



Pediatric Hip Ultrasound

Sarah DiPalma, PGY-4



Indications:

- Child presenting with limp or hip pain
- Refusal to bear weight or leg pain
- Useful in suspected sepsis of the joint
- Evaluation of synovitis



Differential Diagnosis

- Transient (toxic) synovitis
 - Most common cause of painful hip and joint effusion in a child
 - Ages 5-10yo, presenting with hip or knee pain and a limp
 - May be a/w fever and mild leukocytosis
 - Symptoms resolved in 24-48 hours



Differential Diagnosis

- Septic Arthritis
 - Hematogenous infection
 - GBS in neonates, *S. aureus* in infants and older children
 - Child presents with fever, irritability, and lack of movement of the leg
 - Hip is held in flexion, adduction, and external rotation
 - Treatment is arthrotomy and IV antibiotics



Focused Question

- To identify the presence or absence of an effusion



Significance of an Effusion

- Indication for aspiration is still largely based on clinical history, laboratory values, and pain severity
- Absence of an effusion rules out septic arthritis



Benefits of Ultrasound

- Noninvasive
- More sensitive than plain radiographs in the diagnosis of a joint effusion
- Superior spatial resolution
- Mechanical complaints can be assessed in real time
- Sonopalpation
- Lack of artifact a/w orthopedic hardware



Limitations to Hip Ultrasound

- Many hip structures lie deep below soft tissues
- Evaluation of intra-articular structures is an inherent limitation of ultrasound technology



Scanning technique

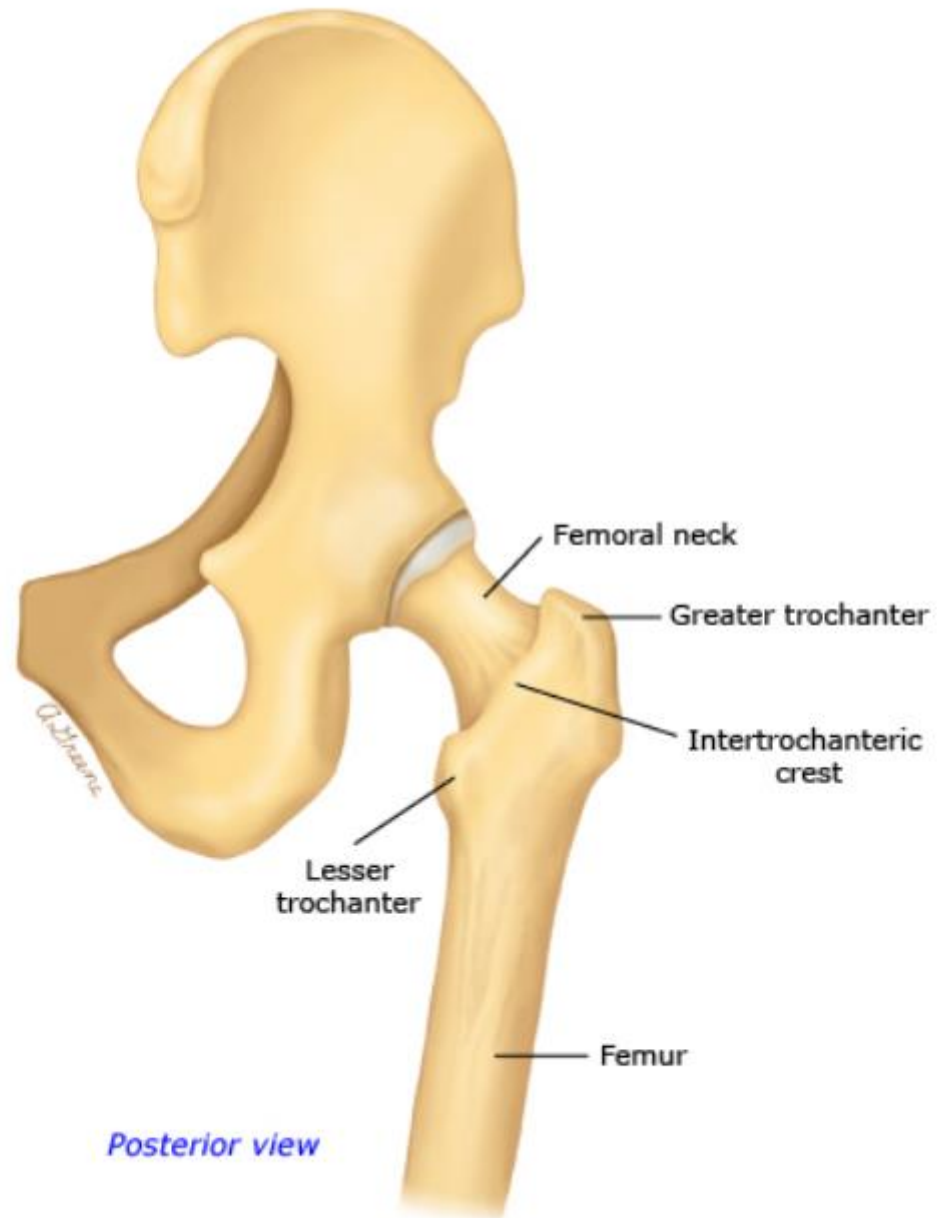
- Patient Position: Supine
 - Expose the hip with drapes for patient comfort
- Place the hip in the extended and abducted position
- Probe: High frequency linear probe



