

# Ultrasound of Common Hip Pathology

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1

## Disclosures

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

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Fundamentals of Musculoskeletal Ultrasound  
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2

## Outline:

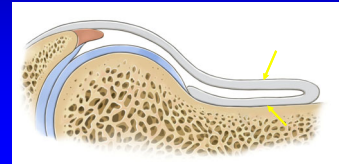
- Hip joint
- Bursae
- Tendon abnormalities
- Snapping hip syndrome

3

## Hip: anterior recess

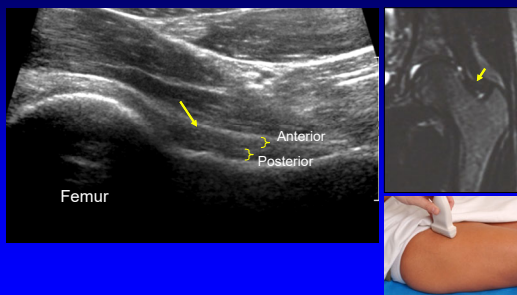
- Anterior and posterior layers
  - Fibrous tissue + minute layer of synovium
  - Hyperechoic
  - Each 2 - 4 mm thick

Radiology  
1999; 210:499



4

## Hip: anterior recess



5

## Hip Effusion:

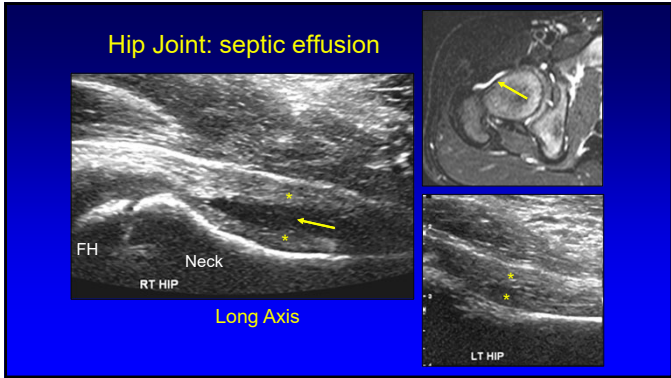
- Separation of anterior and posterior layers<sup>1</sup>
- Capsule distention at femoral neck > 7 mm or difference of 1 mm from opposite side<sup>2</sup>
- Extension & abduction improves visualization<sup>3</sup>
- Do not internally rotate hip: capsule thickens

<sup>1</sup>Radiology 1999; 210:449

<sup>2</sup>Scand J Rheumatology 1989; 18:113

<sup>3</sup>Acta Radiologica 1997; 38:867

6



7

### 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

8

### Hip Effusion:

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

Head  
Neck

\* AJR 1998; 206:731

9

### Pitfall: capsule thickening

- Internal rotation of hip:
  - Anterior hip capsule
  - Thicker, convex anterior

External Rotation  
Internal Rotation

10

### Pigmented Villonodular Synovitis

Head  
Erosion

11

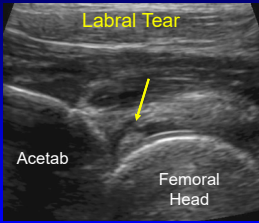
### Juvenile Idiopathic Arthritis

Head

12

### Hip Labrum

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

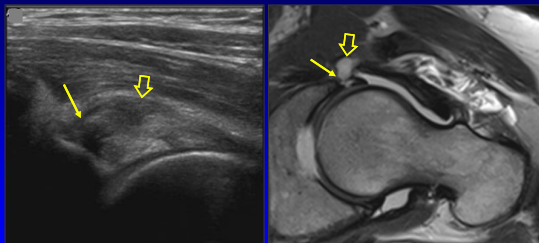


Sagittal-oblique

\*Acta Radiologica 2007; 9:1004

13

### Labral tear & paralabral cyst

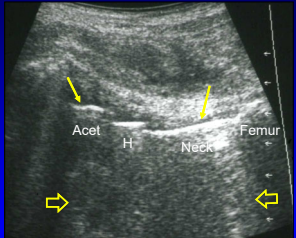


Courtesy of D. Fessell, Ann Arbor, MI

14

### Total Hip Arthroplasty:

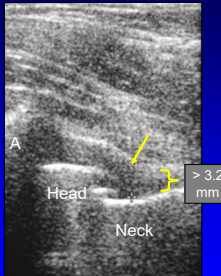
- Metal components demonstrate posterior reverberation
- Artifact occurs deep to prosthesis away from fluid collection (unlike MRI, CT)



