



BULGARIAN SOCIETY OF RHEUMATOLOGY

MUSCULOSKELETAL ULTRASOUND COURSE FOR RHEUMATOLOGIST -
BASIC LEVEL

Standardized scanning of the hip: normal and basic pathologic findings

Division of Rheumatology, Rehabilitation Clinical Hospital Cluj – Napoca

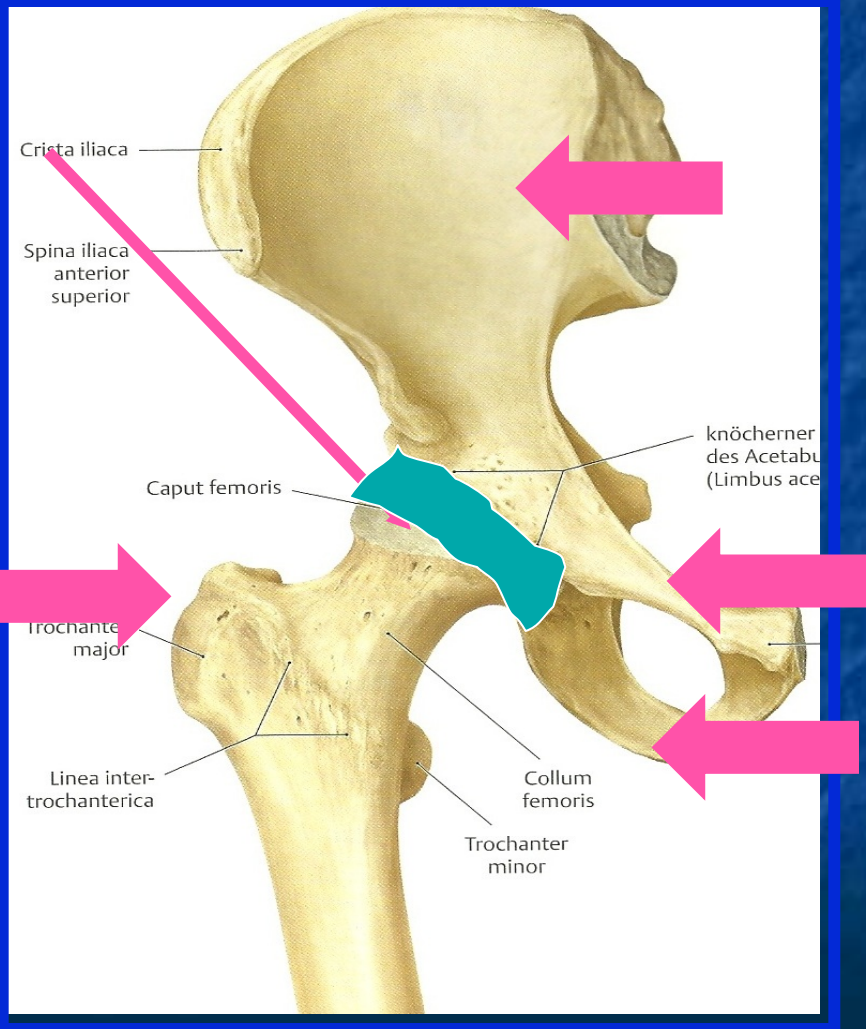
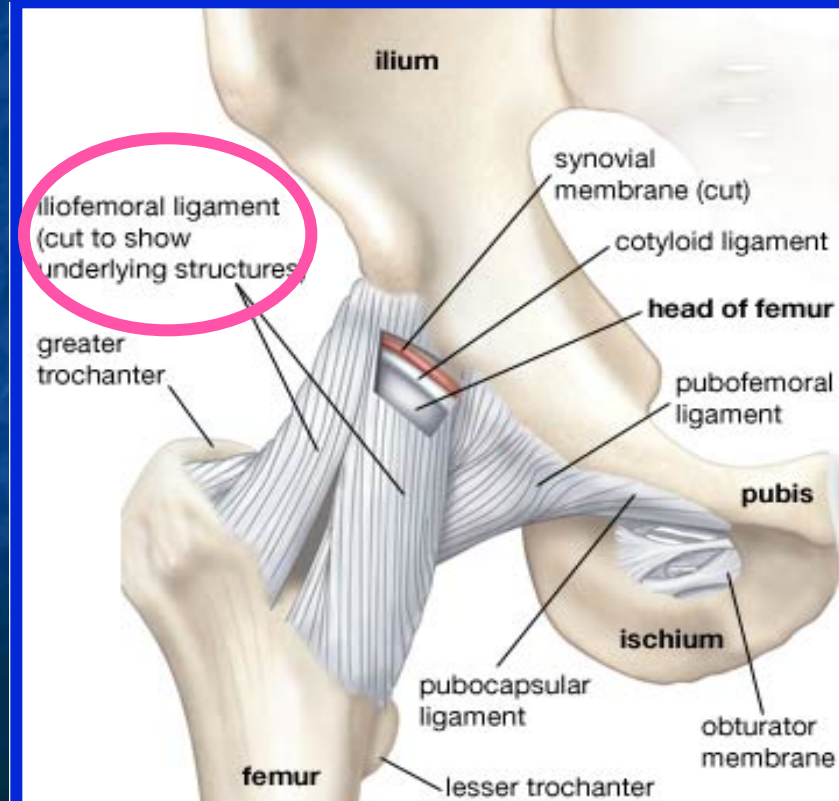
Dr. Mihaela Micu

Plovdiv, 14-16 January 2016

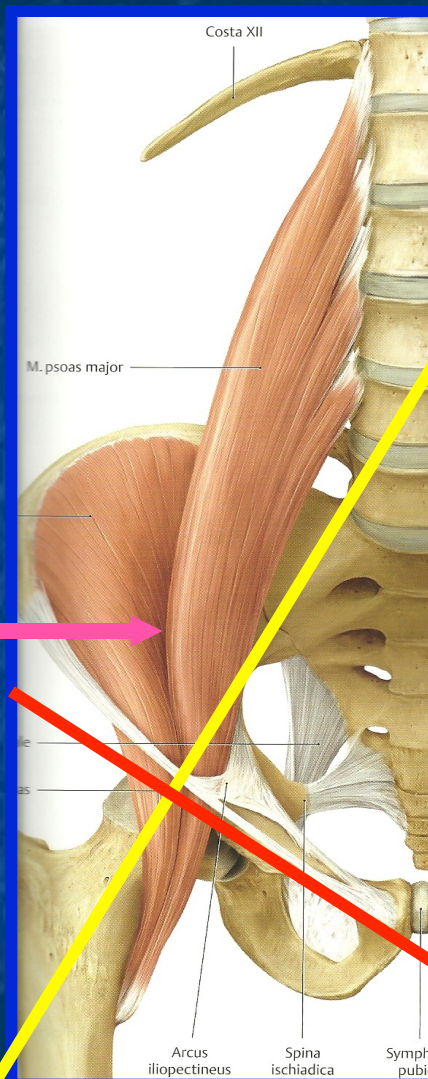
Checklist

- ✓ **Clinical anatomy**
 - ✓ **Clinical indications**
 - ✓ **Imaging technique and Sonoanatomy**
 - ✓ **Sono - pathology**
 - ✓ **Literature - evidence**
-
- ✓ **Key messages**

Clinical anatomy - review

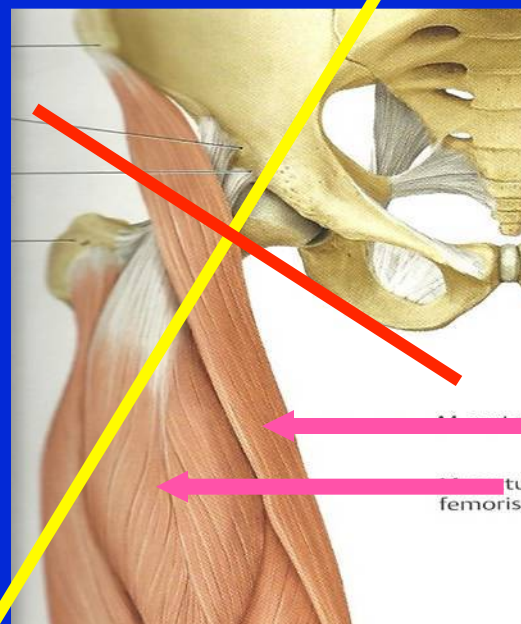


profound layer

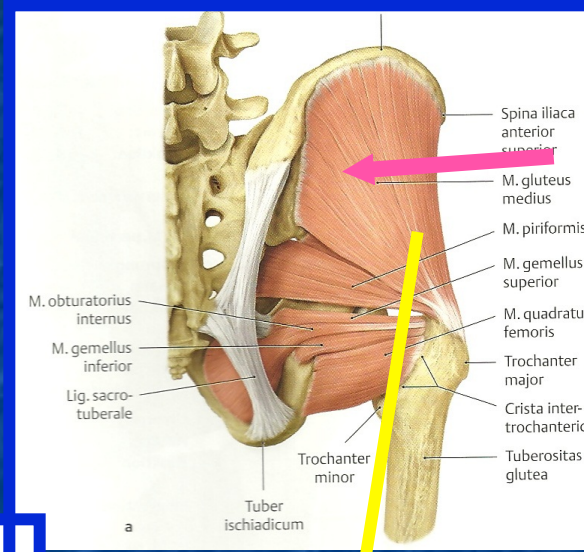
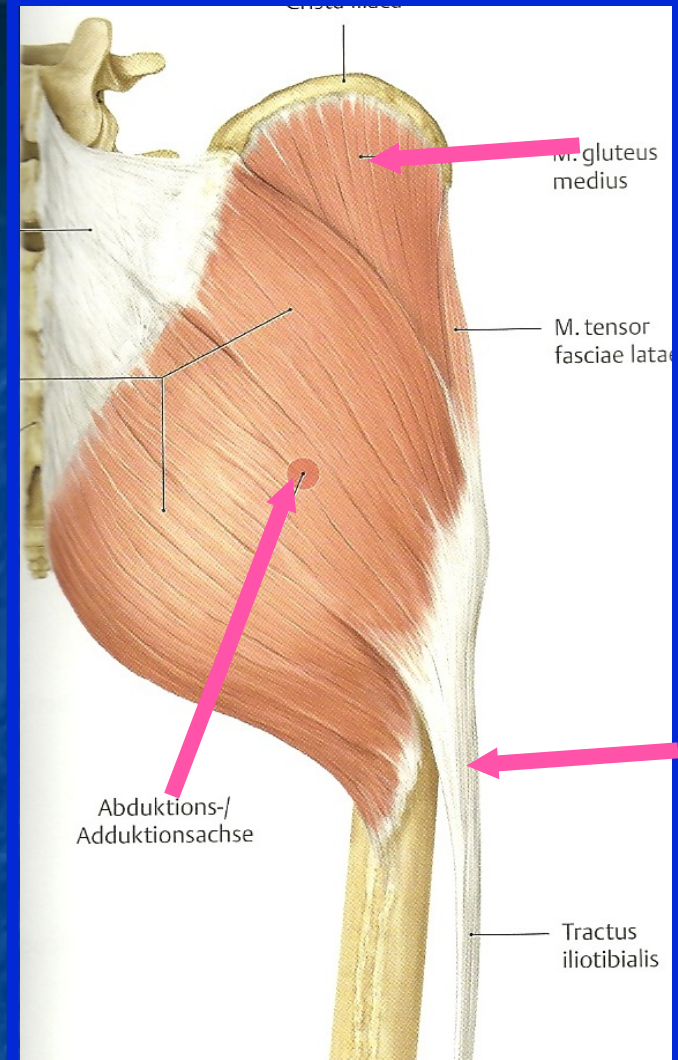
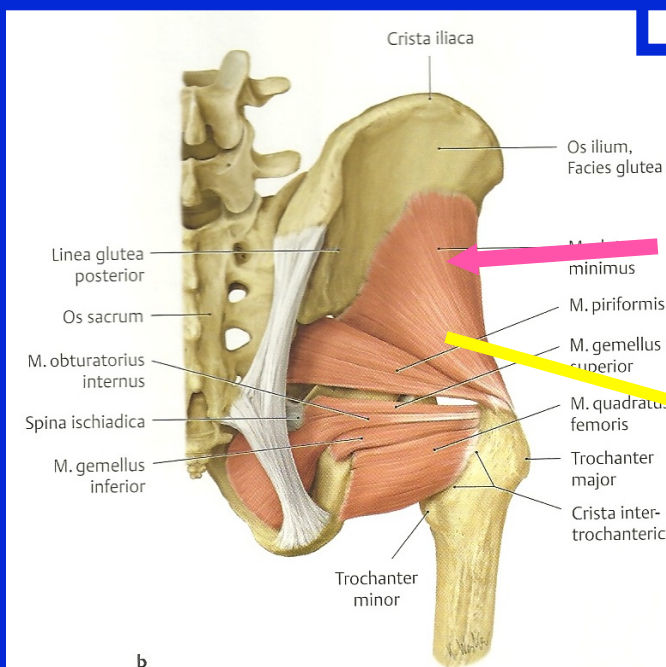