Scanning technique 2

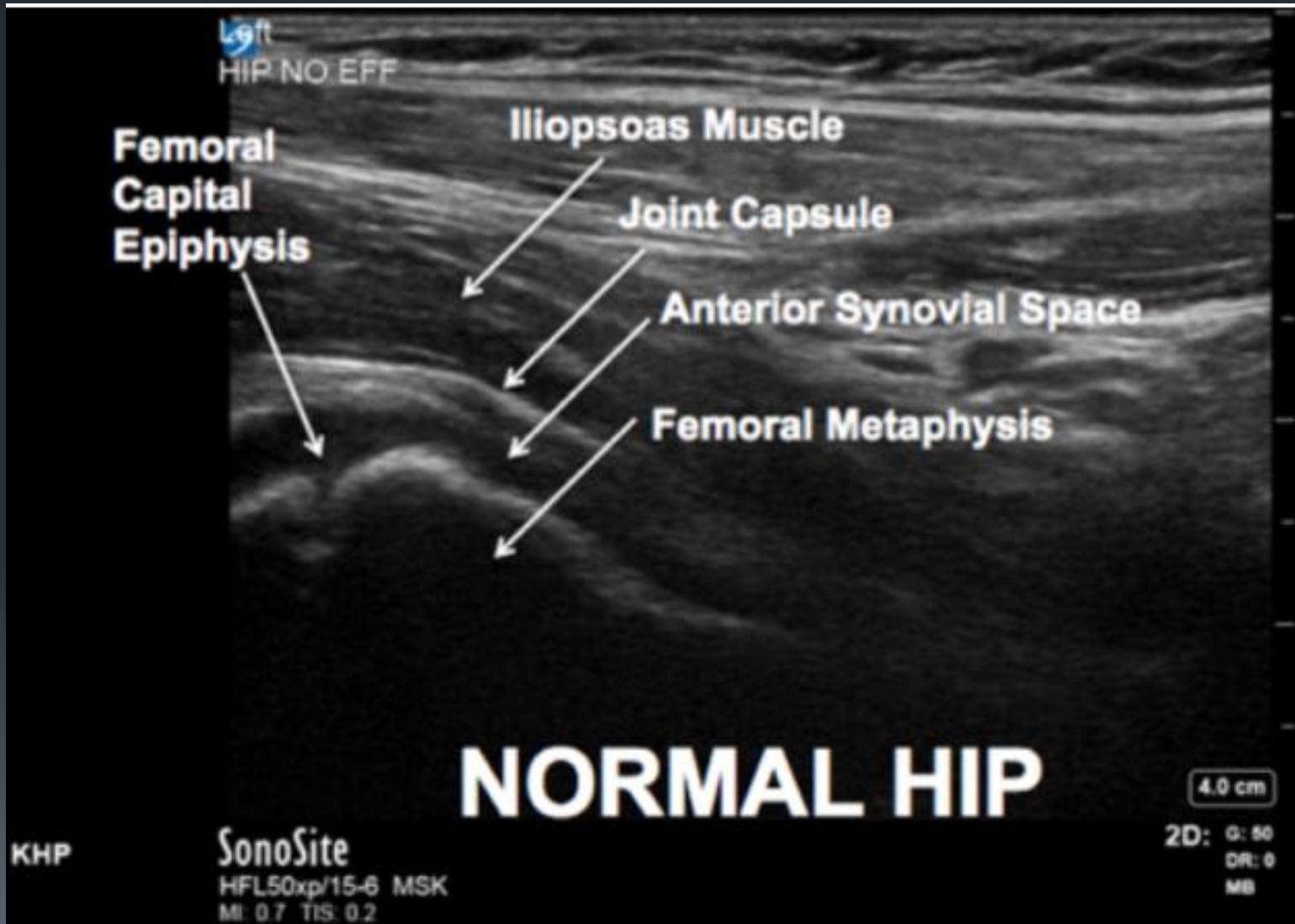
- Technique:
 - Identify the greater trochanter on the symptomatic hip of the patient
 - Place the probe in the sagittal oblique plane parallel to the long axis of the femoral neck (with the indicator toward the patient's head)
 - Move the probe superior until you identify the femoral head

