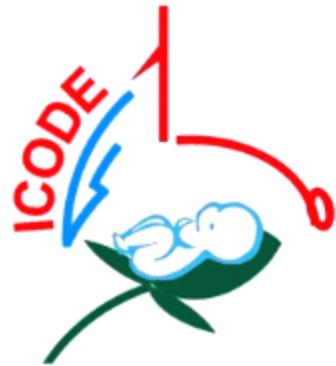
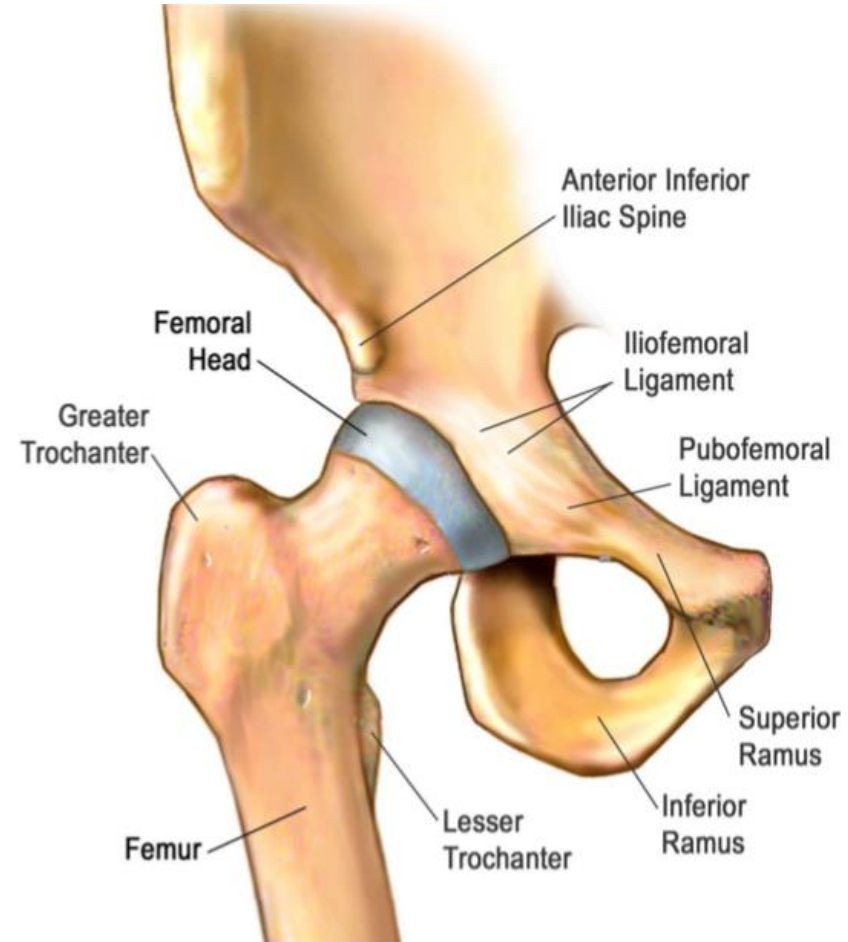


London Graf Hip US course

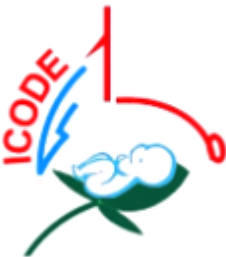
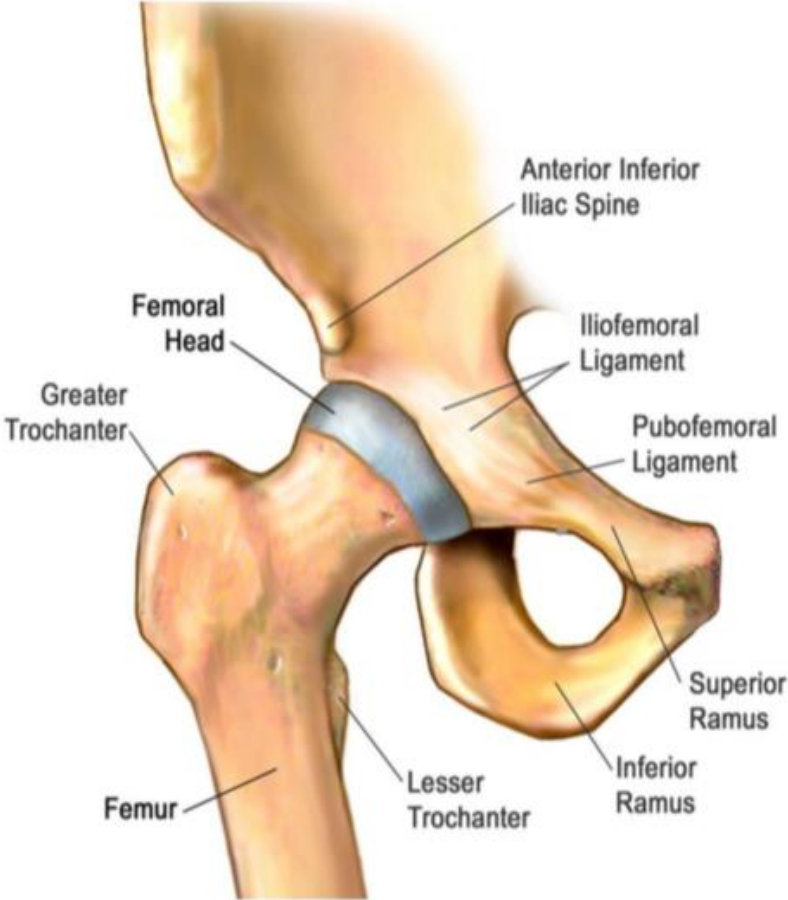
Anatomy and Ultrasound of a normal Infant Hip Joint