Anatomy review

superficial layer



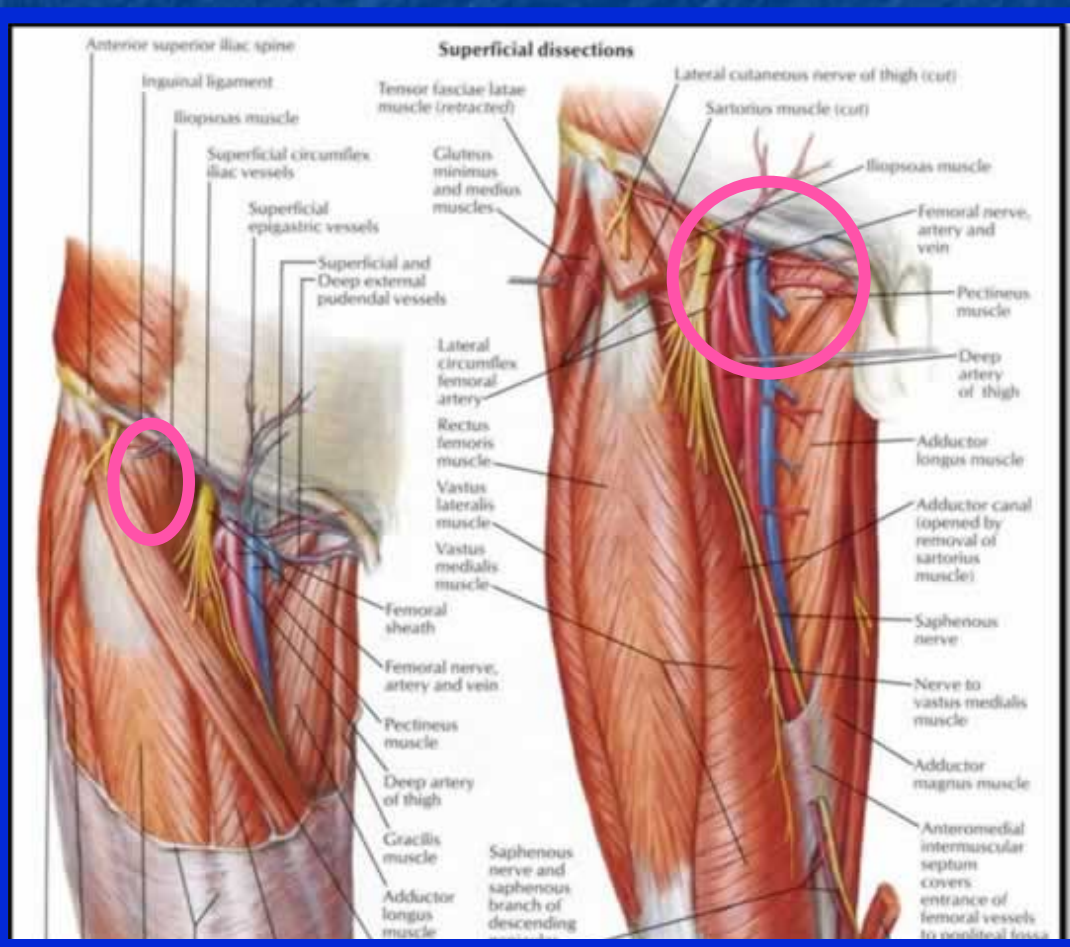
Anatomy review



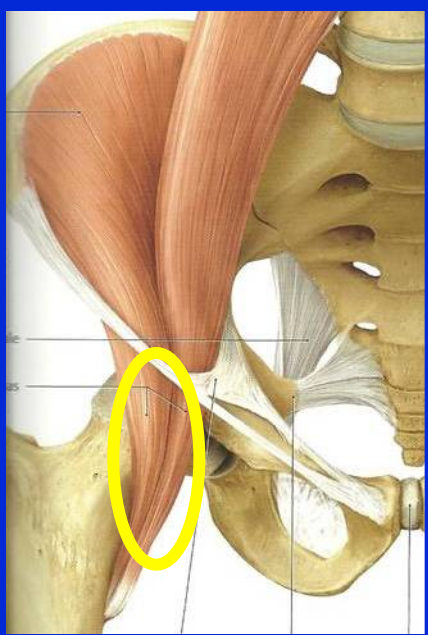
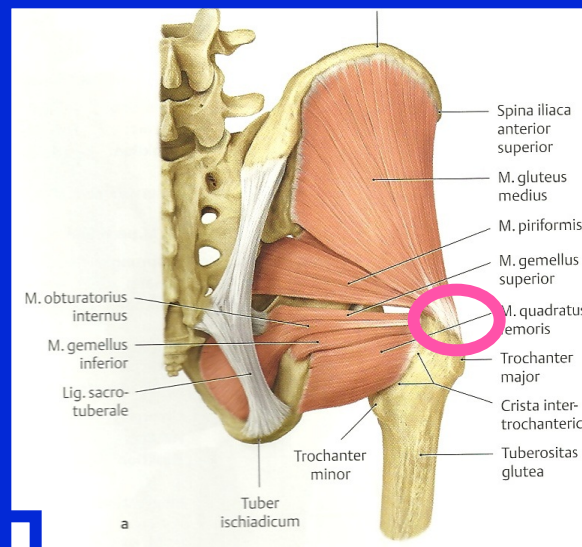
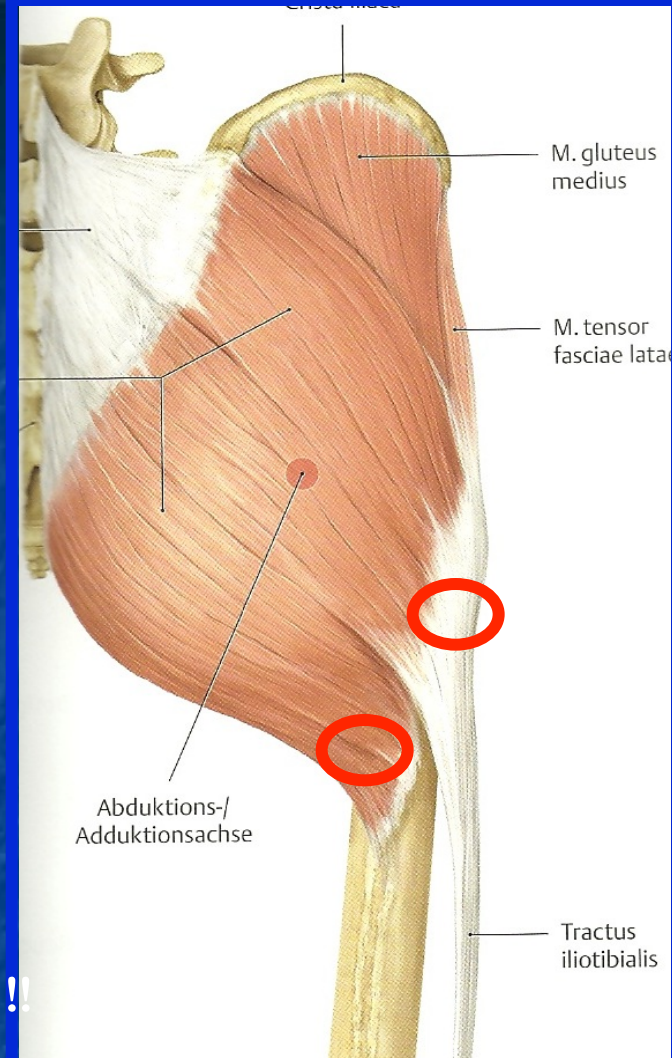
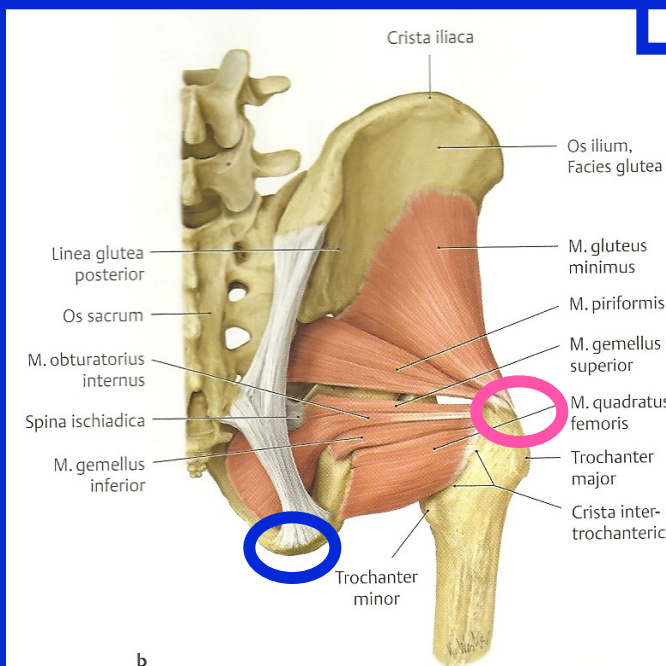
great trochanter insertion

Anatomy - review

Femoral N, A, V



Bursae



Bursae

most important !!

-peritrochanteric

gluteus minimus
gluteus medius
gluteus maximus
subgluteus maximus

- iliopsoas

- ischiogluteal

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Clinical indications

Patient complaints:

- pain**
- reduced ROM**
- walking disturbance**

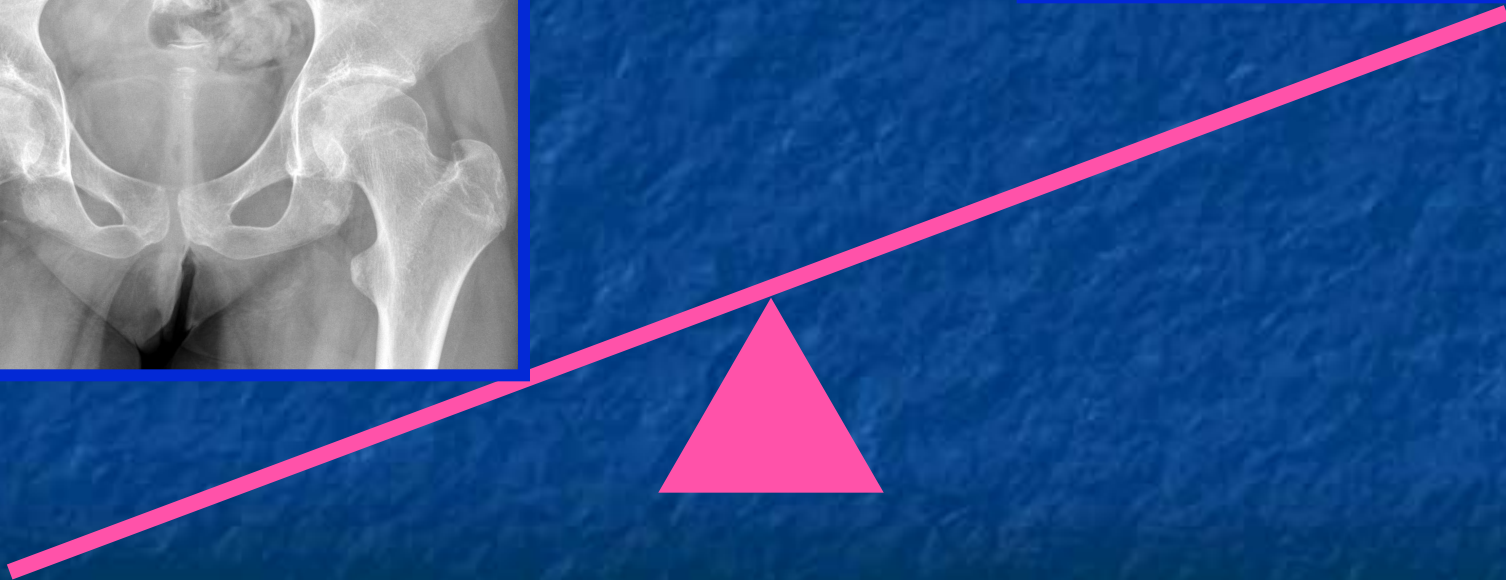
Clinical indications

Clinical evaluation

= difficult (deep joint)