Skeletal anatomy of the hip

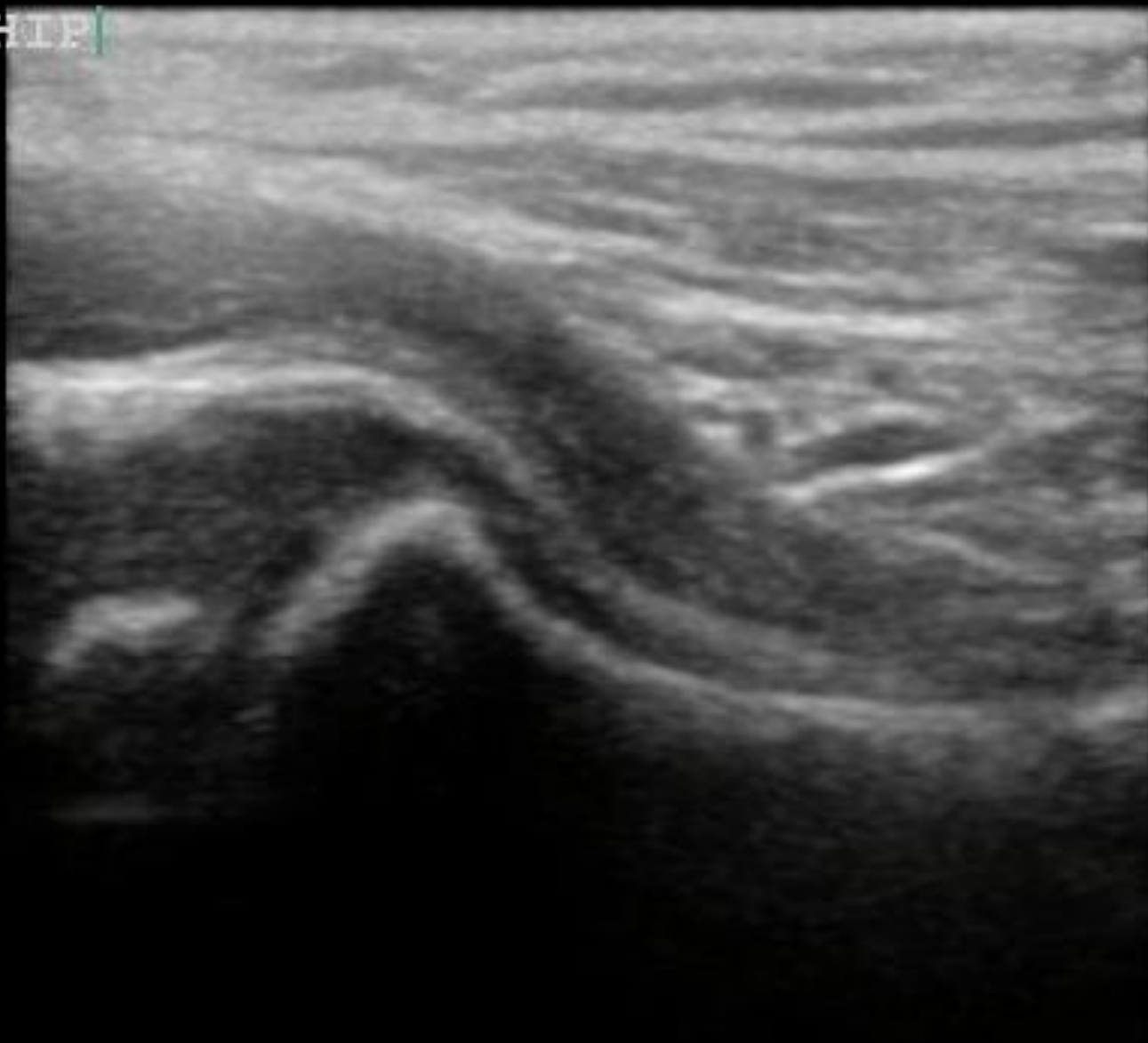


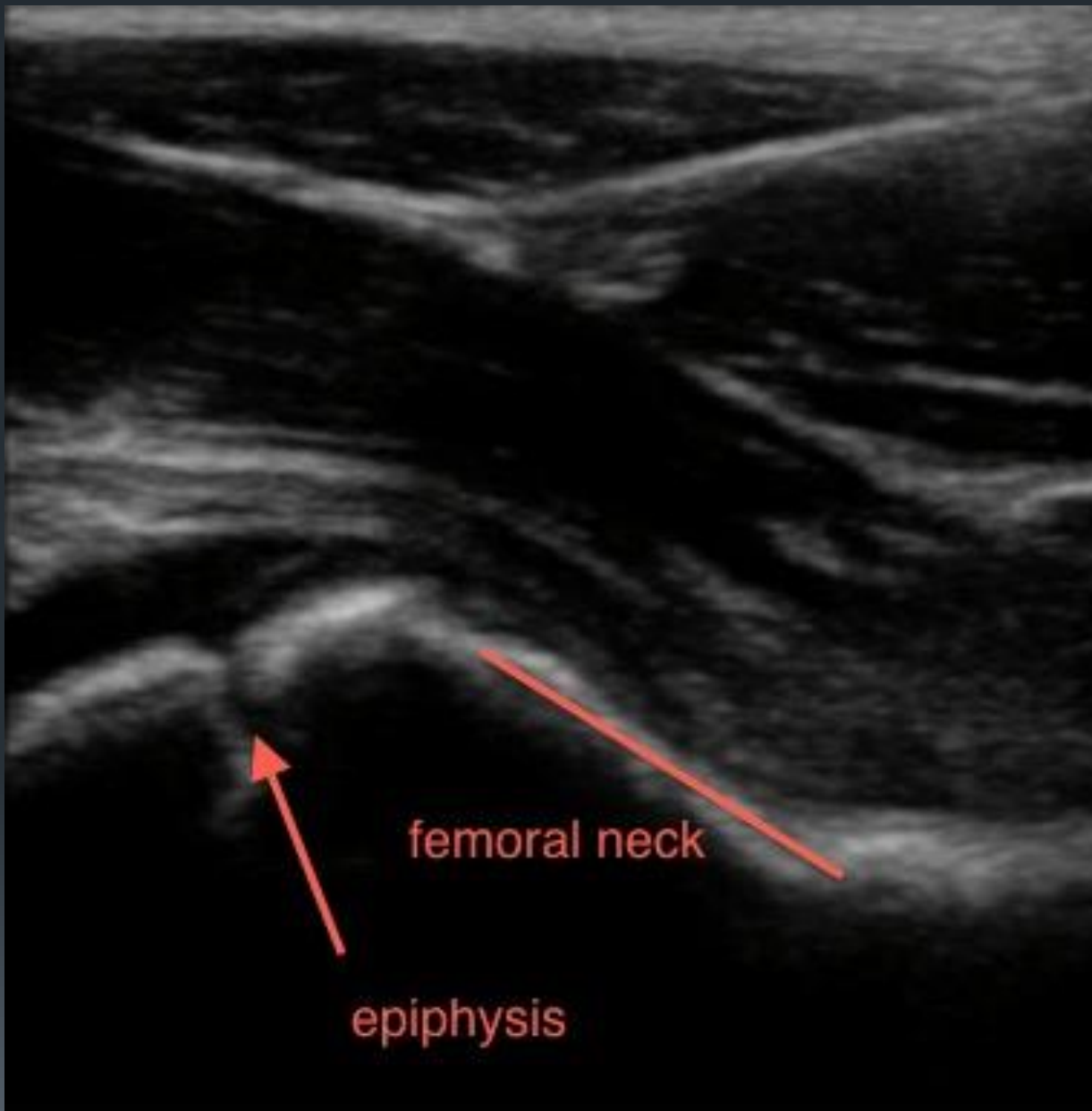


Normal Hip Anatomy



L ● HIP








Measuring a Hip Effusion