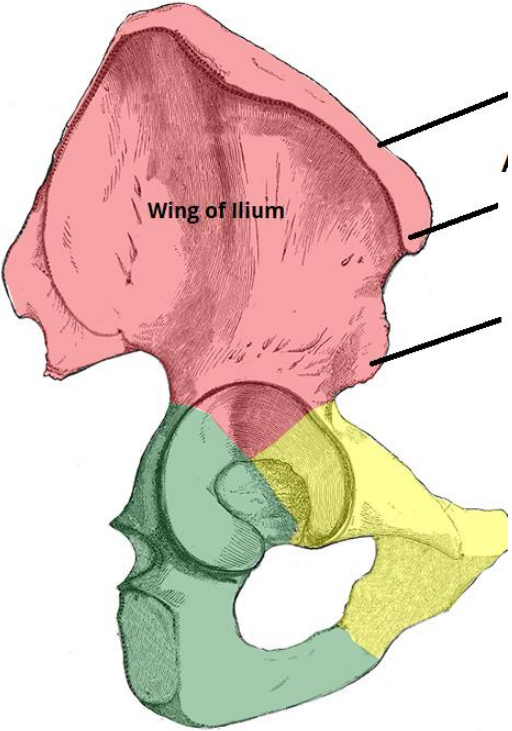
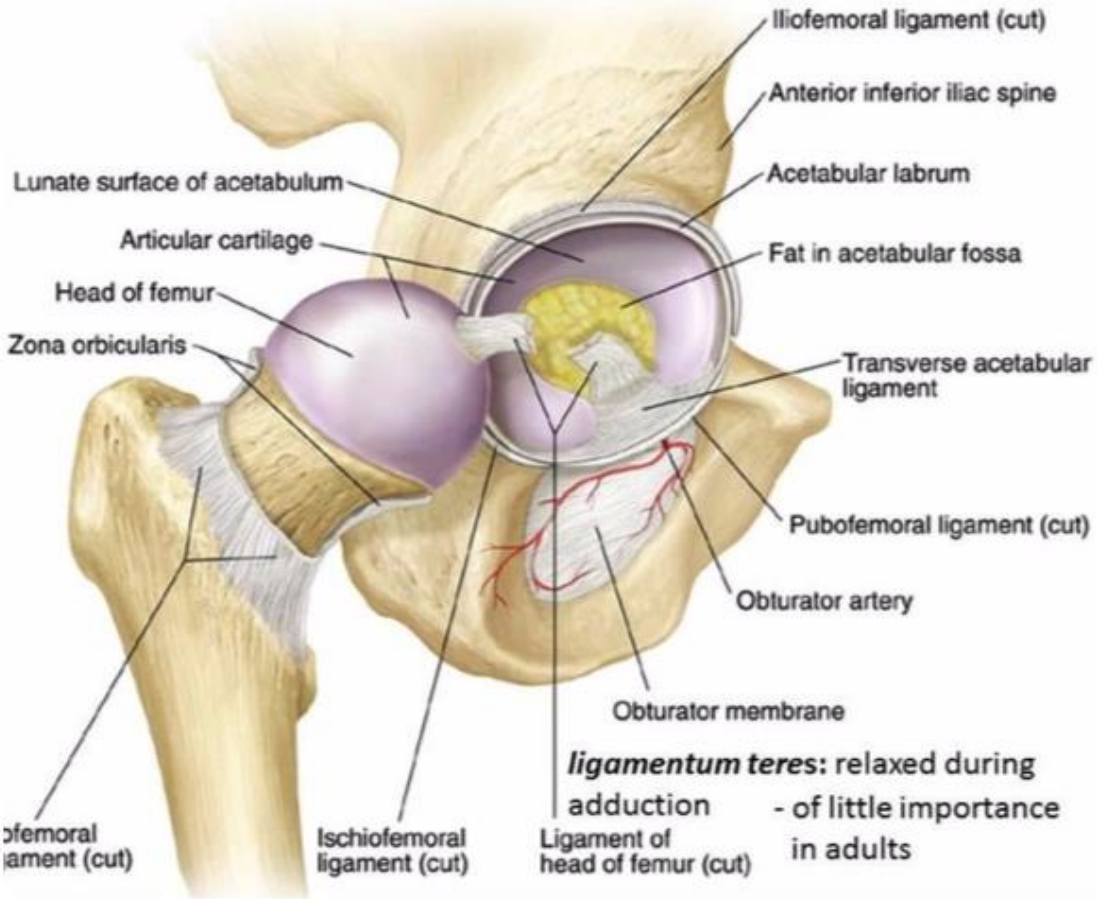
Anatomy