- reduced ROM**
- pressure on trochanteric region → pain**

Imaging



Motivation

- **Reducing delays in diagnostic and treatment**
- **Increase nr of sick leaves, productivity loss**
- 6.3% patients developed psoriatic hip arthropathy (41%- 1 year), 5 years arthroplasty
- 33% patients with AS- hip involvement – inflammatory, structural lesions
- Hip involvement ~ more progressive AS at spine level
- Higher prevalence of subclinical enthesopathy at the greater trochanter level in patients with SpA

Motivation

RA- 42% detection of hip abnormalities, 24% hip joint inflammation, 32% hip joint damage; 3rd most common cause for lower limb joint replacement

OA- JE 50%, SH 41.3 %

Aspiration- septic arthritis, gout, CPPD

Provisional classification criteria for PMR

Higher efficacy of local treatment with CS, viscosupplementation drugs

!!! Necessity for a reliable, valid , reproducible tool for hip evaluation

Ultrasound

- **Evaluation: complementary to radiology**
- **Easy, quick, nonradiant**
- **Interventional : guidance of needle**
 - aspiration
 - biopsy
 - injection
- **Dynamic assessment- follow up:**
 - disease
 - response to therapy

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Standard scans of the hip

□ Anterior

- longitudinal
- transversal

□ Lateral

- longitudinal
- transversal

□ Posterior oblique

- optional

!! multiplanar and dynamic
!! grey scale and Doppler

Probe

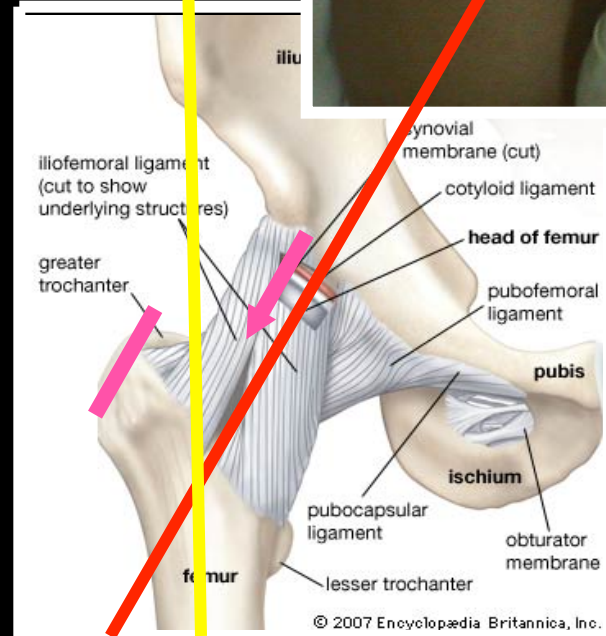
- frequency: 3 – 7,5 MHz
- linear/ convex



2.5- 5 MHz

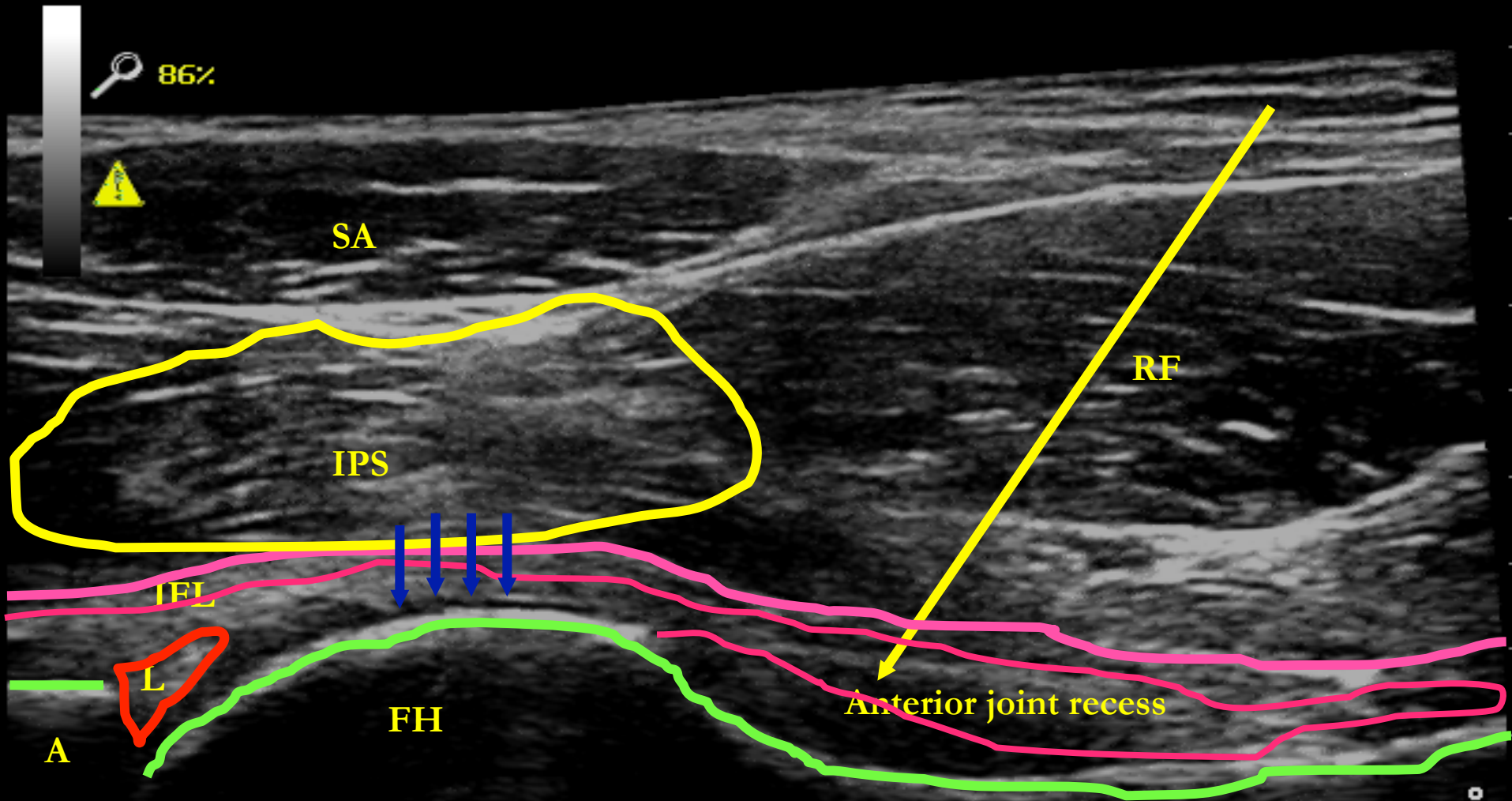
anterior longitudinal

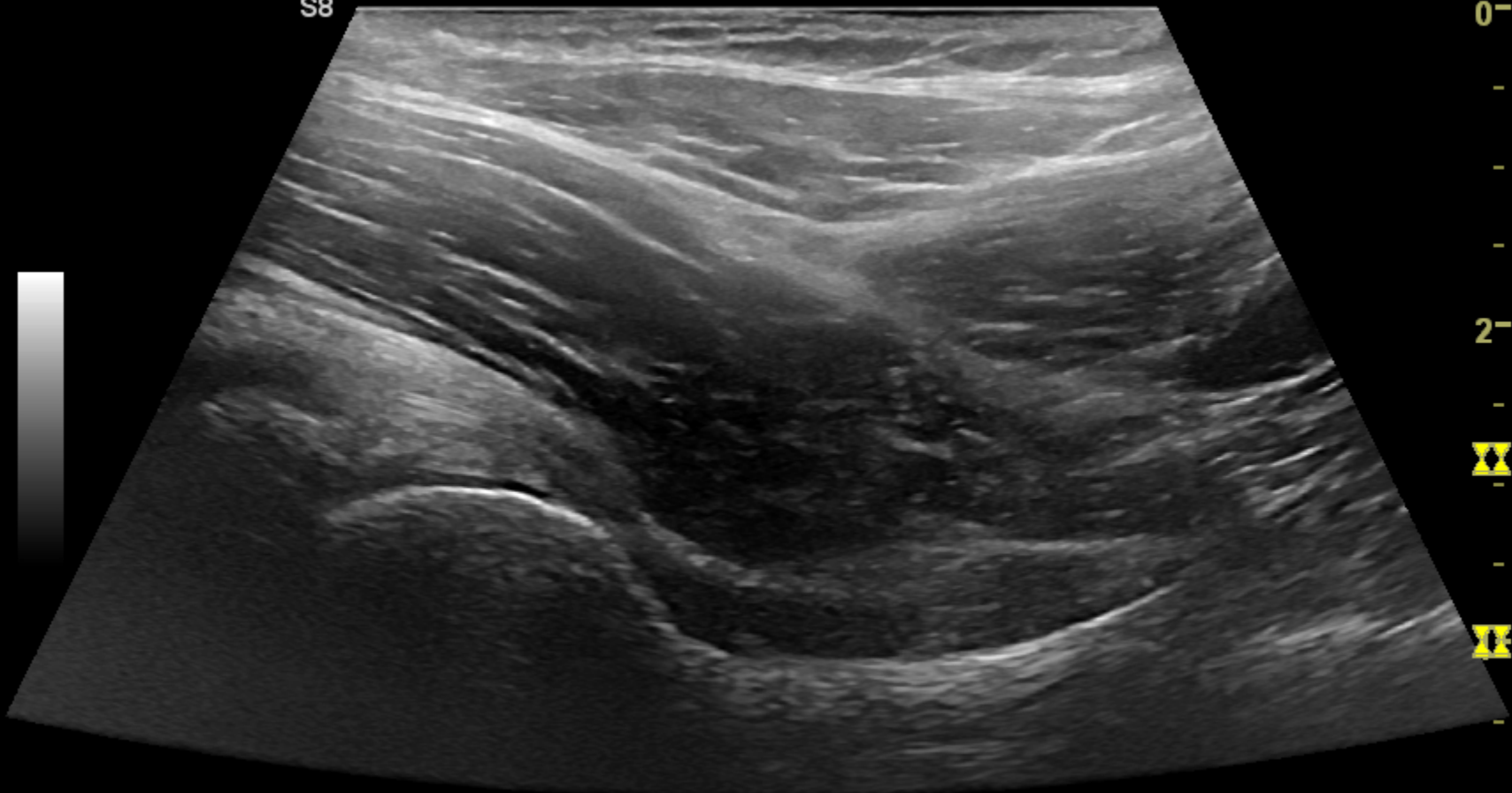
- iliac bone to intertrochanterian line
- from lateral to medial



Standard scans of the hip

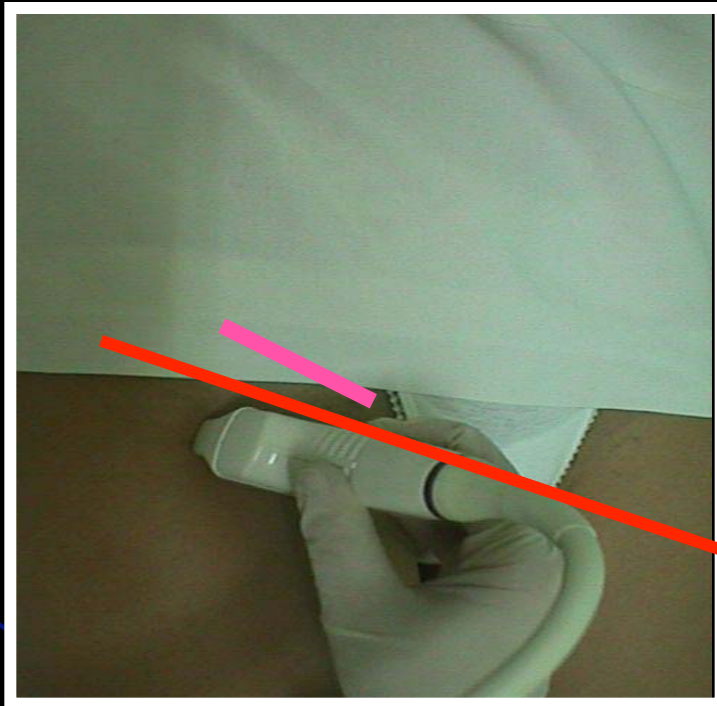
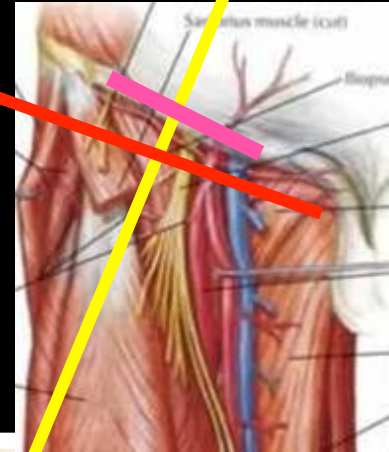
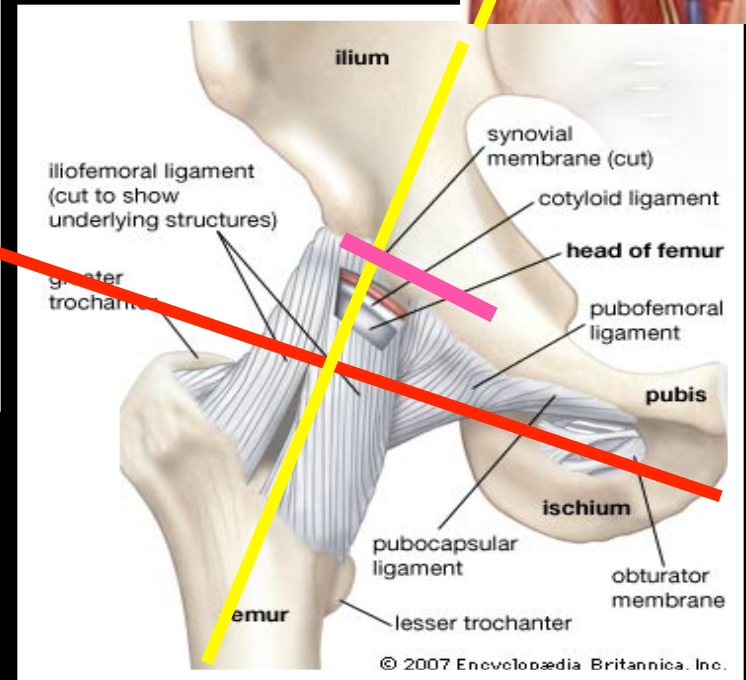
anterior longitudinal – panoramic view