15

### Hip Arthroplasty:

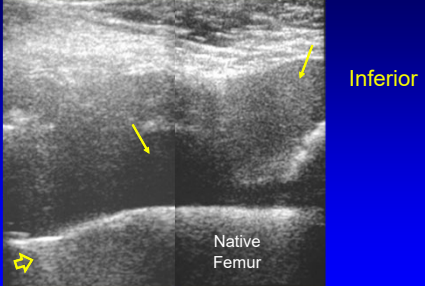
- Ultrasound cannot differentiate small effusion from post-op change<sup>1</sup>
- Suspect infection:
  - Pseudocapsule > 3.2 mm: suspect infection<sup>2</sup>
  - Extra-articular fluid collection
  - Not visualized with arthrography if non-communication



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

16

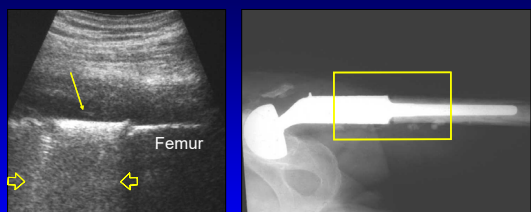
### Hip Arthroplasty: infection



Sagittal

17

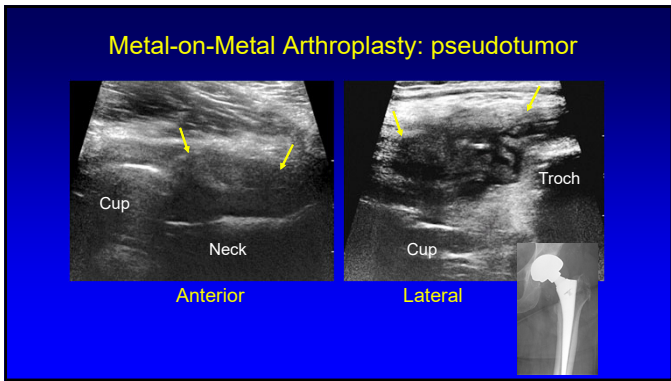
### Hip Arthroplasty: infection



Coronal Radiograph

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

18



19

### Outline:

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

20

### Trochanteric Pain Syndrome:

- Most commonly caused by gluteus minimus and medius tendon abnormalities<sup>1</sup>
- Trochanteric bursitis: uncommon
  - 20% of symptomatic patients<sup>2</sup>
  - Not actually inflamed<sup>3</sup>
  - Not associated with pain<sup>4</sup>