Anatomy - Imaging



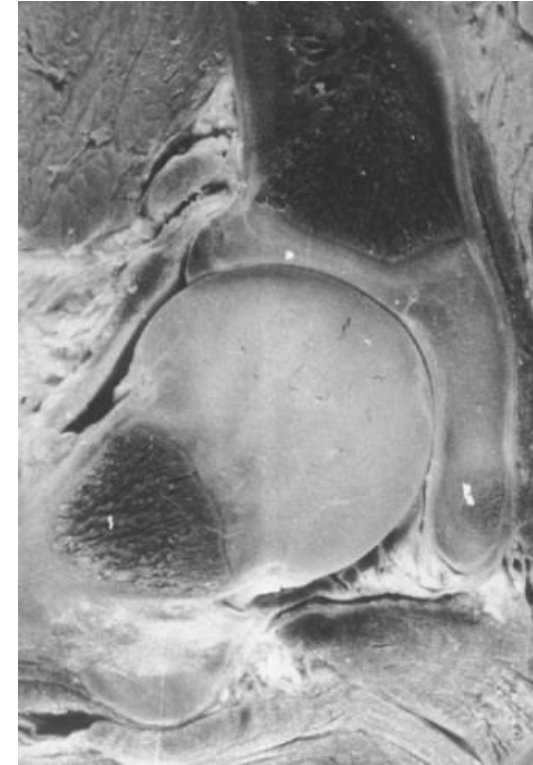
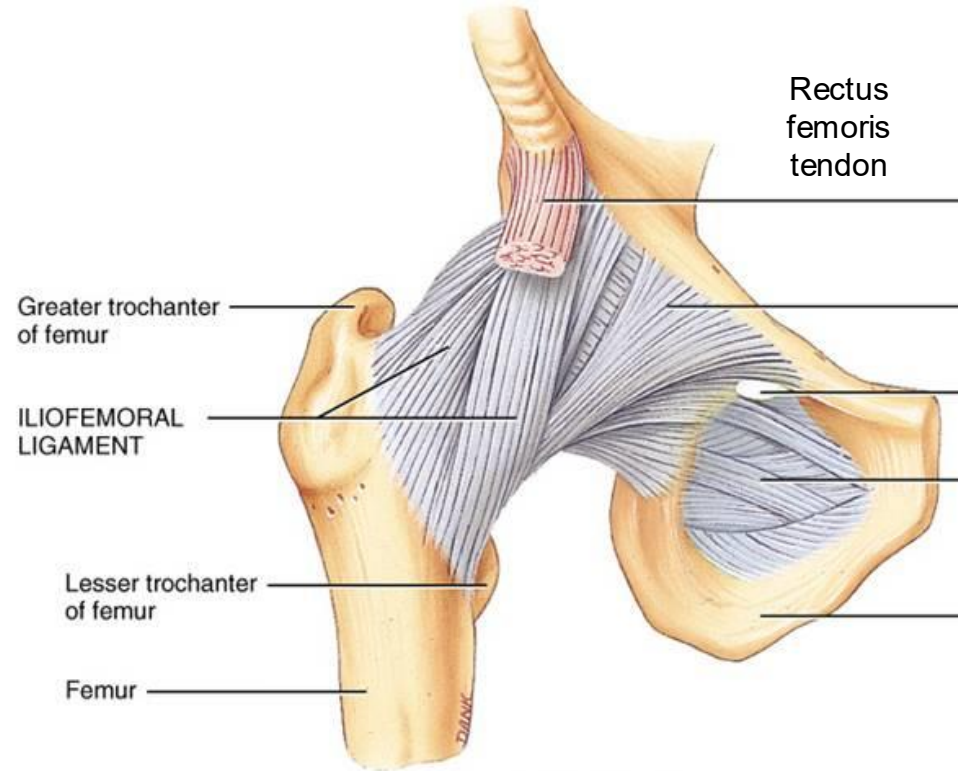
Inside the hip joint