Standard scans of the hip

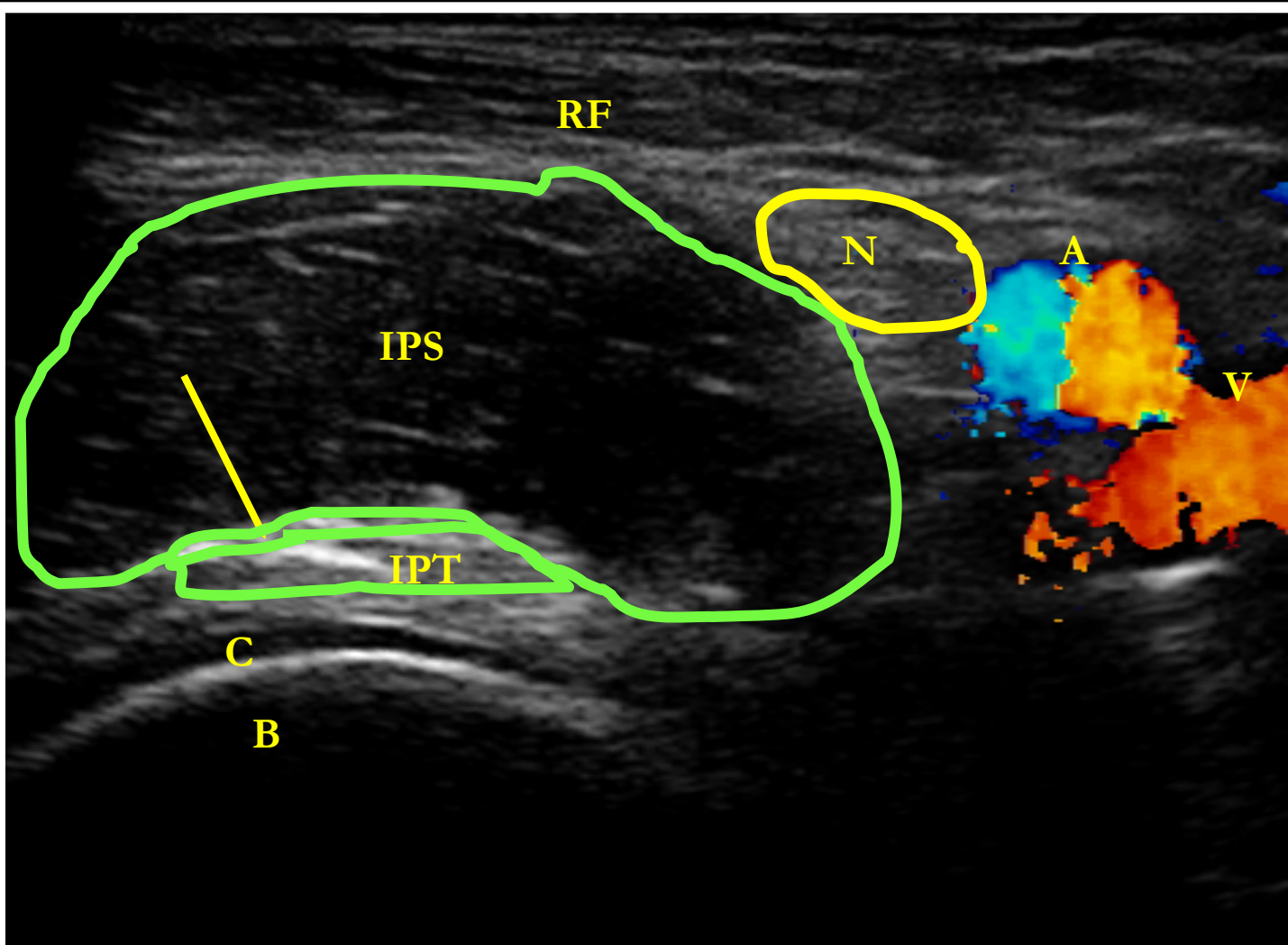
anterior transversal



Supine position
Leg- external rotation(10- 20 degrees)
Probe- perpendicular to the femoral neck
Scanning: iliac bone to femoral neck

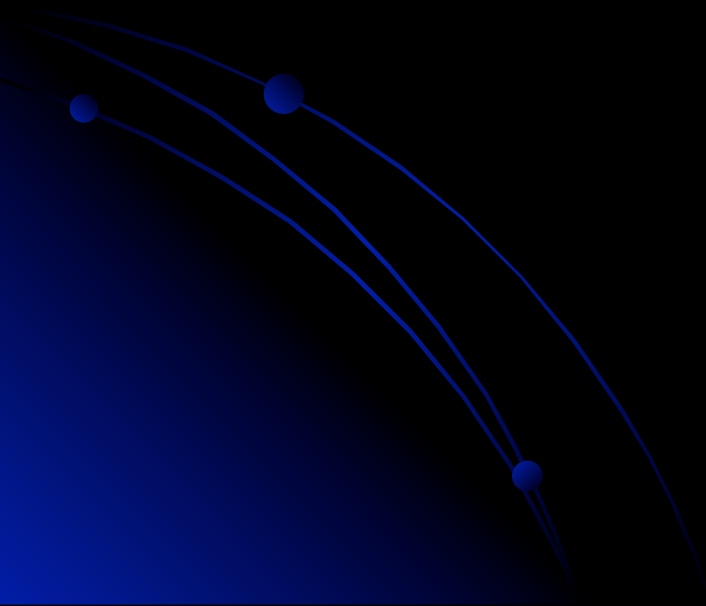
Standard scans of the hip

anterior transversal



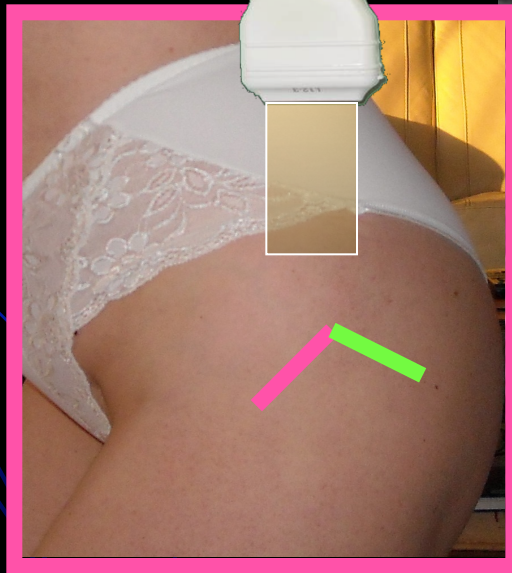
Lateral scan of the hip

Trochanteric region



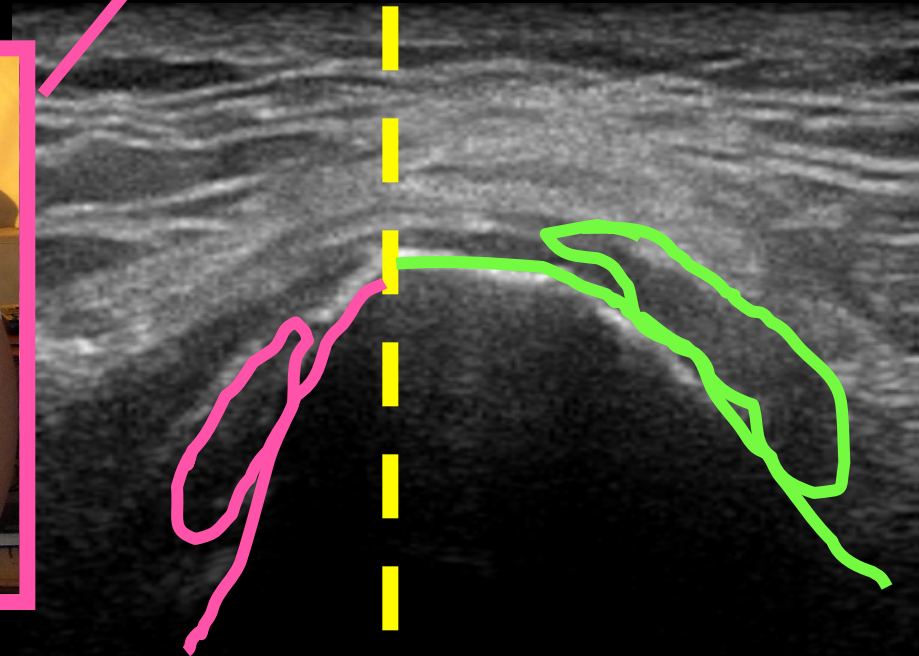
Standard scans of the trochanteric region