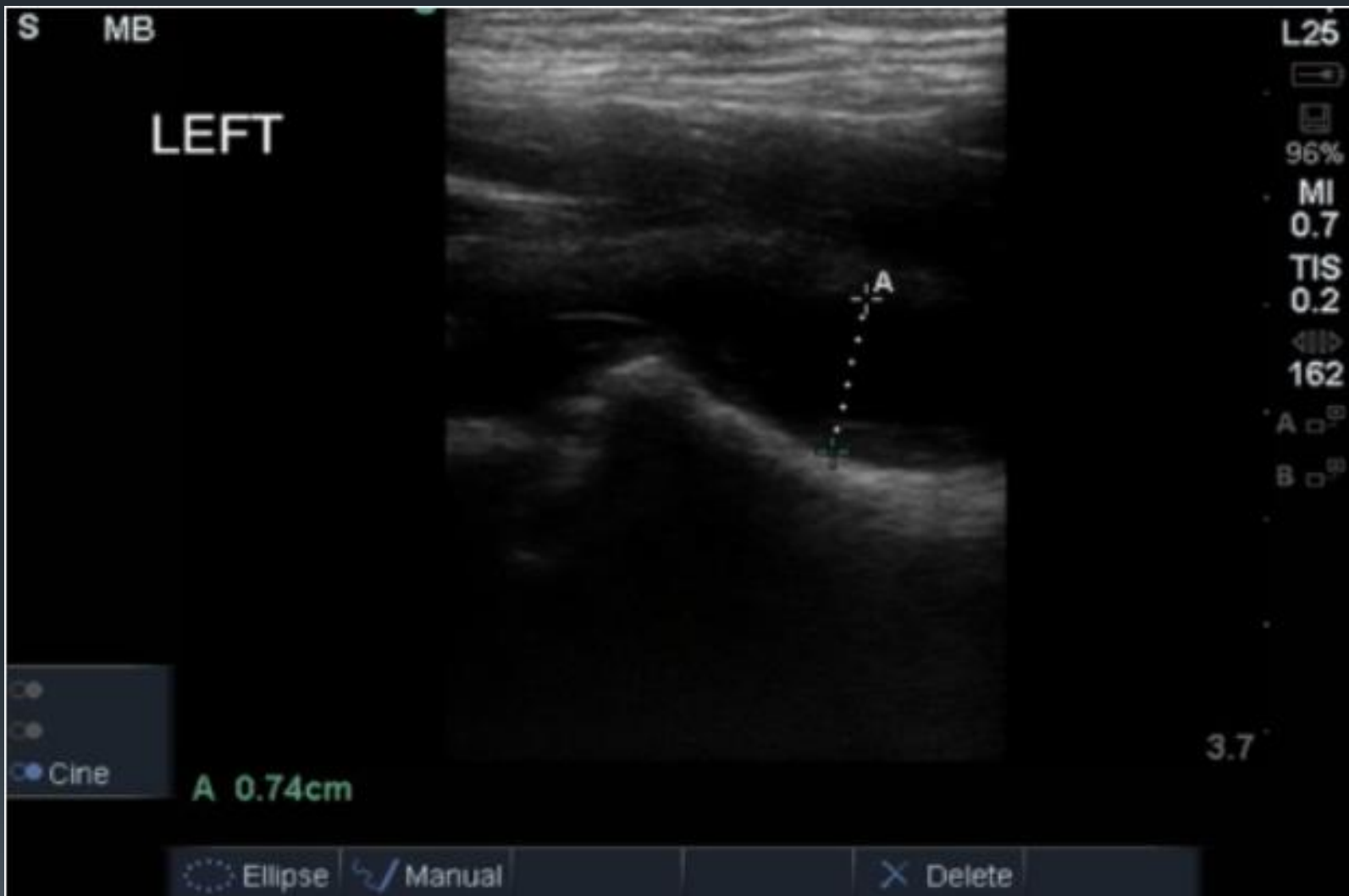
- Measure the maximal distance between the anterior surface of the femoral neck and the posterior surface of the iliopsoas muscle