(i) Lateral View



Anatomy



Ultrasound Terminology

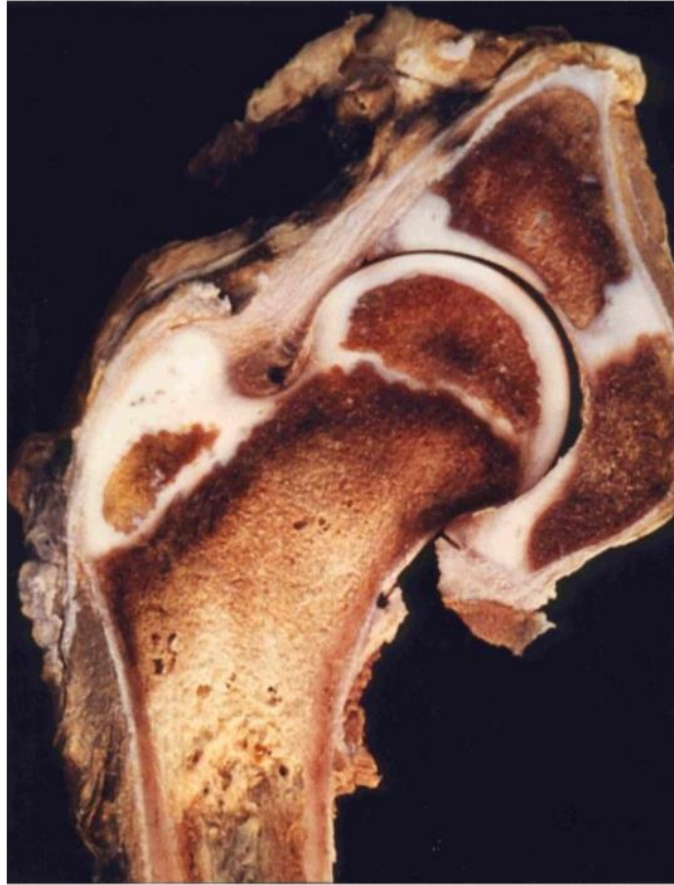
Who is who?

- Bone
 - Bright echos, behind it acoustic /sound shadow
- Collagen & fibrocartilage
 - Good echos
- Fatty and fibrous tissue
 - Weak echos
- Hyaline cartilage
 - No echos
- Hip - Centred /non centred

