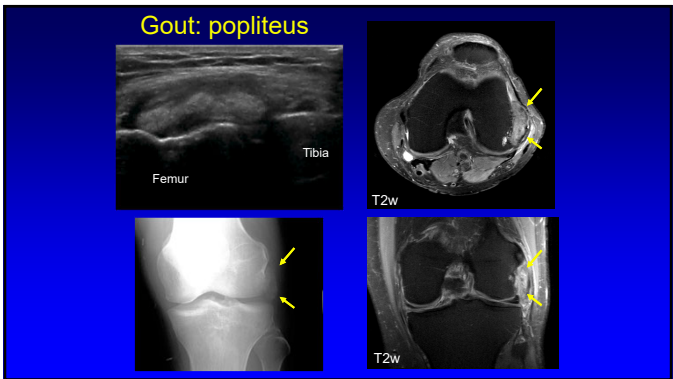
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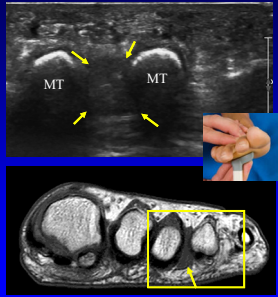
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Intermetatarsal Neuroma

- Hypochoic 5 mm mass
 - Sensitivity: 100% ; Specificity: 83%
- Digital nerve continuity*
- Excludes other causes for mass
- Compression:
 - Produces symptoms
 - Bursa (compressible) vs. neuroma (not compressible)

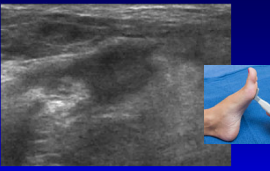
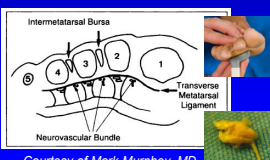


Redd et al. Radiology 1989; 171:415
Quinn et al. AJR 2000; 174:1723

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Dynamic Evaluation

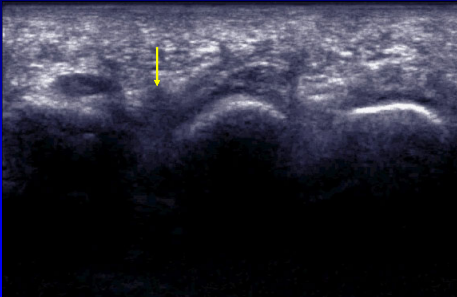
- Compression
 - Between transducer and palpation
 - Bursae (dorsal) compress, neuromas (plantar) do not
- Sonographic Mulder Sign
 - Scan plantar: coronal plane
 - Neuroma displaces: plantar
 - Palpable click

Torriani M et al. AJR 2003; 180:1121
Zanetti M et al. Radiology 1997; 203:516
Courtesy of Mark Murphey, MD

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Dynamic imaging: Mulder's Maneuver




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Take Home Points

- Hip joint: screen for fluid anterior
- Greater trochanter pain syndrome: not bursitis!
- Iliopsoas snapping: dynamic evaluation
- Extensor mechanism (knee): not tendinitis
- Achilles and peroneals: dynamic imaging
- Gout: specific findings
- Intermetatarsal neuroma: dynamic imaging


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Thank you!



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



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