transversal

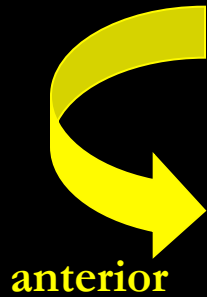
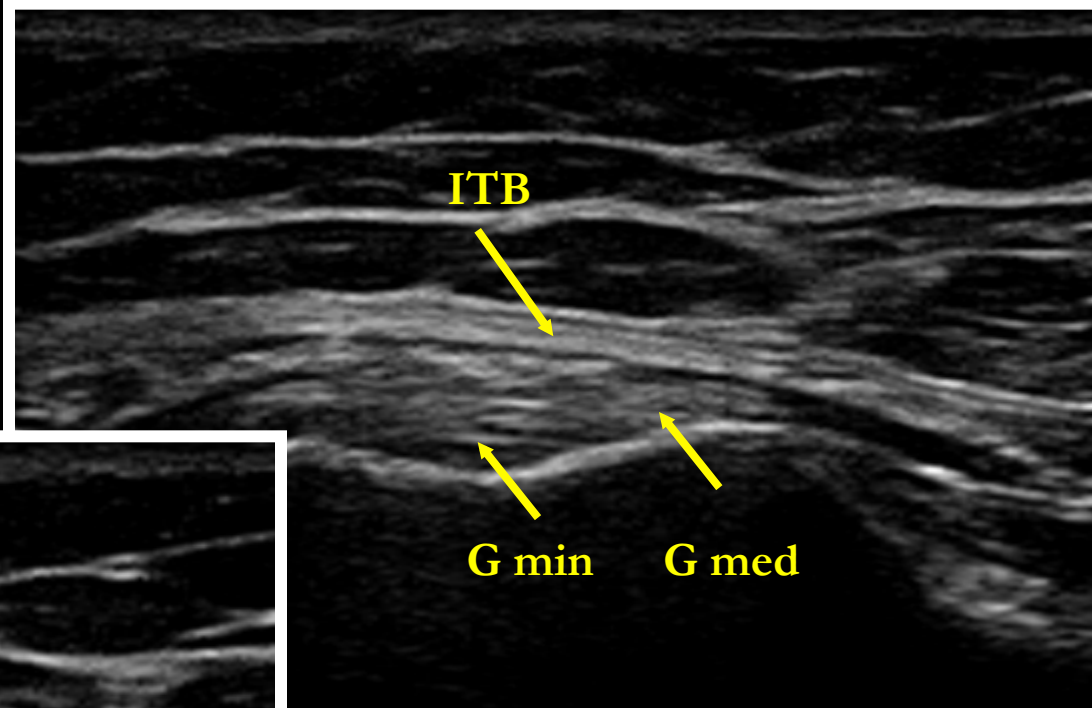
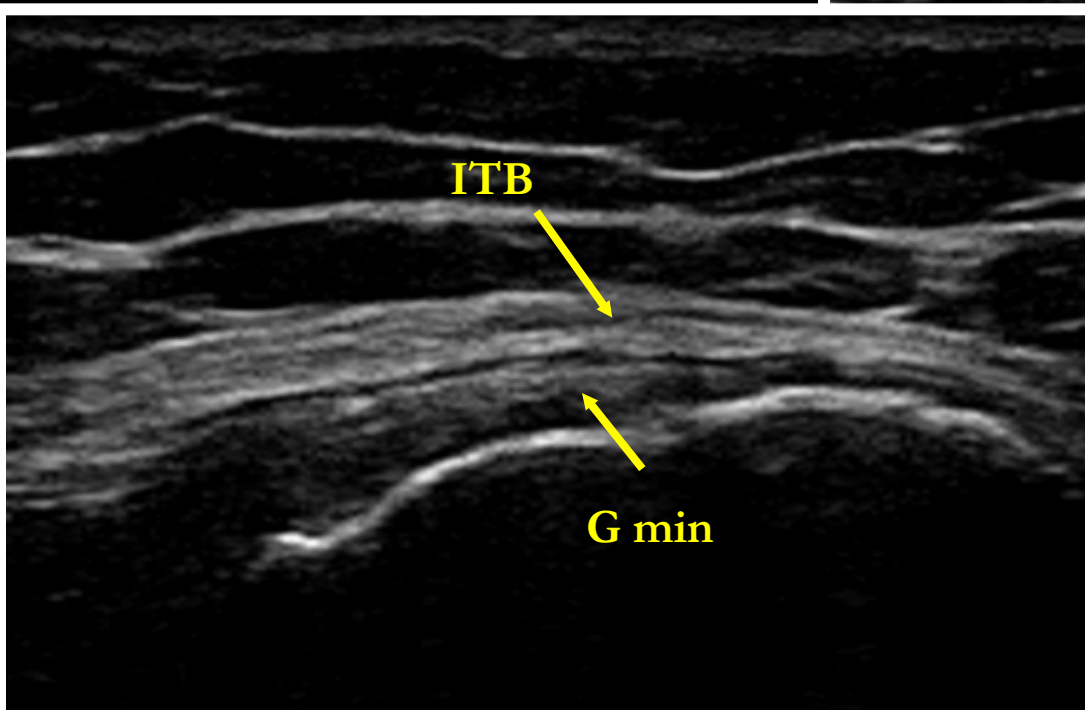


Anterior

Lateral



Standard scans of the trochanteric region longitudinal

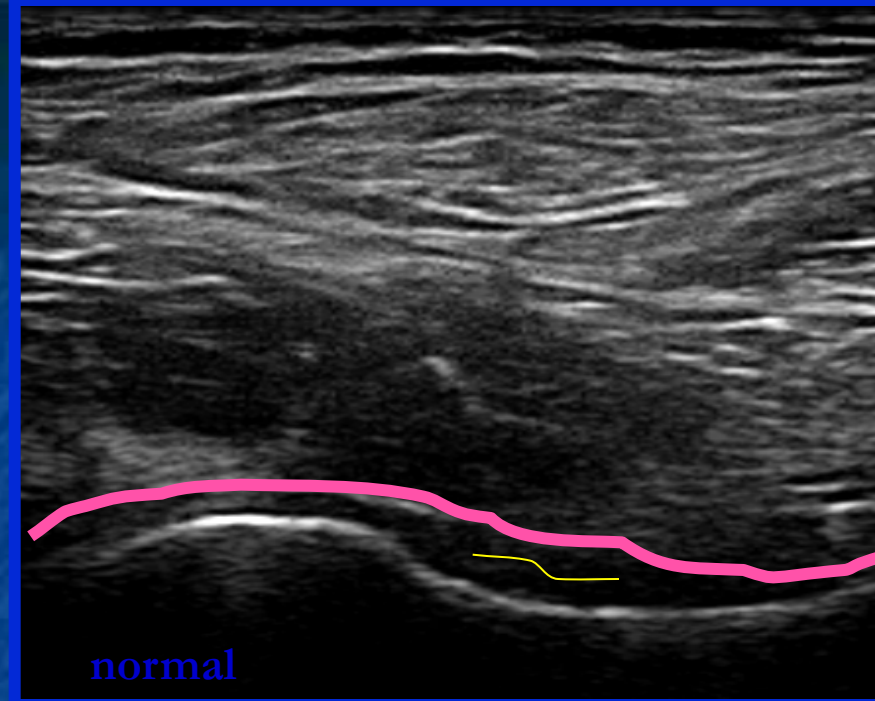
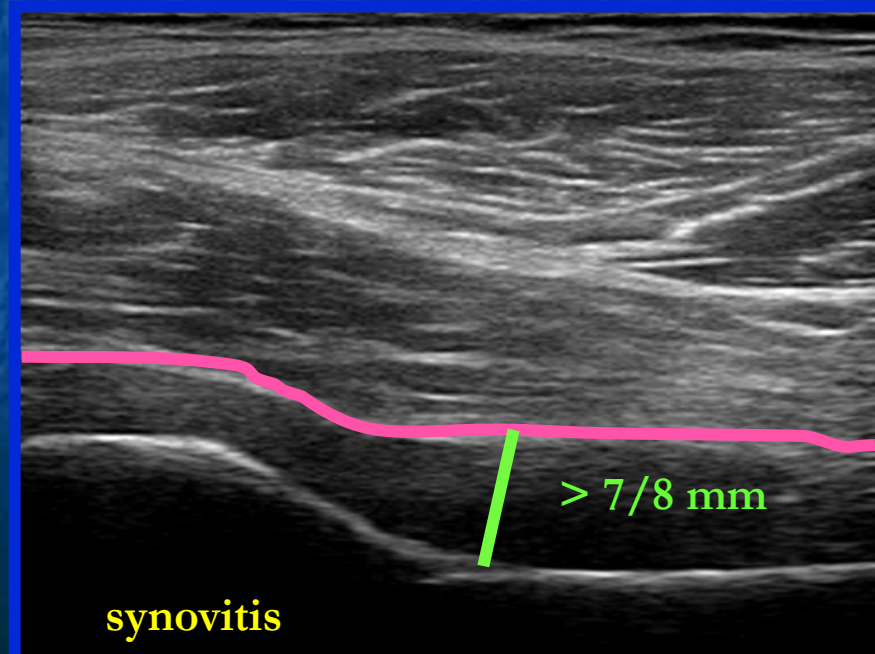


Synovitis

Joint effusion / Synovial hypertrophy

+

- Thickening of the joint capsule
- Anechoic/hypoechoic joint cavity
- Irregularities of the bony profile
- Capsular convexity/distension
- Osteophytes
- Erosions
- ≥ 2 mm side difference
- Longest bone-capsule distance $> 7/8$ mm
- No stripe sign
- Hyperemia (Doppler)



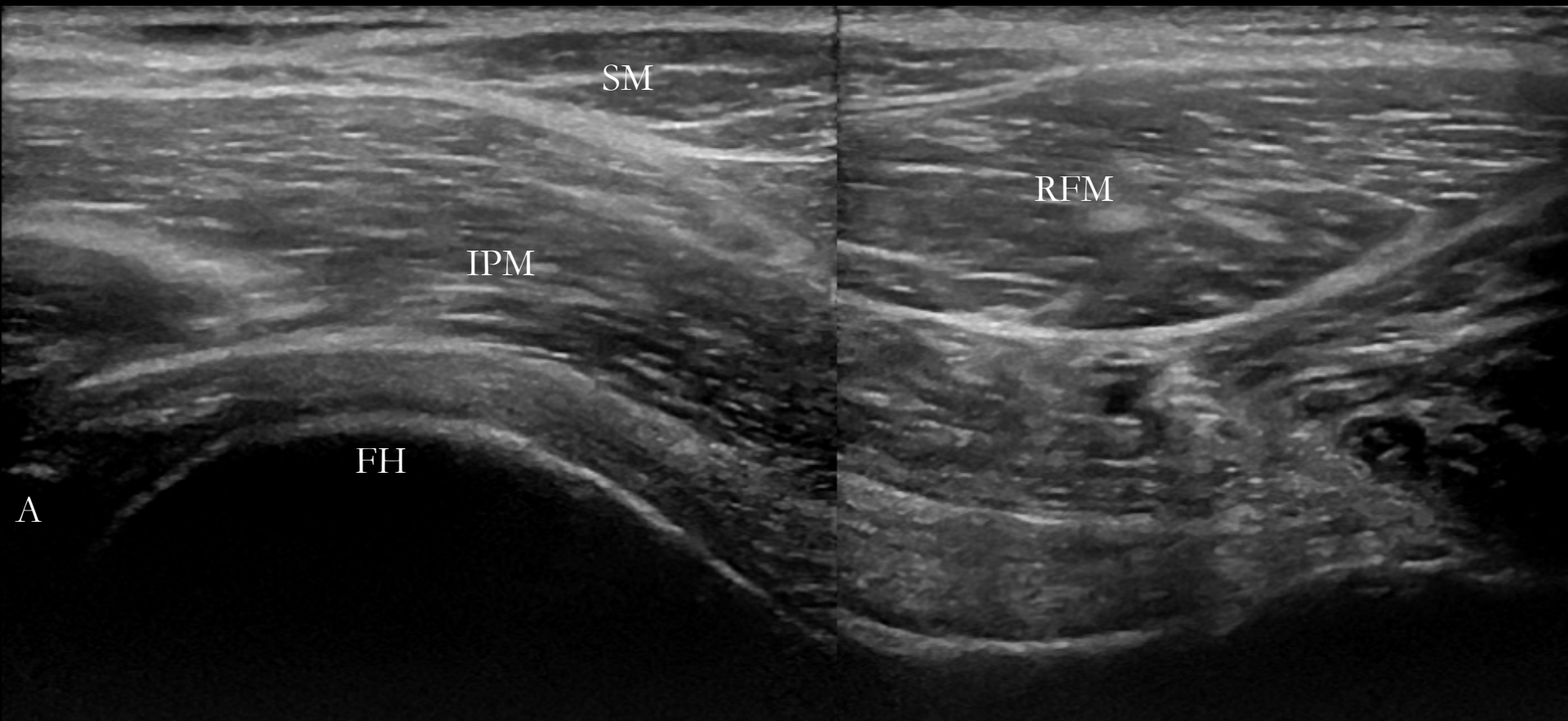
OMERACT definitions

- ***Synovial hypertrophy*** - abnormal hypoechoic (relative to subdermal fat, but sometimes may be isoechoic or hyperechoic) intraarticular tissue that is nondisplaceable and poorly compressible and which may exhibit Doppler signal.
- ***Effusion***- abnormal hypoechoic or anechoic (relative to subdermal fat, but sometimes may be isoechoic or hyperechoic) intraarticular material that is displaceable and compressible, but does not exhibit Doppler signal.
- ***Erosion***- an intraarticular discontinuity of the bone surface that is visible in 2 perpendicular planes.
- ***Tenosynovitis***- hypoechoic or anechoic thickened tissue with or without fluid within the tendon sheath, which is seen in 2 perpendicular planes and which may exhibit Doppler signal.
- ***Enthesopathy***- abnormally hypoechoic (loss of normal fibrillar architecture) and / or thickened tendon or ligament at its bony attachment (may occasionally contain hyperechoic foci consistent with calcification), seen in 2 perpendicular planes that may exhibit Doppler signal and / or bony changes including enthesophytes, erosions, or irregularity.

