

Ultrasound of Hip Pathology and Intervention

Jon A. Jacobson, MD FACR
FSRU, FAIUM, RMSK

Professor of Radiology
Lenox Hill Radiology, NYC
University of California, San Diego



Syllabus

1

Disclosures

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

2

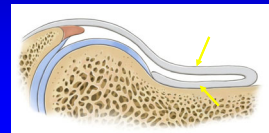
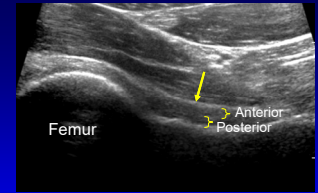
Outline:

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

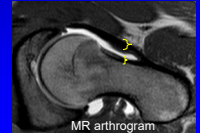
3

Hip: anterior recess

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



Radiology
1999; 210:499

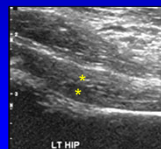
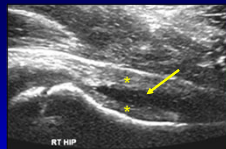


MR arthrogram

4

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

5

Hip Effusion: misconception

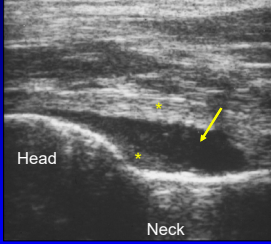
- It is incorrect to assume that joint fluid may not be seen anterior due to gravity
- Native hip: joint fluid distributes around femoral neck
- In no cases was fluid only seen posterior
- Exception: after hip surgery

Moss et al. Radiology 1998; 208:43

6

Hip Effusion:

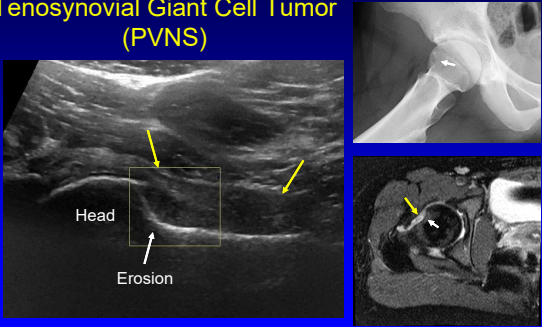
- Cannot predict infection by ultrasound
- Negative power color Doppler does not exclude infection*
- Guided aspiration



* AJR 1998; 206:731

7

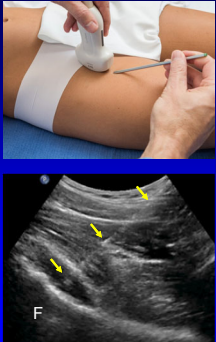
Tenosynovial Giant Cell Tumor (PVNS)



8

Joint injection

- Anterior recess
- In plane
- Transducer:
 - Parallel to femoral neck
 - Consider curvilinear
- Needle: distal to proximal
- 97% accuracy¹

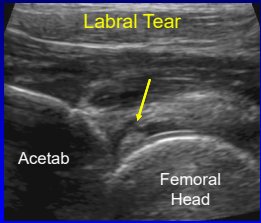


¹Smith J. J Ultrasound Med 2009; 28:329

9

Hip Labrum

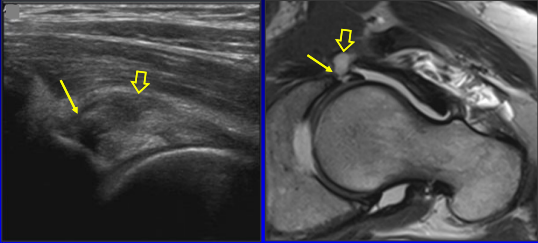
- Normal:
 - Hyperechoic, triangular
- Degeneration: hypoechoic
- Tear:
 - Anechoic cleft
 - Most common anterior
 - Possible paralabral cyst
 - Sensitivity 44%, specificity 75%*