Sonographic criteria for a pediatric hip effusion:

1. Anterior Synovial Fluid collection $> 5\text{mm}$ **OR**
2. $>2\text{mm}$ difference when compared to the asymptomatic contralateral hip





Comparison to Gold Standard

- Emergency physician practitioners have comparable accuracy when looking for effusions using radiology performed studies as the gold standard



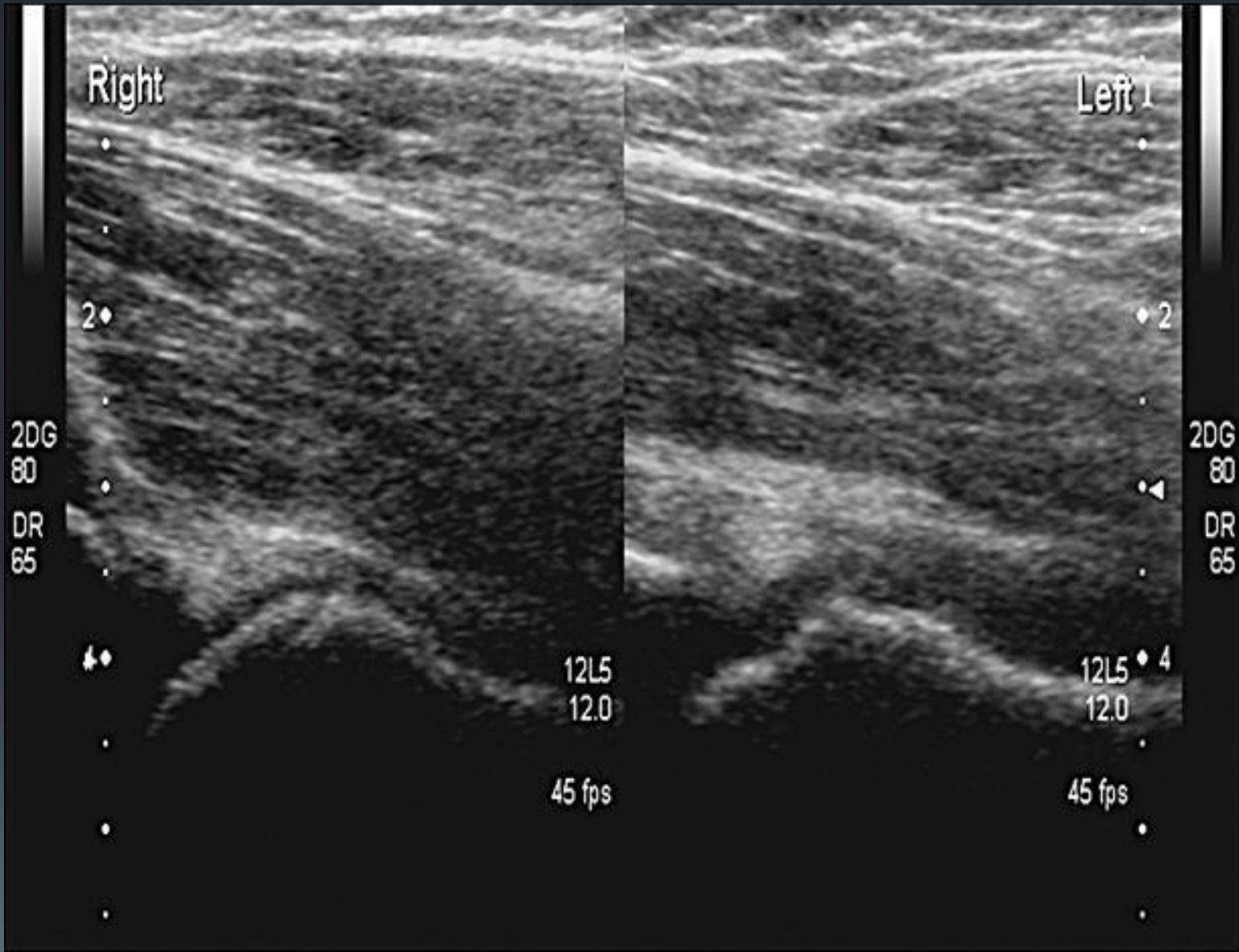
Doppler

- Increased color signal in the capsule and soft tissues is seen in about 25% of patients with septic arthritis
- Color signal is absent in toxic synovitis