Other published definitions

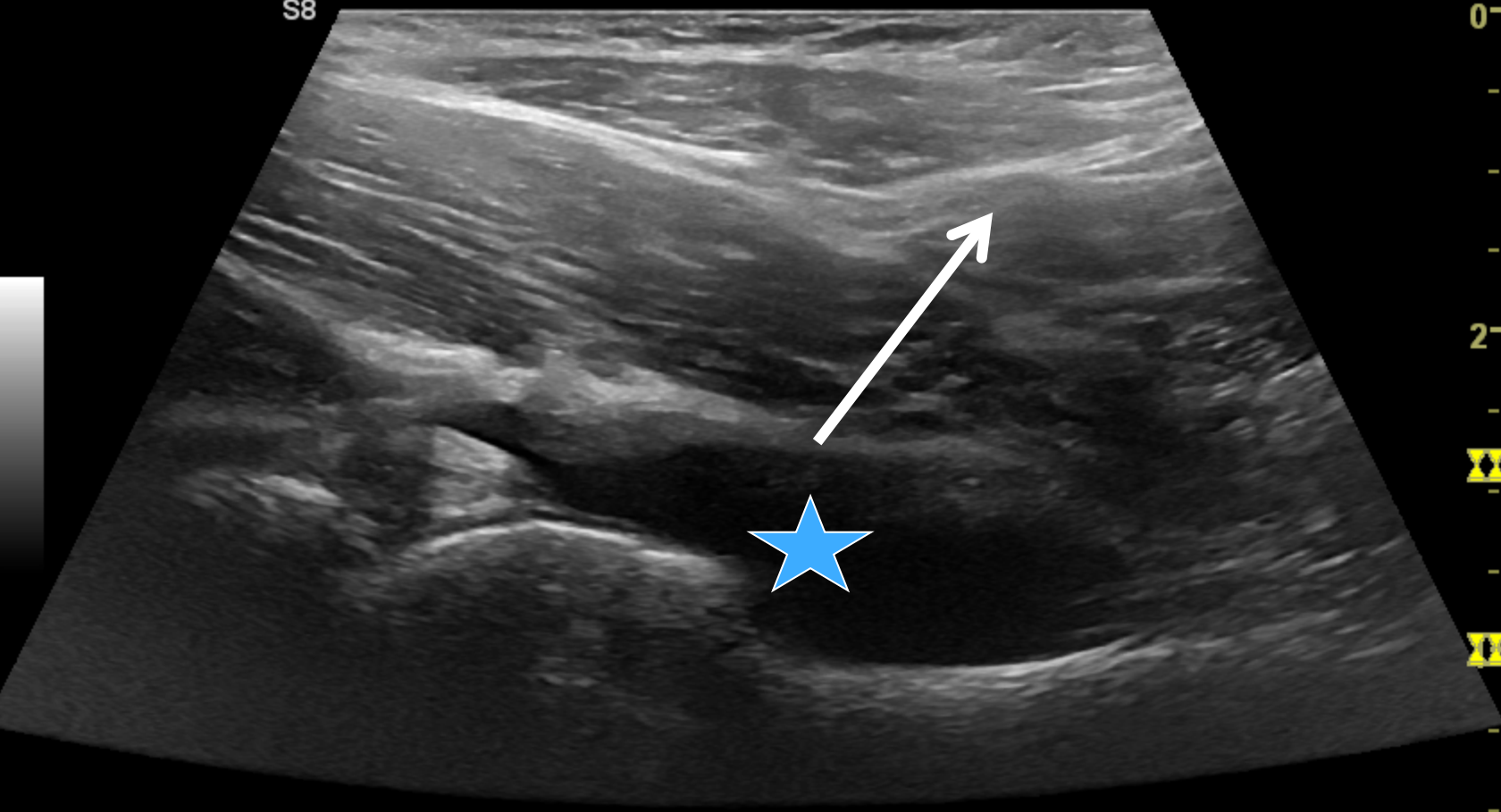
- Tendinosis*** - loss of normal internal echo texture
- Tendon erosion*** - focal tendon defect
- Tendon partial tear*** - partial-thickness interruption of the tendon fibres
- Tendon complete tear*** - full-thickness interruption of the tendon fibers
- Osteophytes*** - irregularities at bony profile at joint margins due to new bone formation, "step up"

Normal hip



SpA – 8 weeks onset

LOGIQ
S8



CHI		
0-	Frq	12.0
	Gn	46
-	S/A	3/3
	Map	D/0
-	D	5.0
	DR	66
-		
2-		
-		
II		
-		
-		
II		
-		
-		

LOGIQ
S8

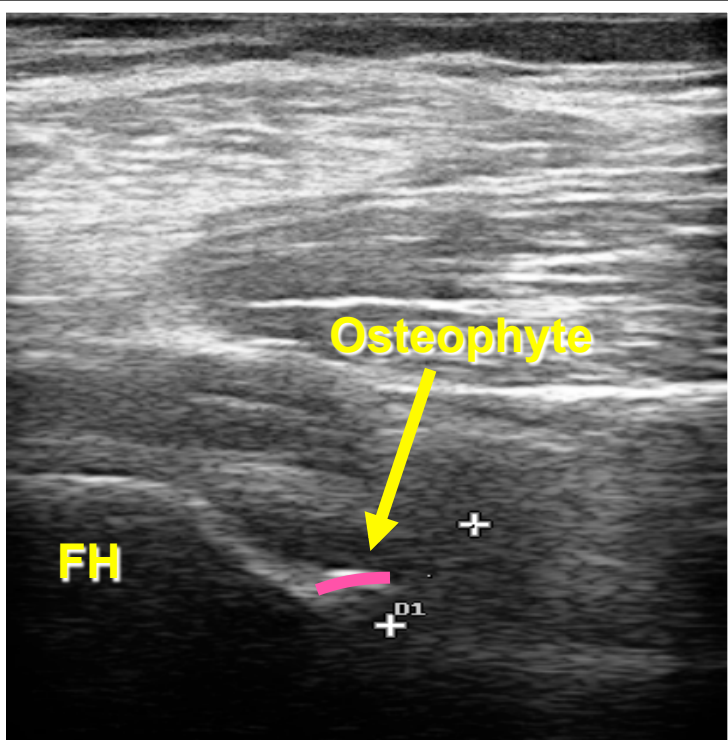
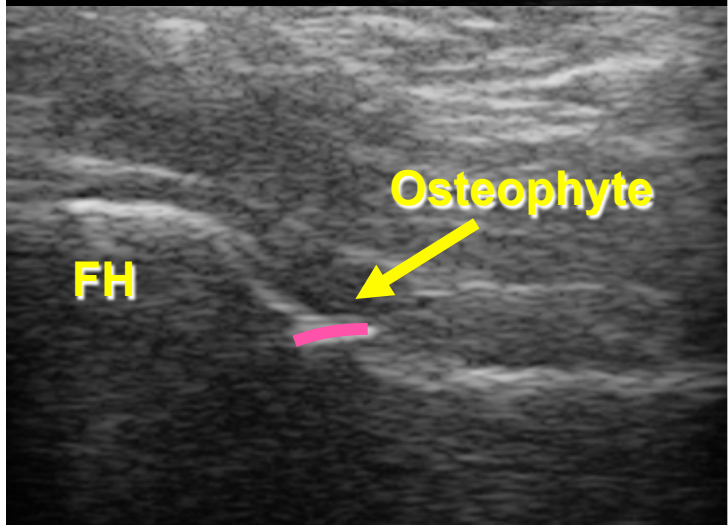
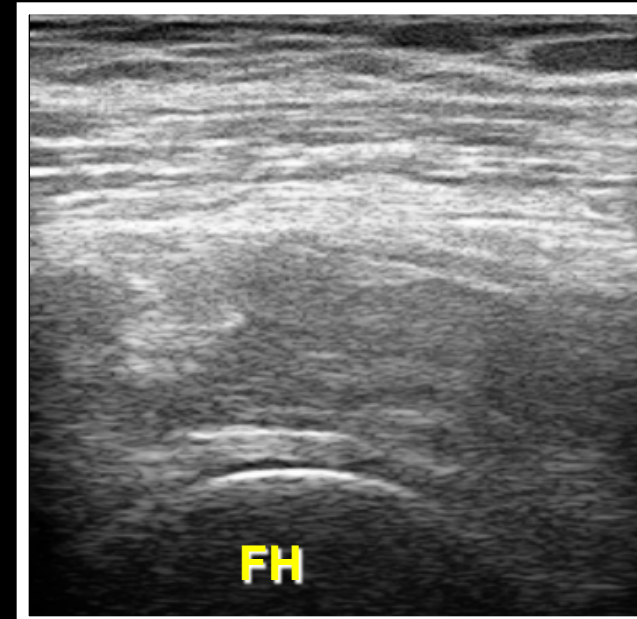
	CHI	
0-	Frq	12.0
	Gn	46
-	S/A	3/3
	Map	D/0
-	D	5.0
	DR	66
-		

2-



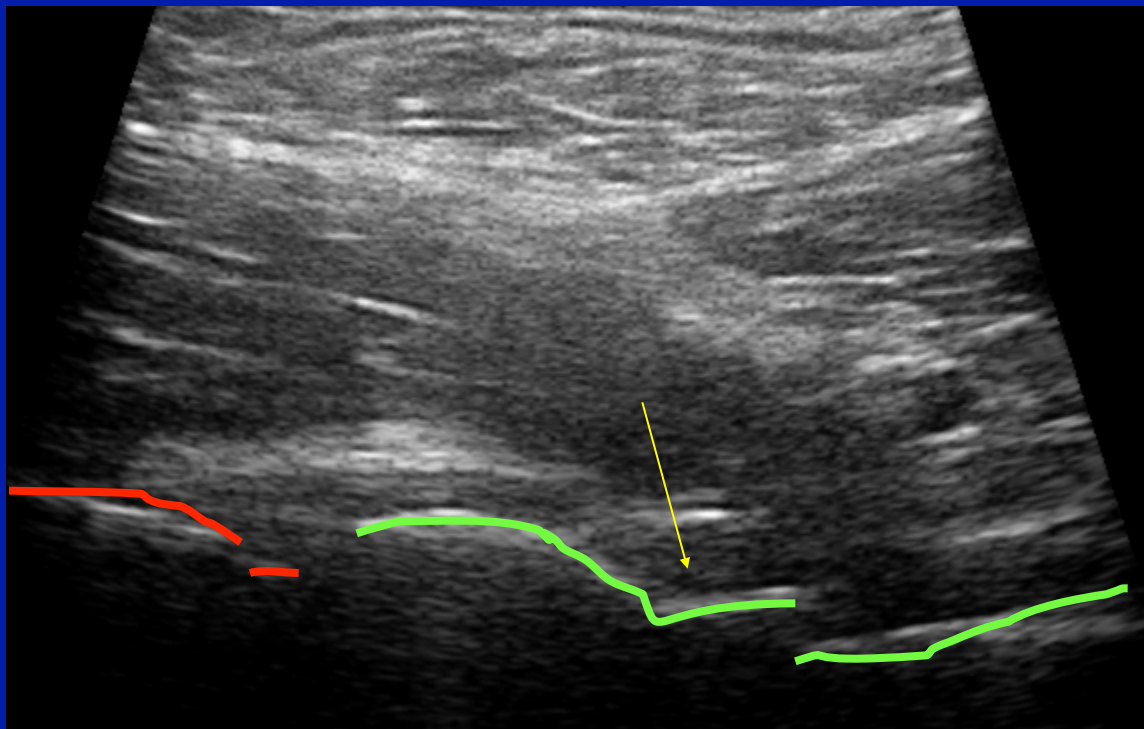
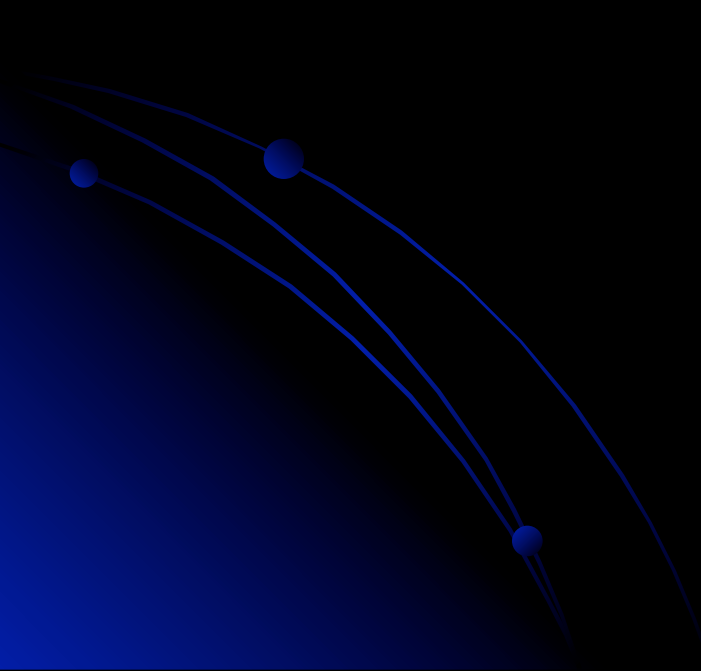
Osteophytes

