

Ultrasound of Common Hip Pathology

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Disclosures

- Consultant: Bioclinica
- Contractor: POCUS PRO
- Book Royalties: Elsevier
- Not relevant to this lecture

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Fundamentals of Musculoskeletal Ultrasound
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Outline:

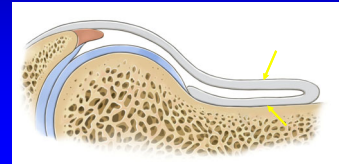
- Hip joint
- Bursae
- Tendon abnormalities
- Snapping hip syndrome

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Hip: anterior recess

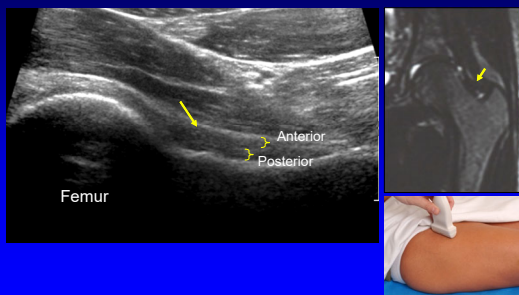
- Anterior and posterior layers
 - Fibrous tissue + minute layer of synovium
 - Hyperechoic
 - Each 2 - 4 mm thick

Radiology
1999; 210:499



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Hip: anterior recess



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Hip Effusion:

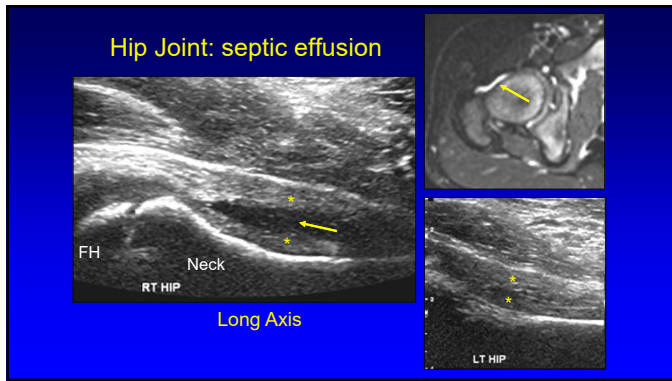
- Separation of anterior and posterior layers¹
- Capsule distention at femoral neck > 7 mm or difference of 1 mm from opposite side²
- Extension & abduction improves visualization³
- Do not internally rotate hip: capsule thickens