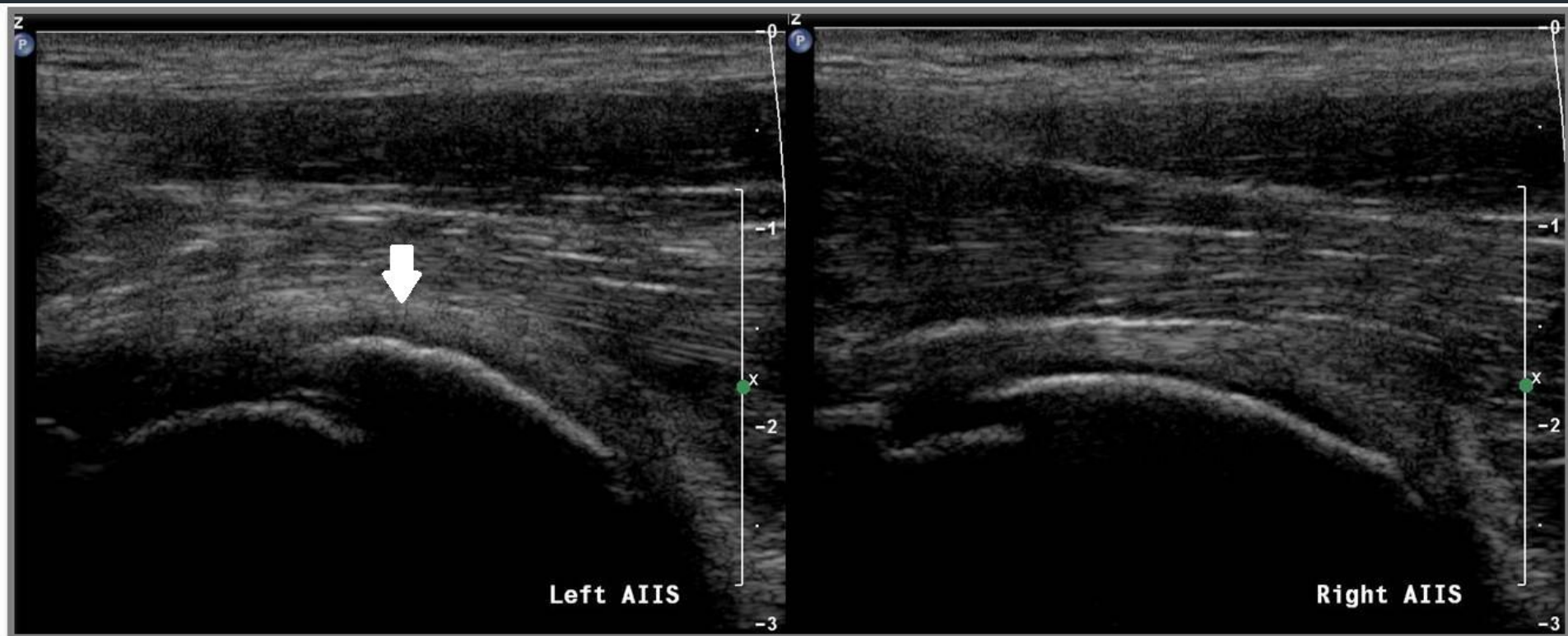


Other Causes of Limp as seen on Ultrasound

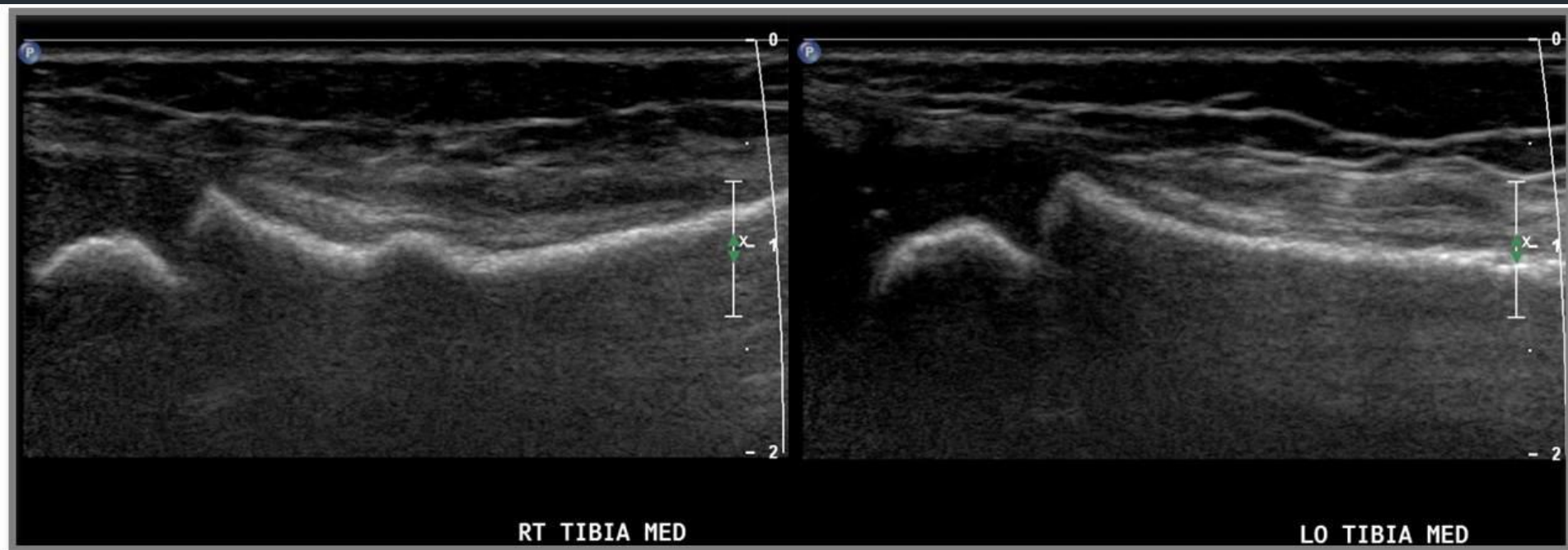
SCFE of left hip. Almost fused physis on the normal right side and the stepped