- Cartilage loss definition
- Osteophytes
- Mild synovitis

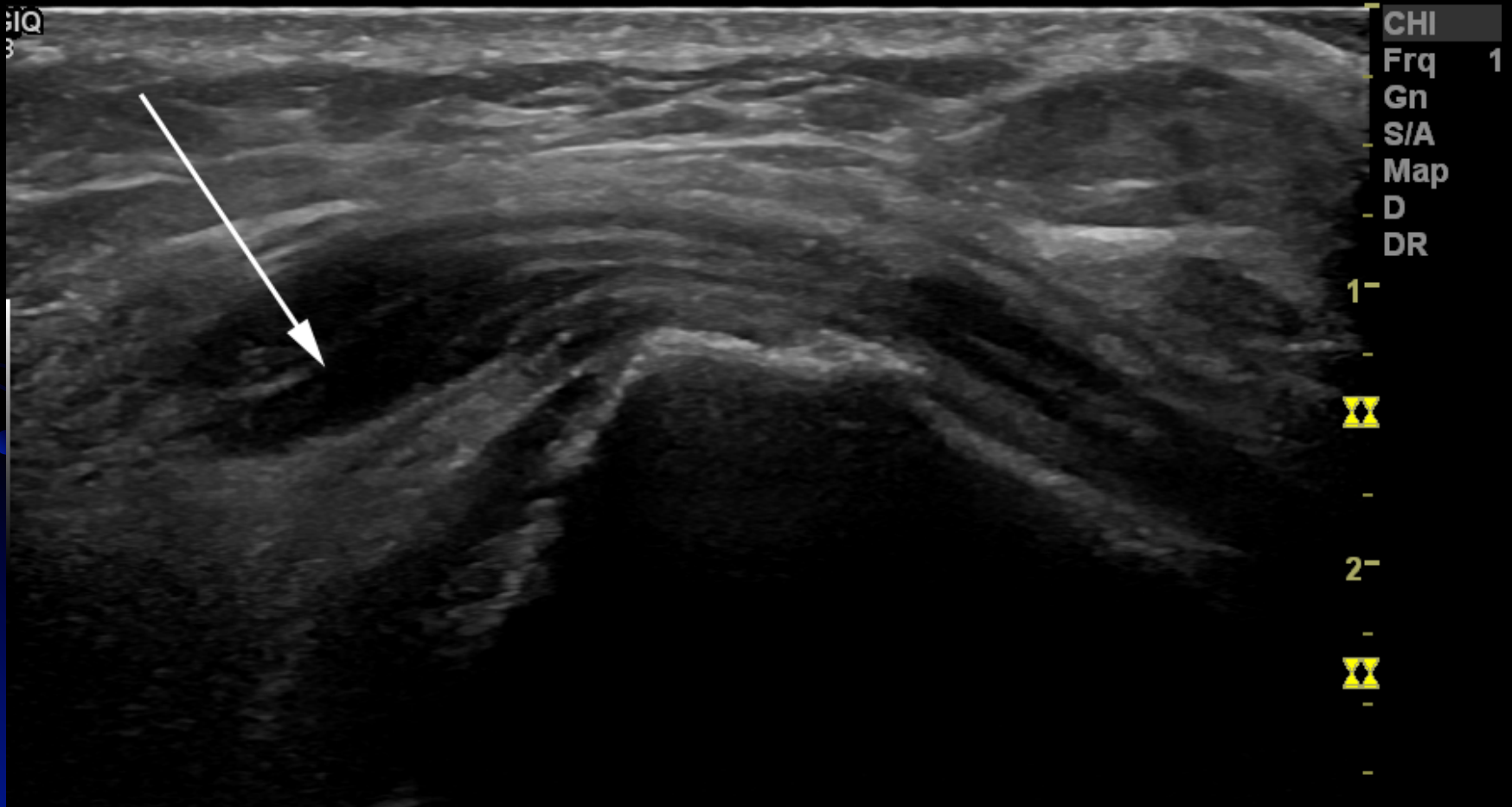


OA

Multiplanar visualisation of
The head – neck junction!!

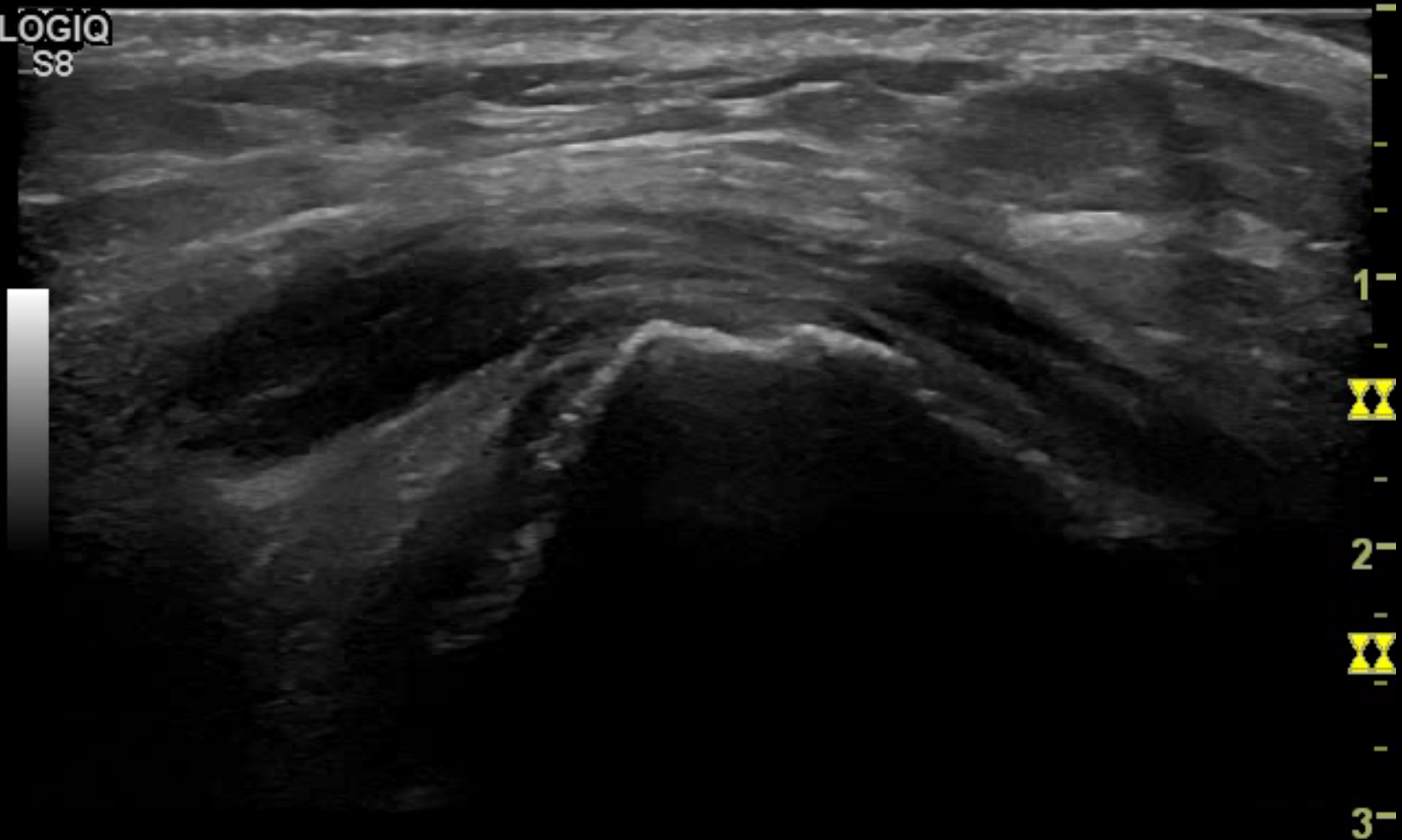


Trochanterian bursitis

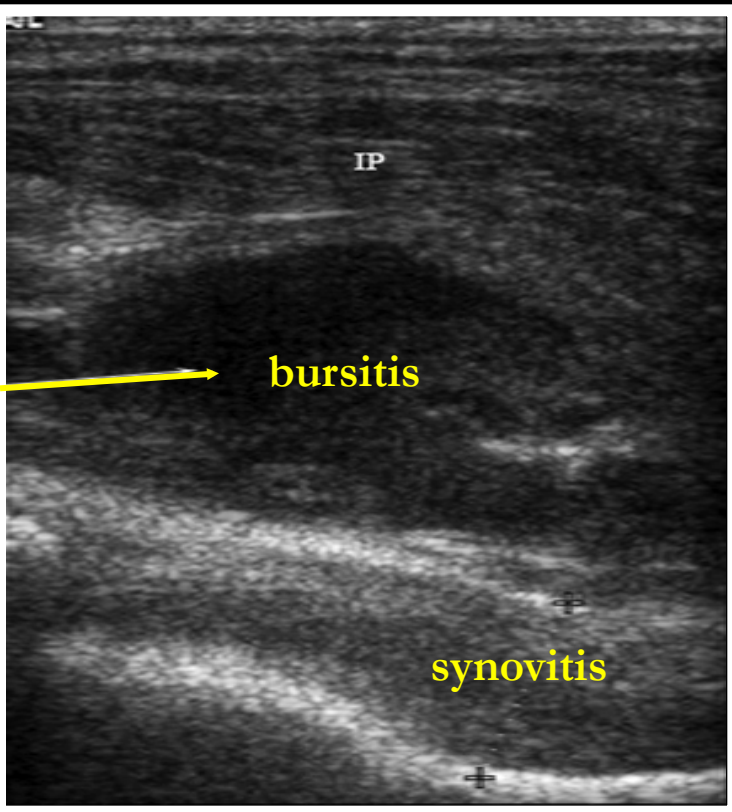
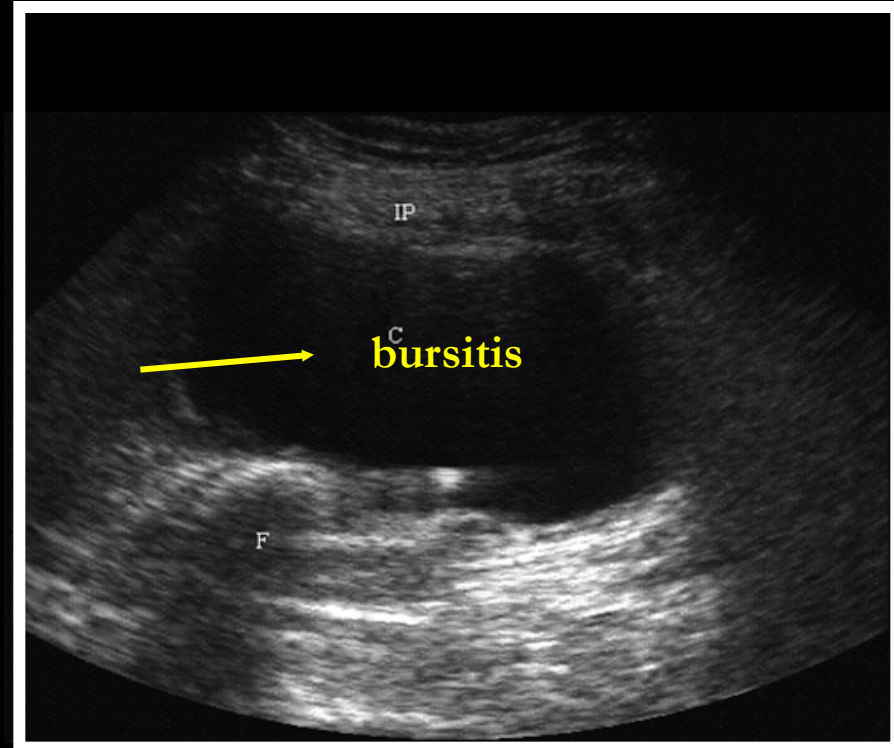
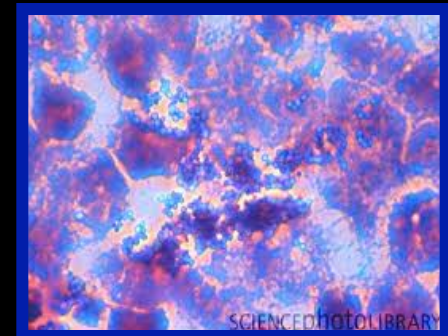