¹Radiology 1999; 210:449

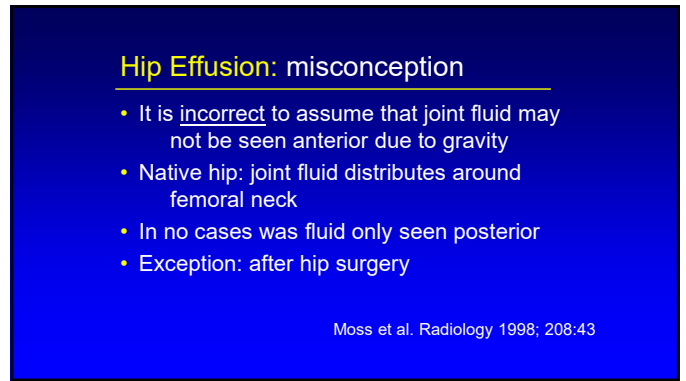
²Scand J Rheumatology 1989; 18:113

³Acta Radiologica 1997; 38:867

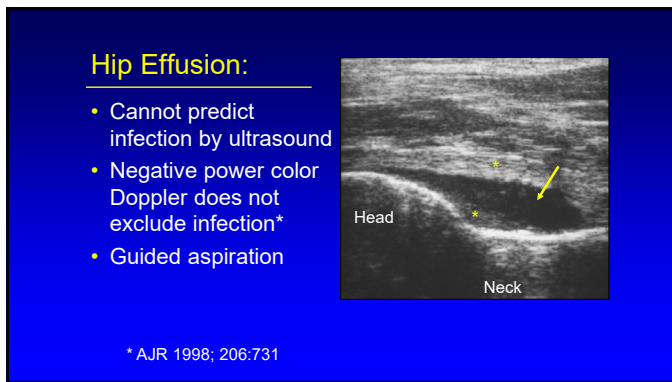
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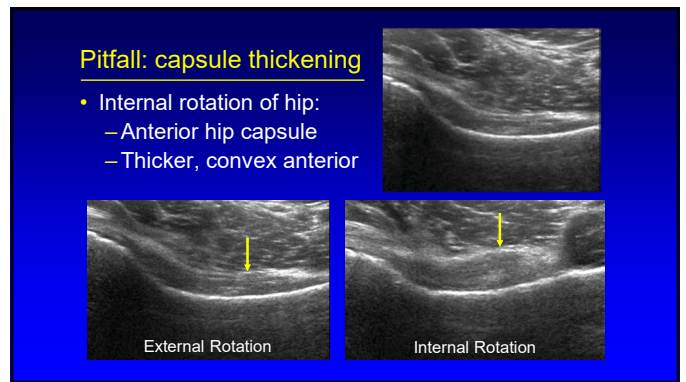
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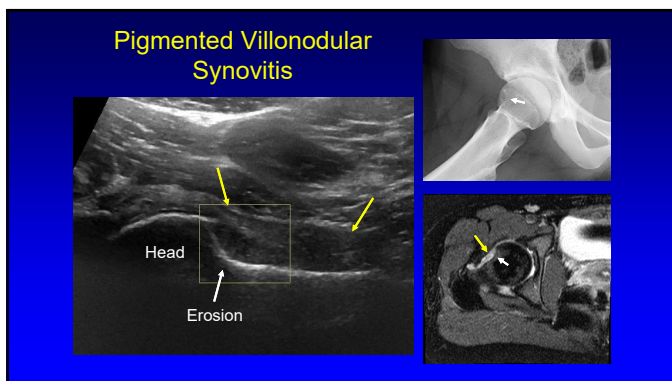
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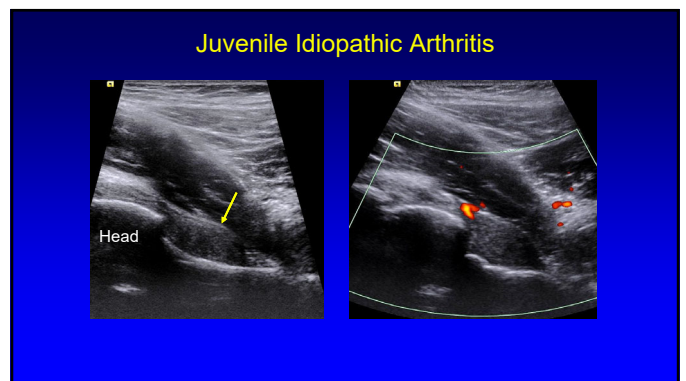
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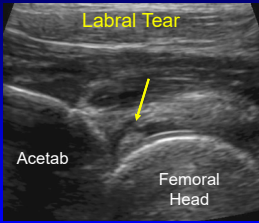
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Hip Labrum

- Normal:
 - Hyperechoic, triangular
- Degeneration: hypoechoic
- Tear:
 - Anechoic cleft
 - Most common anterior
 - Possible paralabral cyst
 - Sensitivity 44%, specificity 75%*

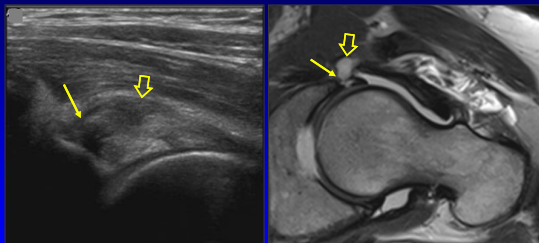


Sagittal-oblique

*Acta Radiologica 2007; 9:1004

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Labral tear & paralabral cyst