*Acta Radiologica 2007; 9:1004

10

Labral tear & paralabral cyst

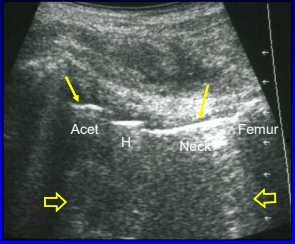


Courtesy of D. Fessell, Ann Arbor, MI

11

Total Hip Arthroplasty:

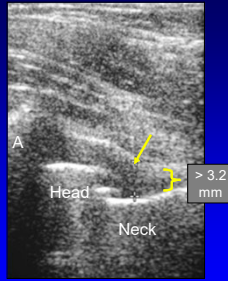
- Metal components demonstrate posterior reverberation
- Artifact occurs deep to prosthesis away from fluid collection (unlike MRI, CT)



12

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

13

Outline:

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

14

Trochanteric Pain Syndrome:

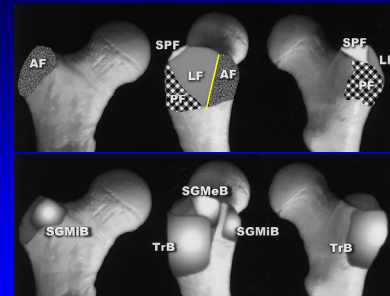
- Most commonly caused by gluteus minimus and medius tendon abnormalities¹
- Trochanteric bursitis: uncommon
 - 20% of symptomatic patients²
 - Not actually inflamed³
 - Not associated with pain⁴



¹Eur Rad 2007; 17:1772
²Long SS et al. AJR 2013; 201:1083
³Clin Rheumatol 2008; 14:82
⁴Skeletal Radiol 2008; 37:903

15

Greater Trochanter

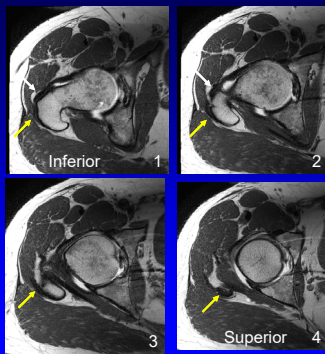


FACETS: AF = anterior; LF = lateral; SPF = superoposterior; PF = posterior
 Pfirrmann et al. Radiology 2001; 221:469

16

Greater Trochanter

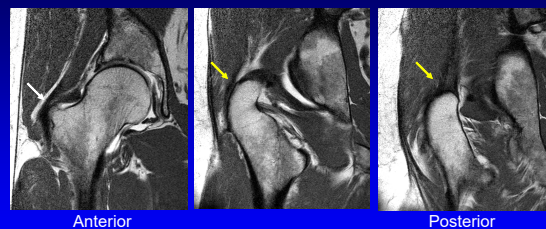
Yellow arrow = gluteus medius
 White arrow = gluteus minimus