Trochanterian bursitis

LOGIQ
S8



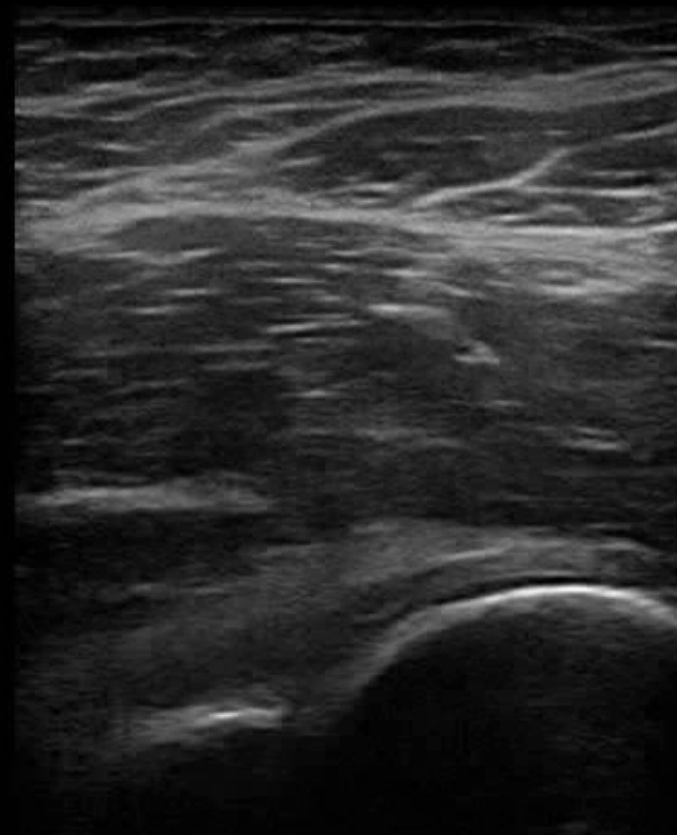
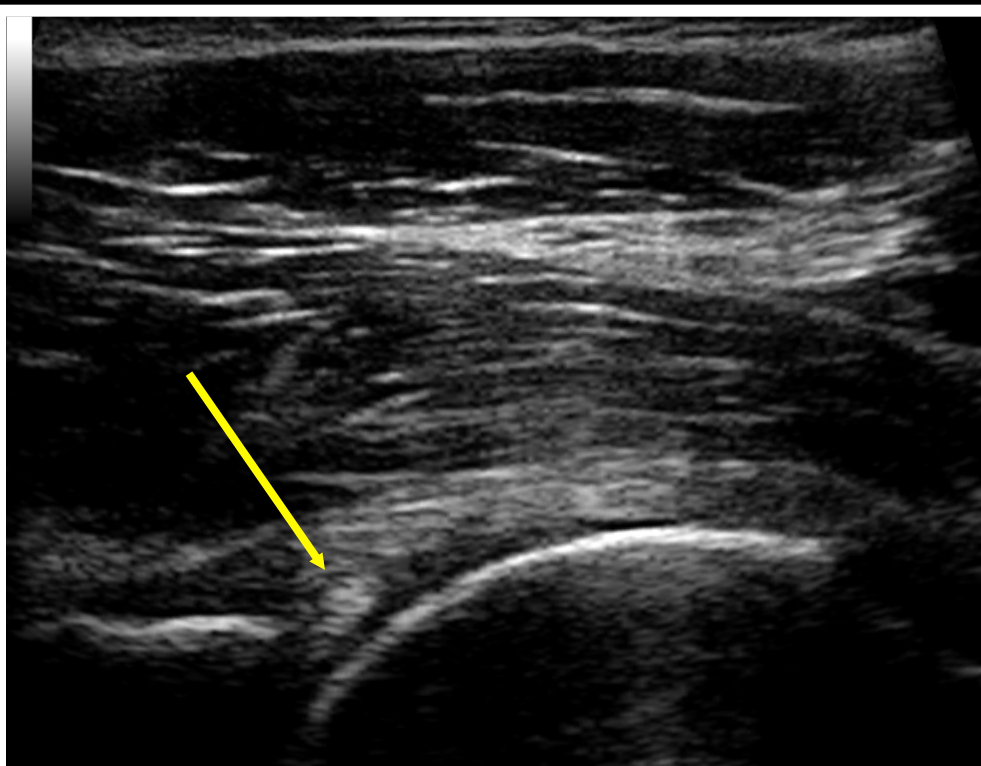
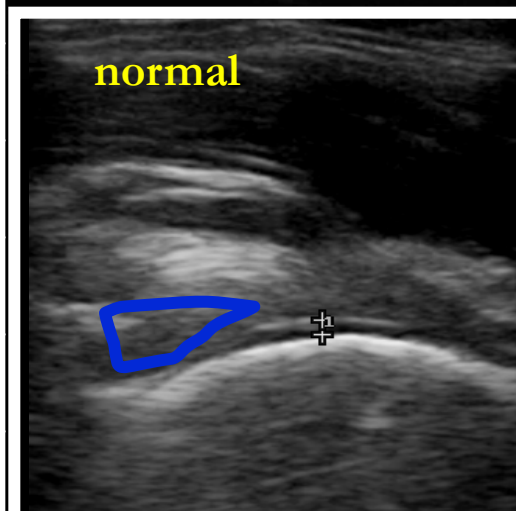
Septic arthritis and iliopsoas bursitis



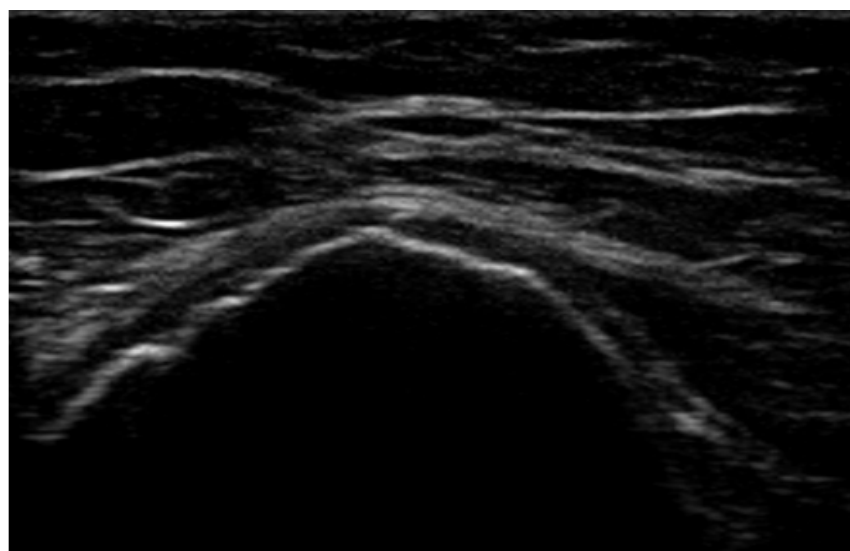
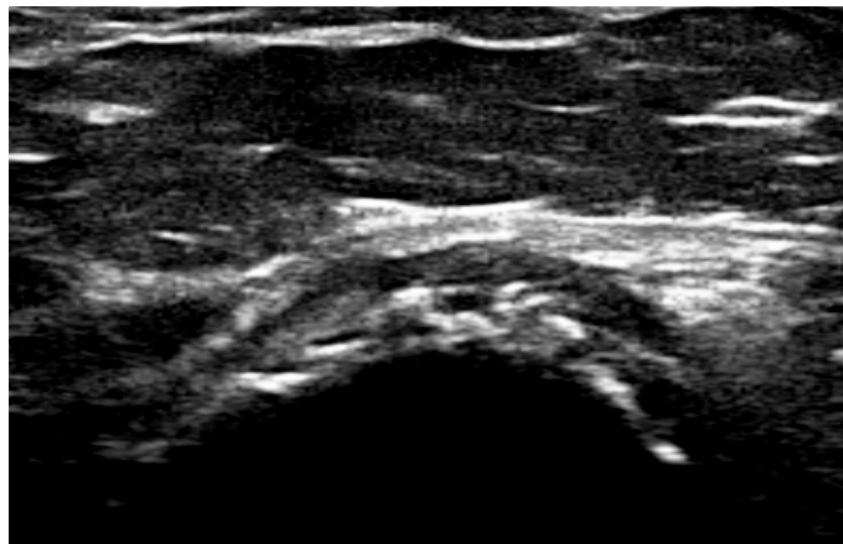
Dr. Daniela Fodor

Labrum - calcifications

PRC 13-5-L PRS 3
PST 4 MV 2



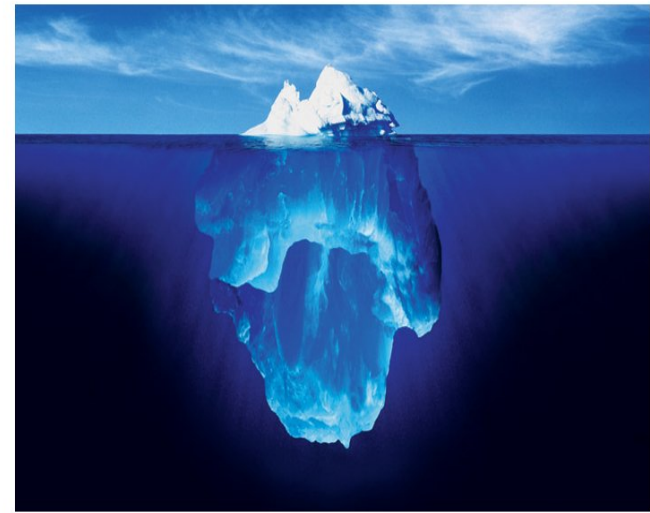
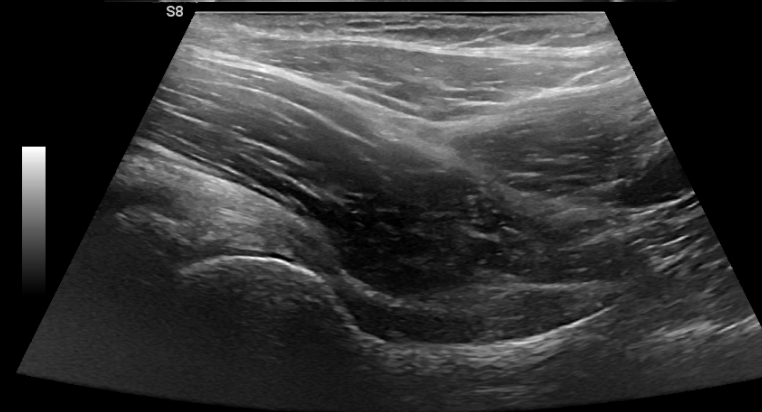
Trochanteric enthesopathy



Key messages

Ultrasound of the hip is very helpful in:

- important evaluation complementary to radiology
- intraarticular and extraarticular structures
- noninvasive, without side effects
- can be performed on bed side, information in real time
- multiplanar/ dynamic evaluation
- time economy, low cost
- can be repeated anytime



Key messages

- allows also interventional invasive techniques ✓

MICU

LA523



Limits:

- posterior recess of the joint
- limited Doppler window

Literature

1. Bierma-Zeinstra SM, Bohnen AM, Verhaar JA, et al. Sonography for hip joint effusion in adults with hip pain. *Ann Rheum Dis* 2000;59:178–82.
2. Koski JM, Anttila PJ, Isomaki HA. Ultrasonography of the adult hip joint. *Scand J Rheumatol* 1989;18:113–7.
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4. Atchia I, Birrell F, and Kane D. A modular, flexible training strategy to achieve competence in diagnostic and interventional musculoskeletal ultrasound in patients with hip osteoarthritis. *Rheumatology* 2007;46: 1583- 6.
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Literature

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8. E Naredo, G Bonilla, F Gamero, J Uson, L Carmona, A Laffon. Assessment of inflammatory activity in rheumatoid arthritis: a comparative study of clinical evaluation with grey scale and power Doppler ultrasonography. Ann Rheum Dis 2005
9. Ovistgaard E, Torp-Pederson S, Christensen r, Bliddal H. Reproducibility and inter-reader agreement of a scoring system for ultrasound evaluation of hip osteoarthritis. Ann Rheum Dis 2006
10. Dasgupta B, Cimmino MA, Maradit-Kremers H, Schmidt WA, Schirmer M, Salvarani C, et al. 2012 provisional classification criteria for polymyalgia rheumatica: a EULAR / ACR collaborative initiative. Ann Rheum Dis 2012
11. Robert Spiera, Rene Westhovens. Provisional diagnostic criteria for polymyalgia rheumatica: moving beyond clinical intuition? Ann Rheum Dis 2012
12. etc.....