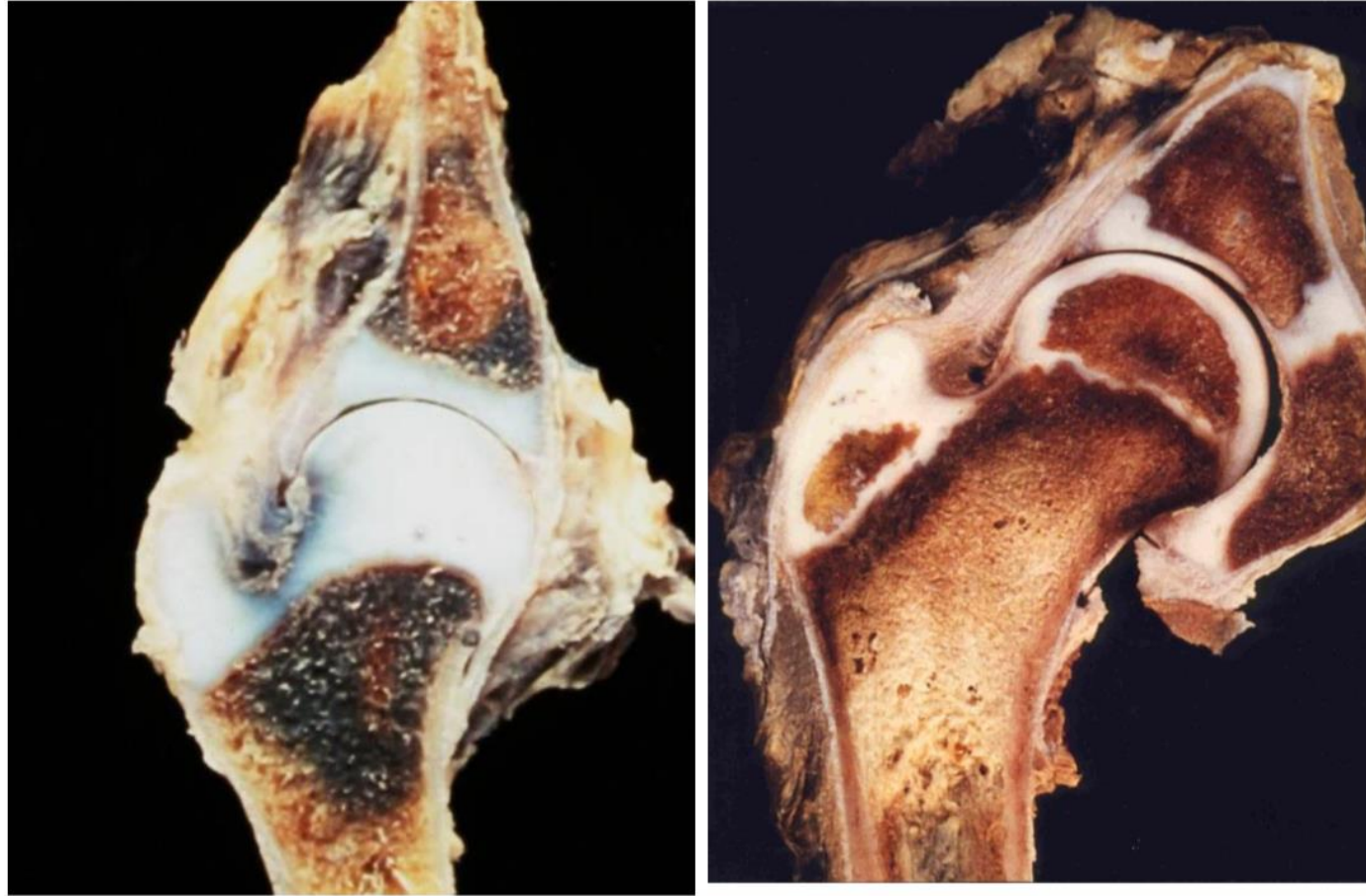


Anatomy

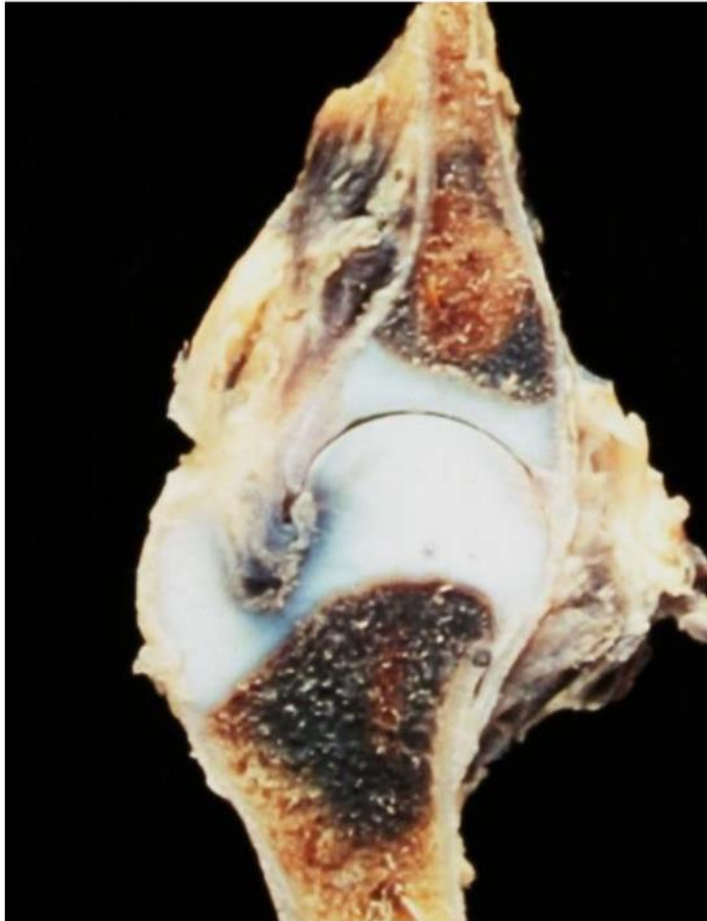
What can we see?