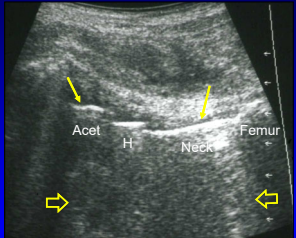


Courtesy of D. Fessell, Ann Arbor, MI

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Total Hip Arthroplasty:

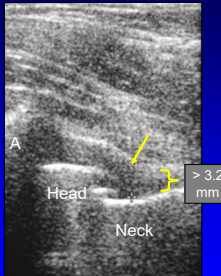
- Metal components demonstrate posterior reverberation
- Artifact occurs deep to prosthesis away from fluid collection (unlike MRI, CT)



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Hip Arthroplasty:

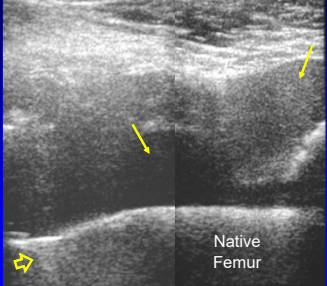
- Ultrasound cannot differentiate small effusion from post-op change¹
- Suspect infection:
 - Pseudocapsule > 3.2 mm: suspect infection²
 - Extra-articular fluid collection
 - Not visualized with arthrography if non-communication



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

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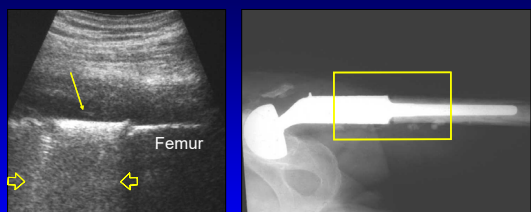
Hip Arthroplasty: infection



Sagittal

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Hip Arthroplasty: infection

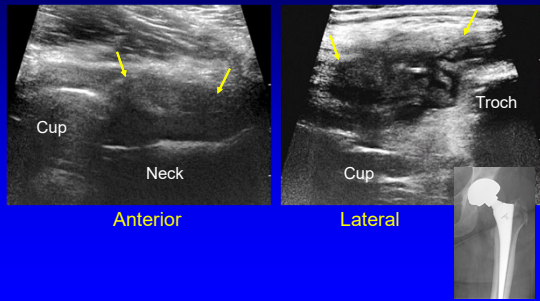


Coronal Radiograph

Teaching Point:
Always screen soft tissues about an arthroplasty prior to fluoroscopic joint aspiration

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Metal-on-Metal Arthroplasty: pseudotumor



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Outline:

- Hip joint
- Bursae
- Tendon abnormalities
- Snapping hip syndrome

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Trochanteric Pain Syndrome:

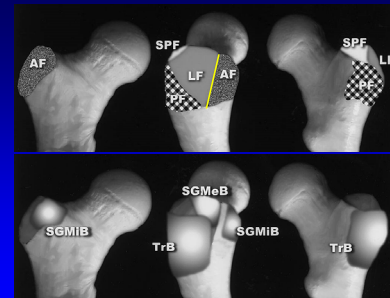
- Most commonly caused by gluteus minimus and medius tendon abnormalities¹
- Trochanteric bursitis: uncommon
 - 20% of symptomatic patients²
 - Not actually inflamed³
 - Not associated with pain⁴



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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Greater Trochanter

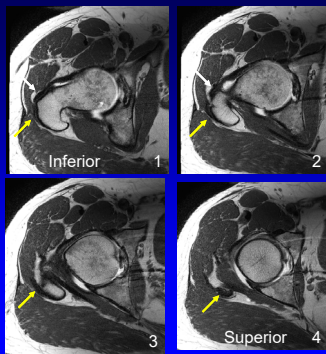


FACETS: AF = anterior; LF = lateral; SPF = superoposterior; PF = posterior
 Pfirmann et al. Radiology 2001; 221:469