appearance of physis on left.



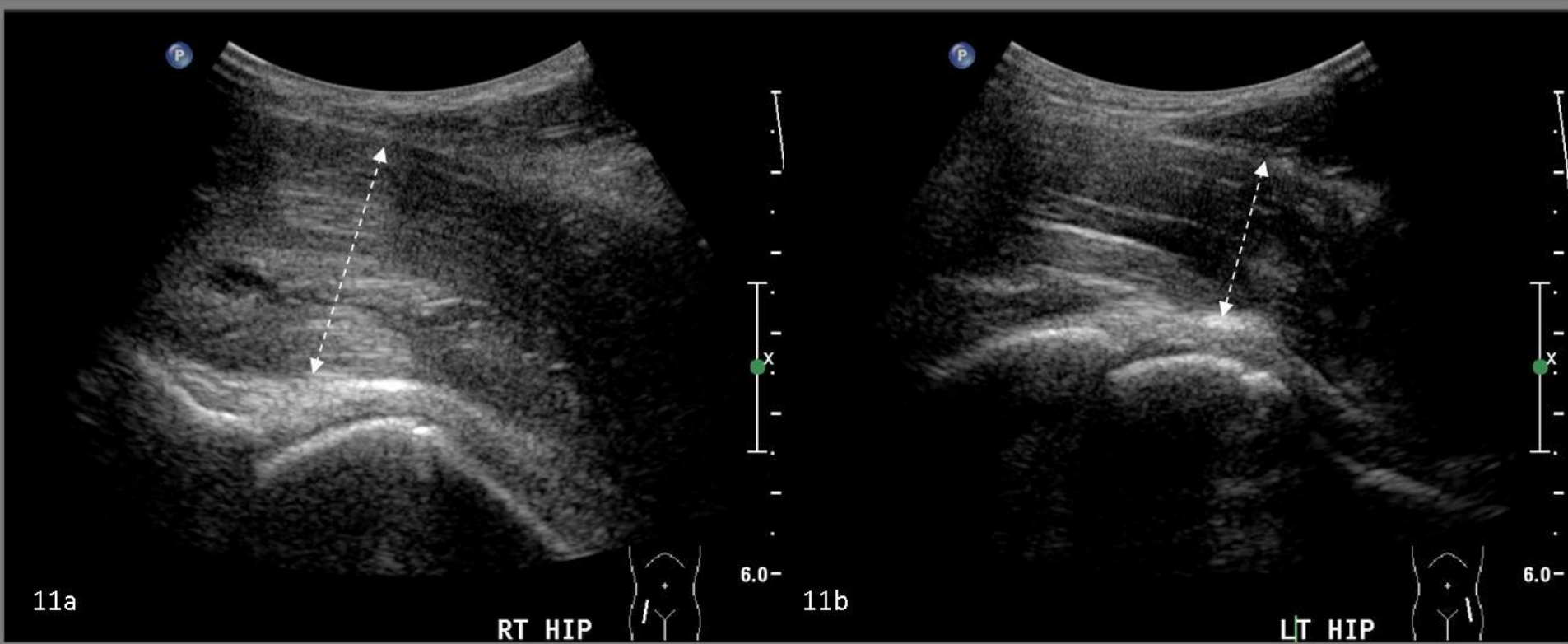
14 year old boy with left hip pain. Hip ultrasound demonstrated rectus femoris avulsion of anterior inferior iliac spine (arrow).