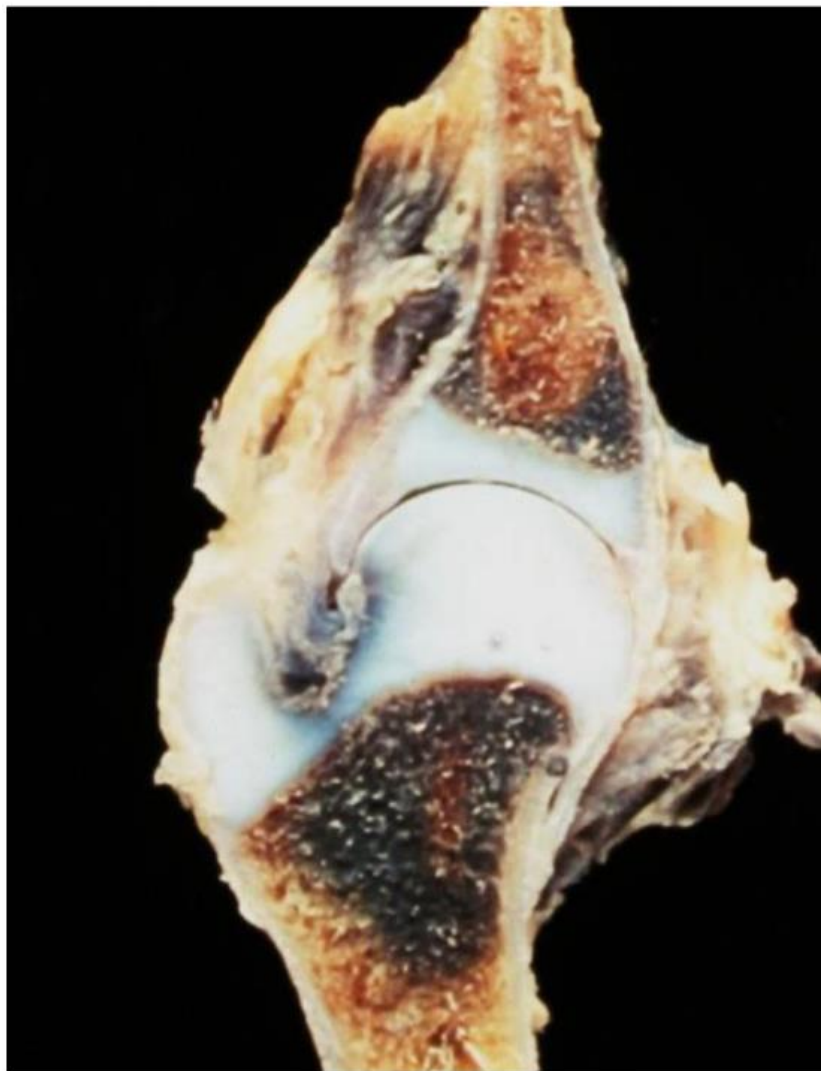


Anatomy according to age



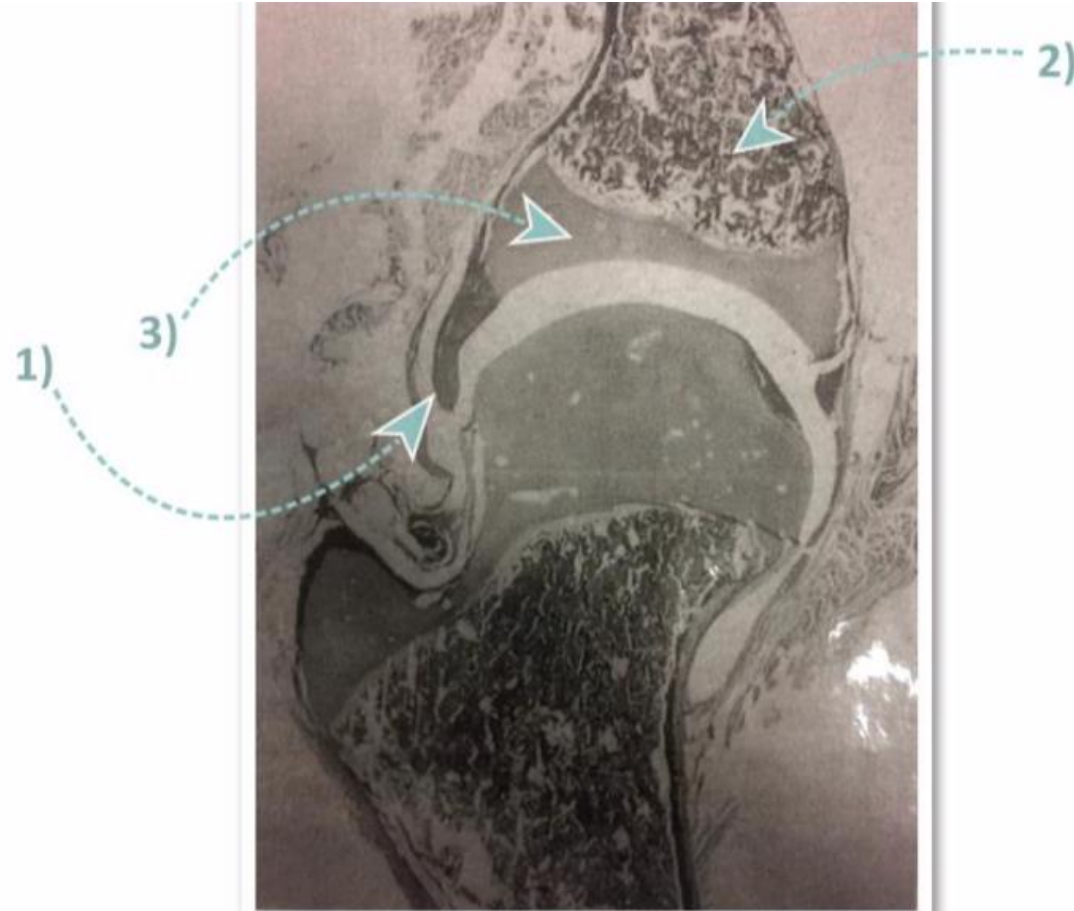
Anatomy of the infant hip





Types of Tissue Infant hip