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

21

### Greater Trochanter

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

22

### Greater Trochanter

Yellow arrow = gluteus medius  
 White arrow = gluteus minimus

Axial MRI

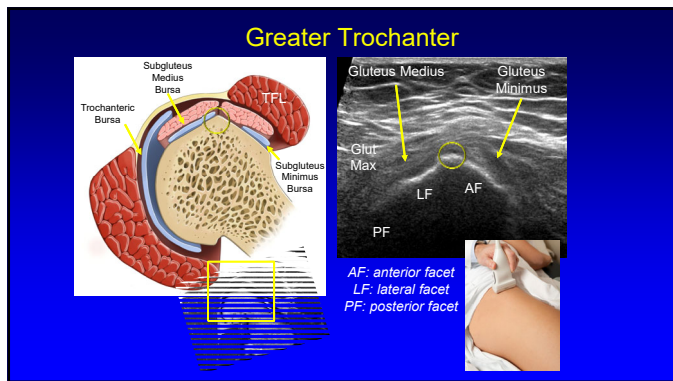
23

### Greater Trochanter

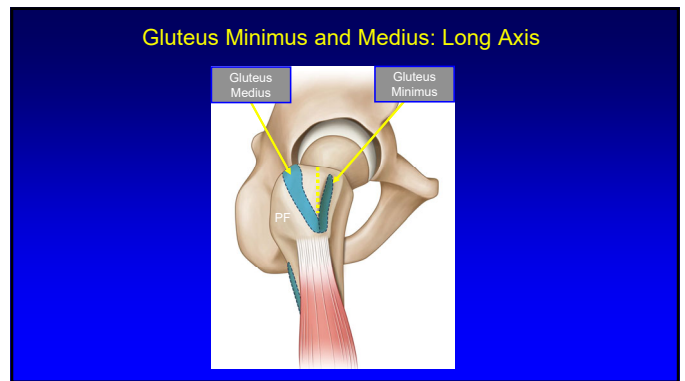
Anterior Posterior

Yellow arrow = gluteus medius  
 White arrow = gluteus minimus

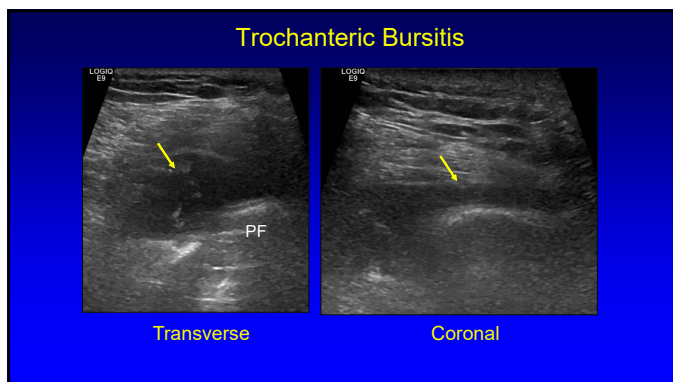
24



25



26



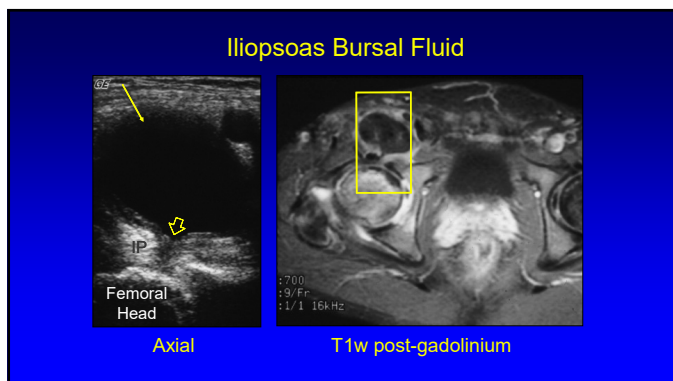
27

### 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

28



29

### Ischial or ischiogluteal Bursa

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

30

**Outline:**

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

31

**Acute Muscle and Tendon Injury**

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

32

**Tendon Injury**

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

33

**Tendinosis: Gluteus Minimus**

34

**Tendinosis: Gluteus Medius**

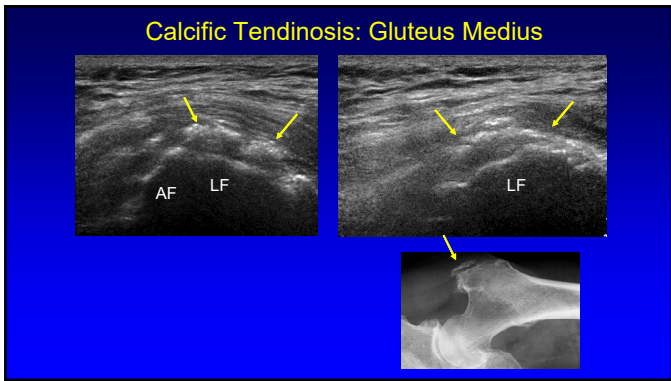
35

**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

36



37

### 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

38

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 Kremchek.