Axial MRI

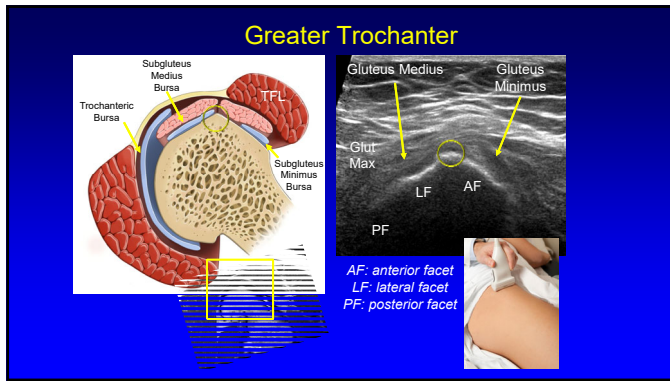
17

Greater Trochanter

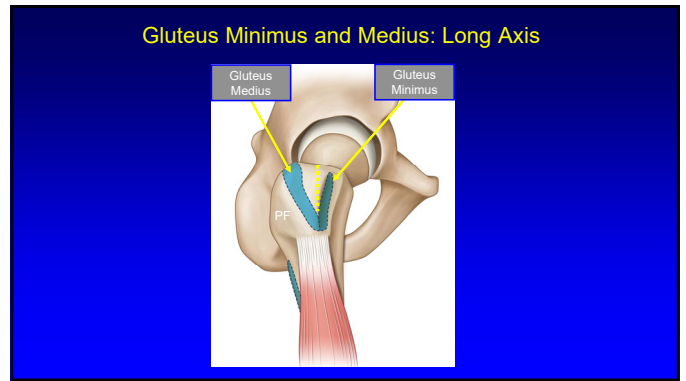


Yellow arrow = gluteus medius
 White arrow = gluteus minimus

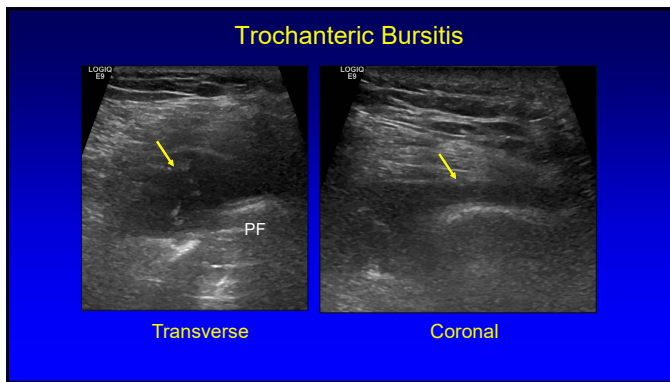
18



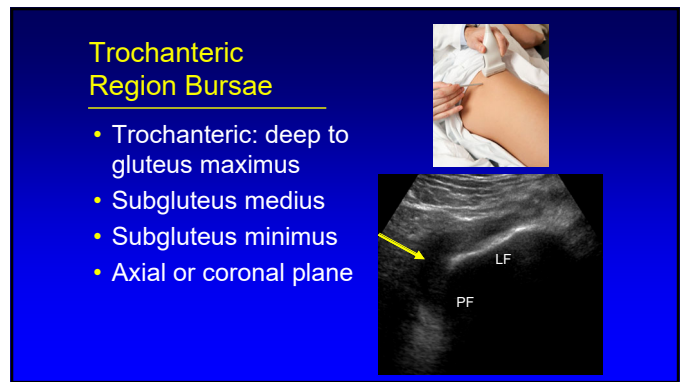
19



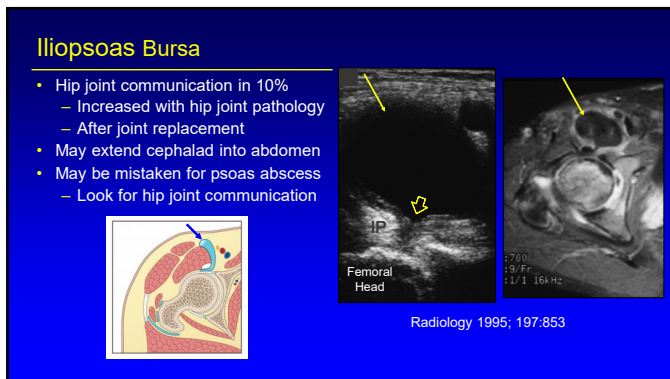
20



21



22



23



24

Ischial or ischiogluteal Bursa

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

25

Outline:

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

26

Tendinosis: Gluteus Minimus

27

Tendinosis: Gluteus Medius

28

Tear: Gluteus Medius

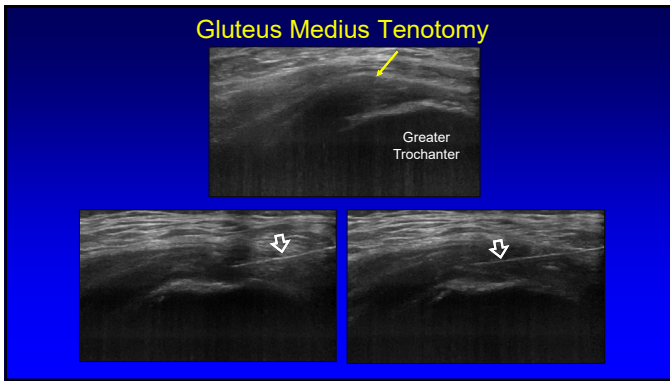
>2 mm cortical irregularity depth (x-ray) = 90% positive predictive value for gluteus tendon tear