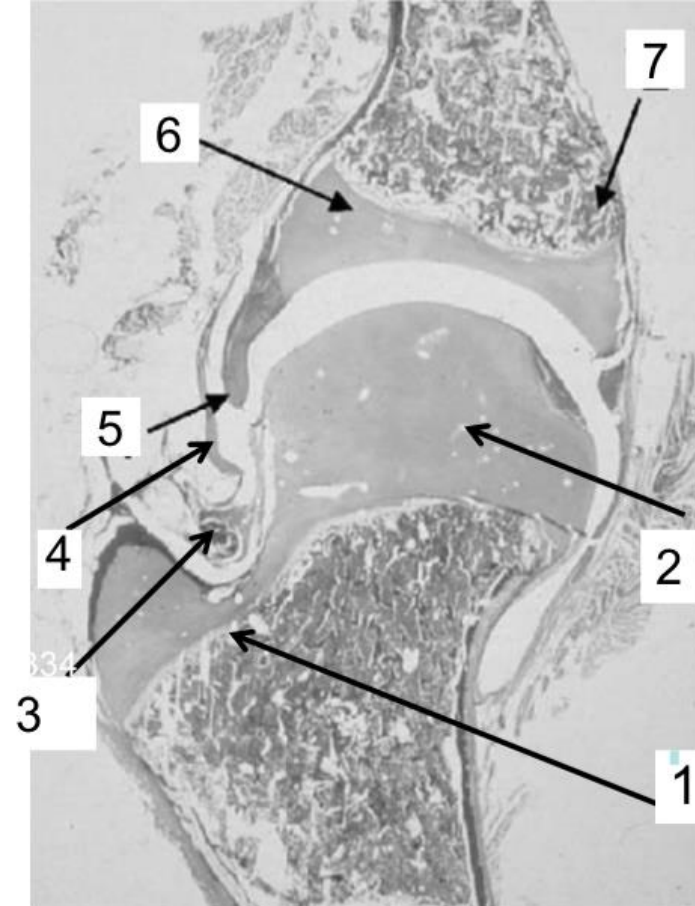
- 1) Labrum
- 2) Bone
- 3) Hyaline cartilage



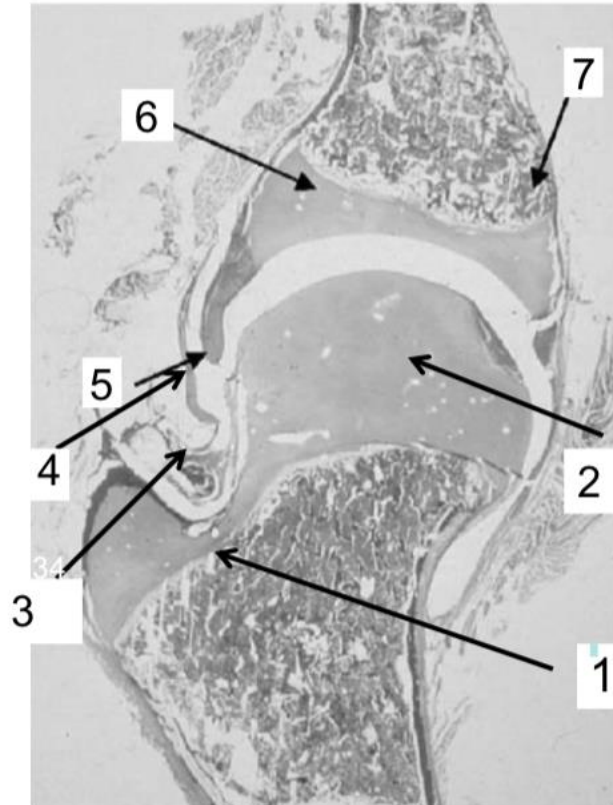
Anatomy

What can we see on US?