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Greater Trochanter

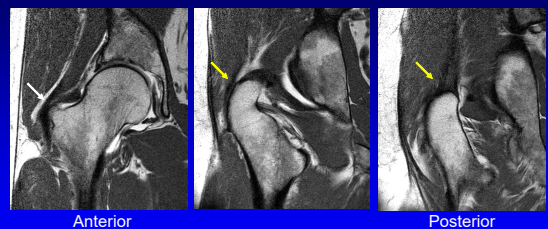
Yellow arrow = gluteus medius
 White arrow = gluteus minimus



Axial MRI

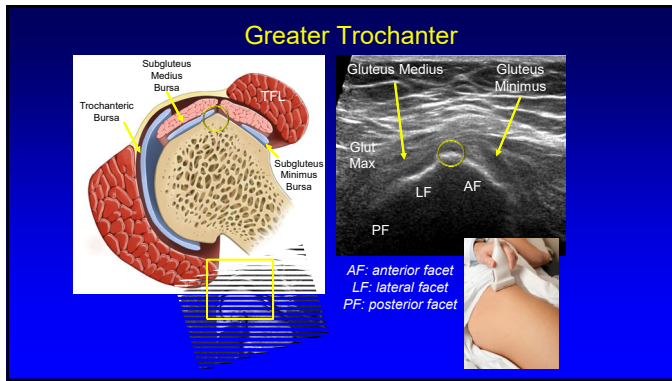
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Greater Trochanter

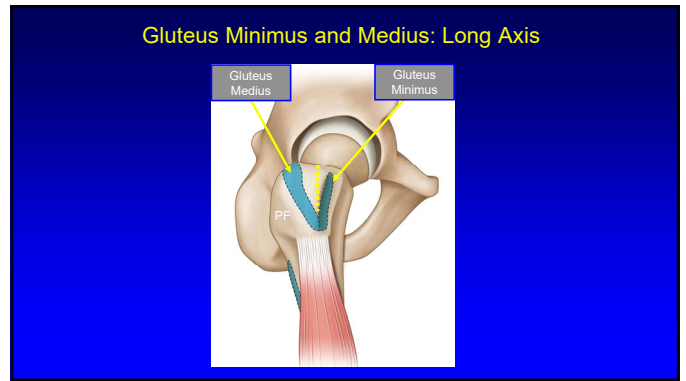


Yellow arrow = gluteus medius
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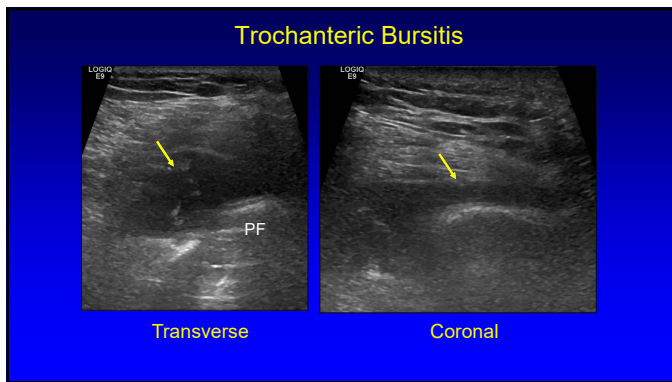
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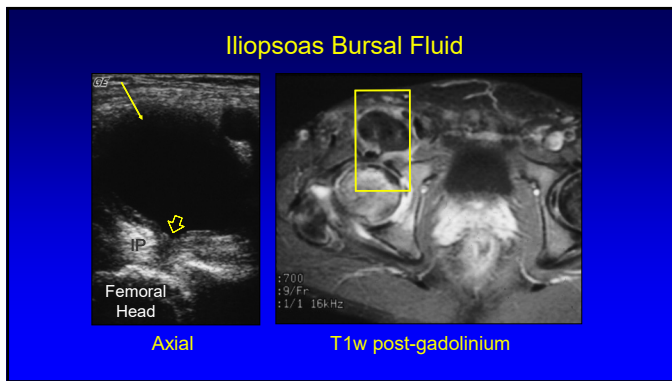
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Iliopsoas Bursa:

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

Radiology 1995; 197:853

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Ischial or ischiogluteal Bursa