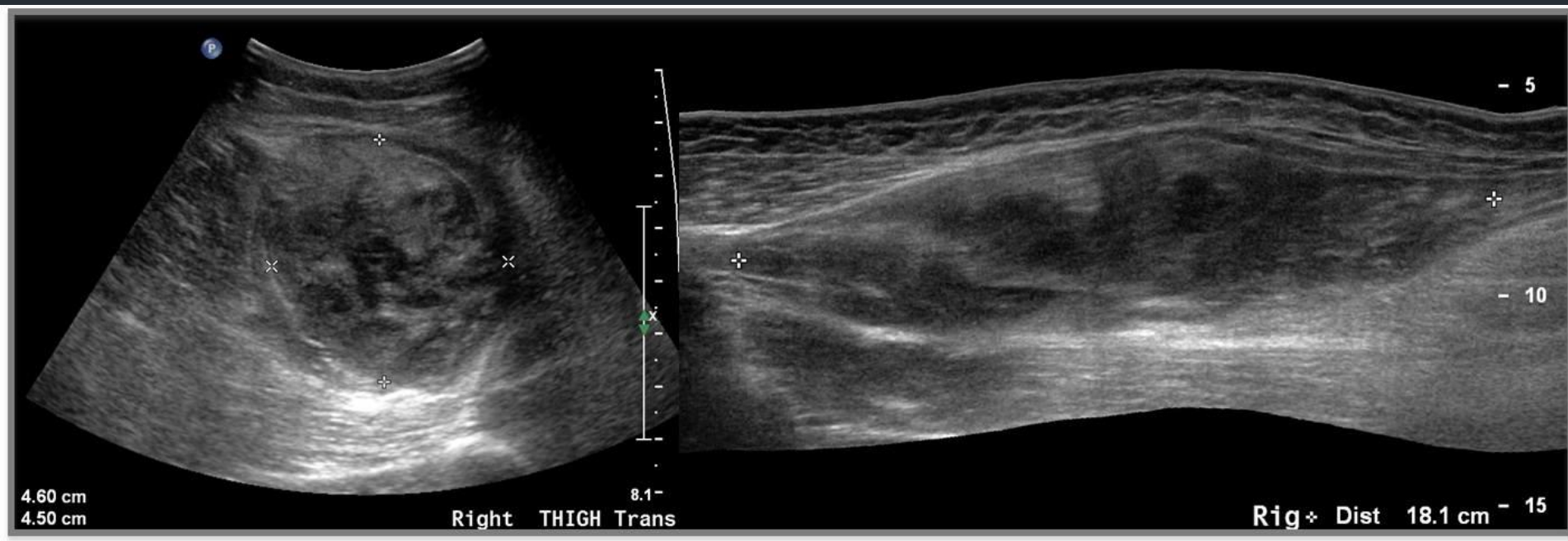
3 year old girl right with "irritable right hip". Normal hip ultrasound.



14 year old male with known hemophilia and right hip pain. Thickened and echogenic right iliopsoas muscle crossing anterior to the hip joint. Normal left iliopsoas for comparison.



10 year old boy. Large intramuscular lesion within the quadriceps group - differentials included a large abscess and soft tissue neoplasm.





Pearls from Dr. Emborsky

- Always compare sides.
- Bilateral effusions are possible, especially in patients with transient synovitis
- Ensure the probe is positioned perpendicular to the skin to avoid anisotropy
- Missing slipped capital femoral epiphysis is a theoretical pitfall when performing hip ultrasound on the older child with a painful hip or limp



References:

- <https://www.acep.org/how-we-serve/sections/emergency-ultrasound/news/april-2018/tips--tricks-ultrasound-in-the-diagnosis-of-a-pediatric-hip-effusion/>
- Manual of Emergency and Critical Care U/S