Steinert et al. Radiology 2010; 257:754

29

Calcific Tendinosis: Gluteus Medius

30



31

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

32

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 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

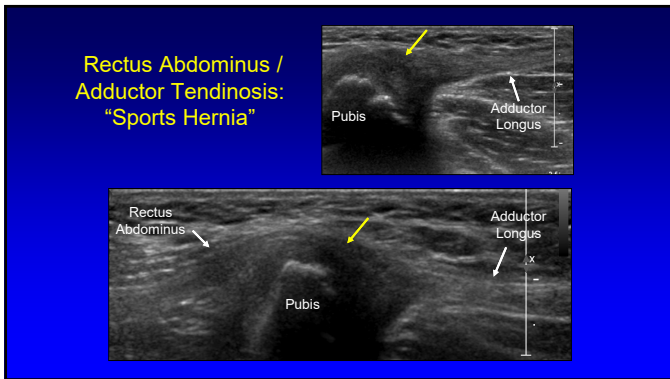
33

Rectus Abdominis + Adductor: "Sports Hernia"

Note: common aponeurosis

From: RadioGraphics 2008, 28:1415

34



35

Outline:

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

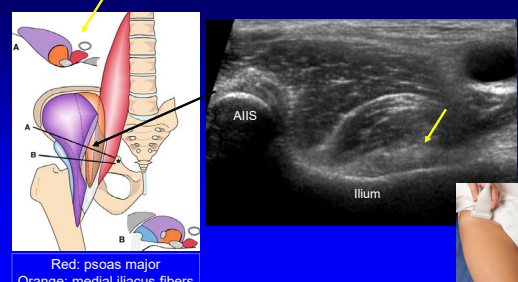
36

Snapping Hip Syndrome

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

37

Iliopsoas Complex

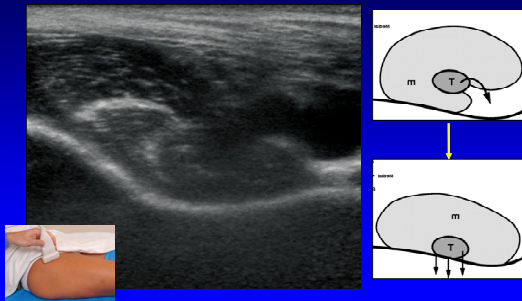


Red: psoas major
Orange: medial iliac fibers
Purple: lateral iliac fibers

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

38

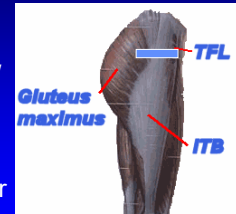
Snapping Hip Syndrome: iliopsoas



39

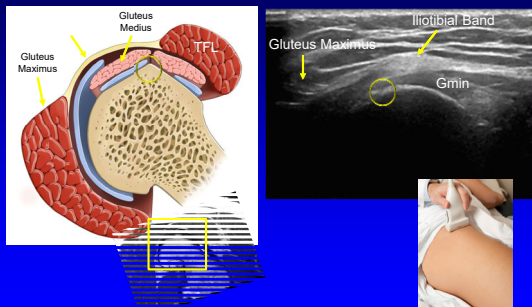
Snapping Hip: lateral

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



40

Snapping Gluteus Maximus / Iliotibial Band



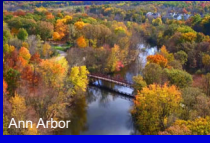
41

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

42

Thank you!



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