- Uncommon
- "Weaver's Bottom"
- Between ischial tuberosity and gluteus maximus

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Outline:

- Hip joint
- Bursae
- **Tendon abnormalities**
- Snapping hip syndrome

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Acute Muscle and Tendon Injury

- Direct impact: contusion, muscle belly
- Indirect (strain):
 - Musculotendinous junction
 - Especially muscles that span 2 joints
 - Hamstrings, gastrocnemius
 - Osseous avulsion

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Tendon Injury

- Tendinosis
- Hypoechoic, increased thickness
- Progression to partial and full-thickness tendon tear
 - Hypoechoic or anechoic tendon defect
 - Retraction: full-thickness tear

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Tendinosis: Gluteus Minimus

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Tendinosis: Gluteus Medius

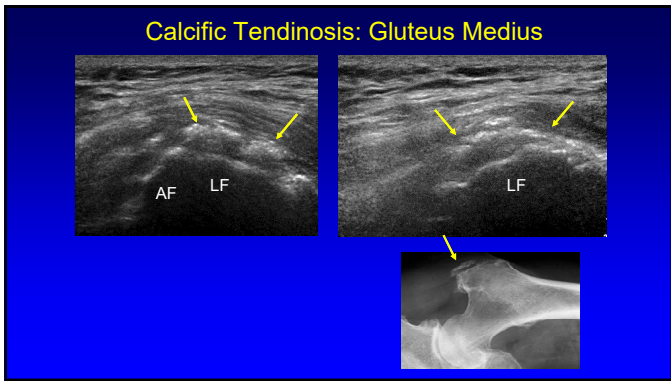
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Tear: Gluteus Medius

>2 mm cortical irregularity depth (x-ray) = 90% positive predictive value for gluteus tendon tear

Steinert et al. Radiology 2010; 257:754

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Sports Hernia?

- A non-anatomic, non-diagnostic term attributed to many cause of groin pain
 - Tears or attenuation of inguinal structures
 - Bulge posterior wall of inguinal canal
 - Obturator nerve entrapment
 - **Common aponeurosis** abnormality:
 - Rectus abdominis and adductors tendons
 - Associated: pubic symphyseal instability, FAI

Omar IM et al. Radiographics 2008; 28:1415
Garvey JFW et al. Hernia 2010; 14:17
Hopkins JN et al. JBJS Reviews 2017; 5:1

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to Durant, who missed 17 games and returned to action on December 2, the general public learned quickly about the injury and its ramifications. Even seasoned athletes were mystified.

"I'm so old that when you get hurt they didn't have names for it," says NBA Hall of Famer and TNT analyst Charles Barkley. "They come up with names for injuries now. Back in my day [they'd say], 'Oh, he broke a foot.'"

Durant's Jones fracture isn't the first time the sports media has felt the need for an explanatory article. Back in the mid-'90s, when Cincinnati Reds shortstop and future Hall of Famer Barry Larkin suffered an injury in the groin area that defied any straight-ahead medical vernacular—it was kind of like a hernia, but not quite—reporters lounded the Reds' medical director and chief orthopedic surgeon, Dr. Timothy Kremenek.

"The newspaper writers—there was no HIPAA back then, nothing—kept asking me about it," Kremenek says now, "so I said he's got a sports hernia. I had never even heard of it, I made it up."

Kremenek is referring to the privacy rule of the Health Insurance Portability and Accountability Act (HIPAA), which Congress passed in 1996 and which forbids public disclosure of medical information without appropriate consent.