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

Kremchek 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

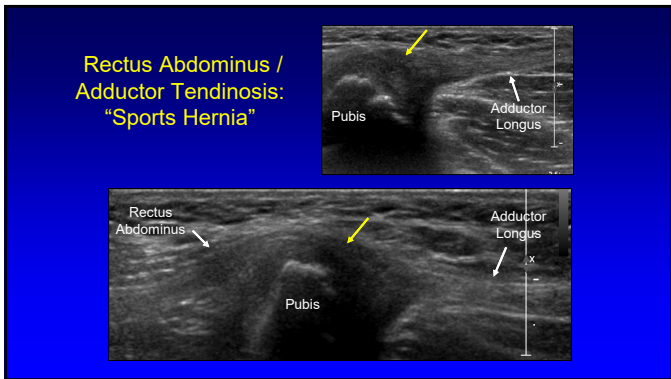
39

### Rectus Abdominis + Adductor: "Sports Hernia"

Note: common aponeurosis

From: RadioGraphics 2008; 28:1415

40



41

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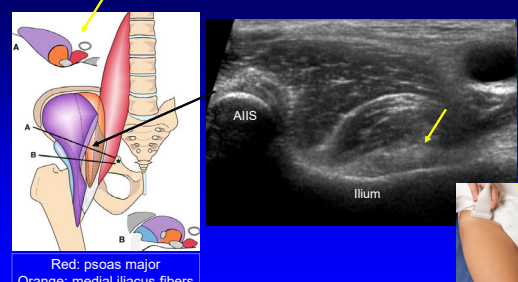
42

### Snapping Hip Syndrome

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

43

### Iliopsoas Complex



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

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

44

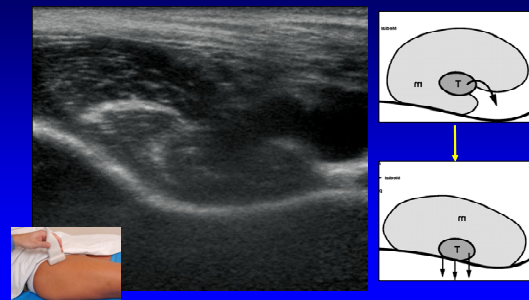
### Snapping Hip Syndrome: iliopsoas

- 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

45

### Snapping Hip Syndrome: iliopsoas



46

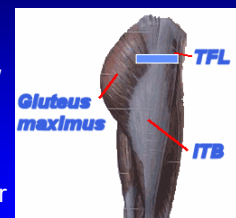
### Snapping Hip: iliotibial tract

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

47

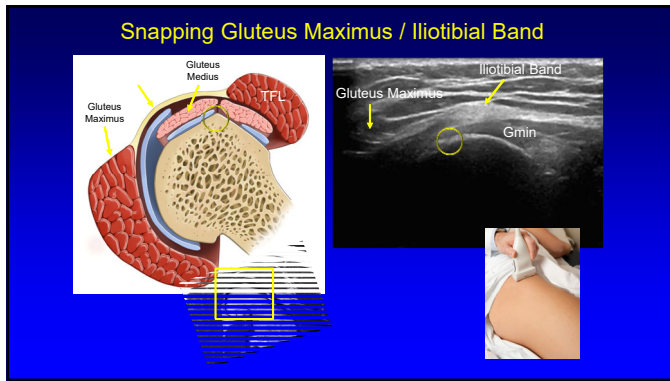
### Snapping Hip: lateral

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



48





49

- ### 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

50

Thank you!

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[www.jacobsonmskus.com](http://www.jacobsonmskus.com)

Twitter handle: @jjacobsn

51