Author: Joe Lemire, Hemisphere Magazine, Feb. 2015

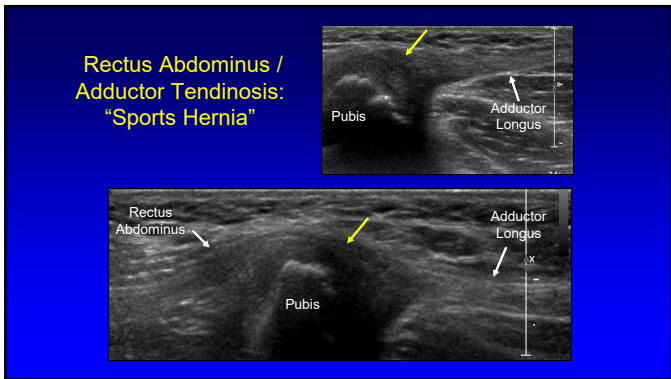
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Rectus Abdominis + Adductor: "Sports Hernia"

Note: common aponeurosis

From: RadioGraphics 2008; 28:1415

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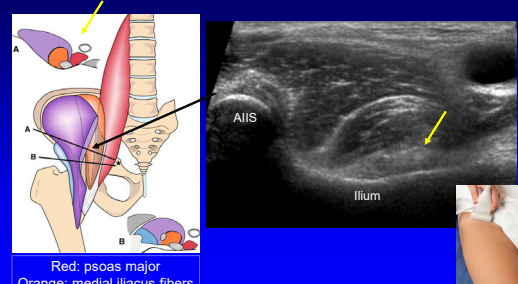
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Snapping Hip Syndrome

- Painful snap with hip motion
- Intraarticular
- Extraarticular:
 - Medial: iliopsoas tendon
 - Lateral: iliotibial tract or gluteus maximus

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Iliopsoas Complex



Red: psoas major
Orange: medial iliac fibers
Purple: lateral iliac fibers

From: Guillin R. et al. Eur Rad 2009; 19:995

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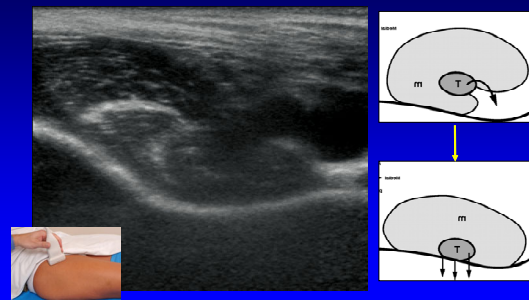
Snapping Hip Syndrome: iliopsoas

- Image long axis to inguinal ligament superior to femoral head
- Extension of flexed abducted and externally rotated hip
- Abrupt movement of iliopsoas as iliacus muscle interposed between tendon and bone moves

Deslandes et al. AJR 2008; 190:576

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Snapping Hip Syndrome: iliopsoas



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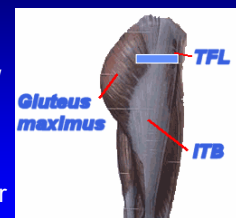
Snapping Hip: iliotibial tract

- Transverse over greater trochanter
- Hip external rotation / flexion
- Abrupt motion of iliotibial tract over greater trochanter

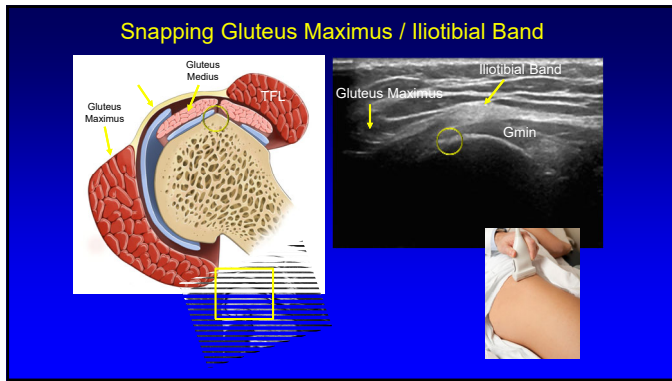
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Snapping Hip: lateral

- Transverse over greater trochanter
- Hip external rotation / flexion
- Abrupt motion of iliotibial tract or gluteus maximus over greater trochanter



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- ### Take-home points
- Joint effusion: anterior recess
 - Pitfalls: large patients, post-arthroplasty
 - Bursae and gluteal tendons:
 - Use facets of greater trochanter for orientation
 - Sports hernia:
 - Common aponeurosis
 - Snapping hip:
 - Dynamic evaluation

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

Twitter handle: @jjacobsn

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