1. Chondro osseous border
2. Femoral head
3. Synovial fold
4. Capsule
5. Labrum
6. Cartilage
7. Bony roof

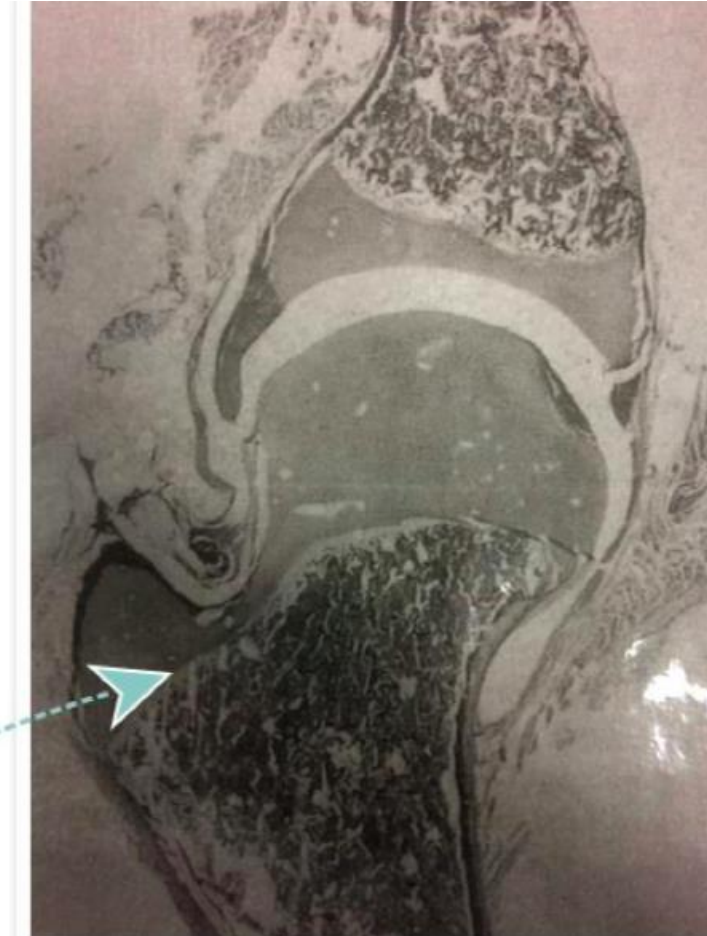
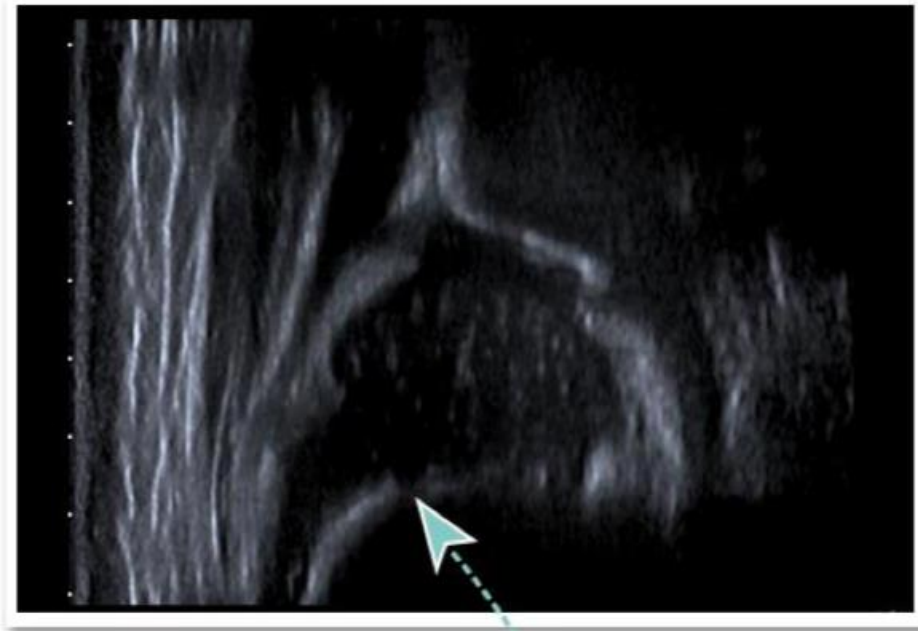


Anatomy



1 chondro-osseous border, 2 femoral head , 3 synovial fold , 4 capsule 5 labrum, 6 cartilage, 7 bony roof

Chondro-osseus border



CHONDRO-OSSEOUS
BORDER

Chondro-osseous border

Curved

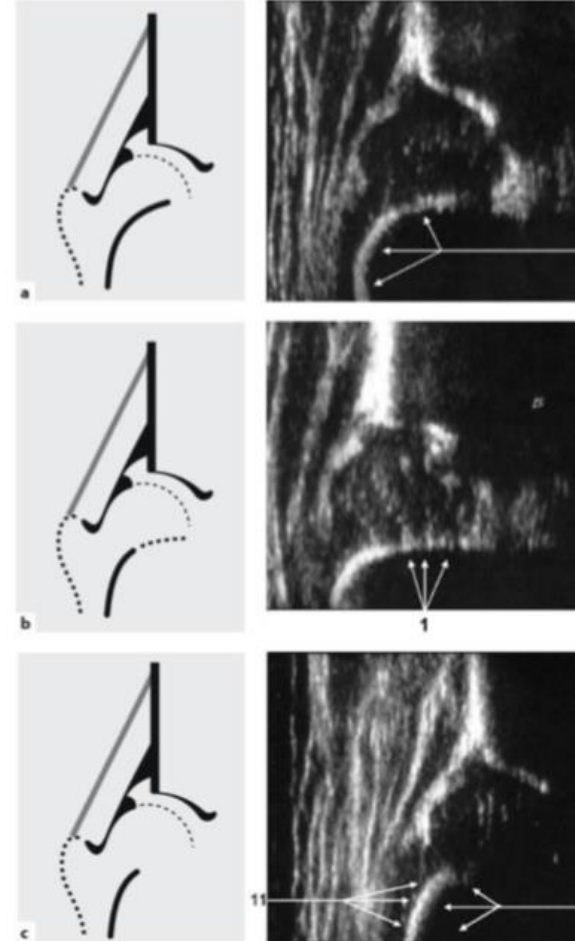
Angulated –
“palisades”

Medial portion not
seen

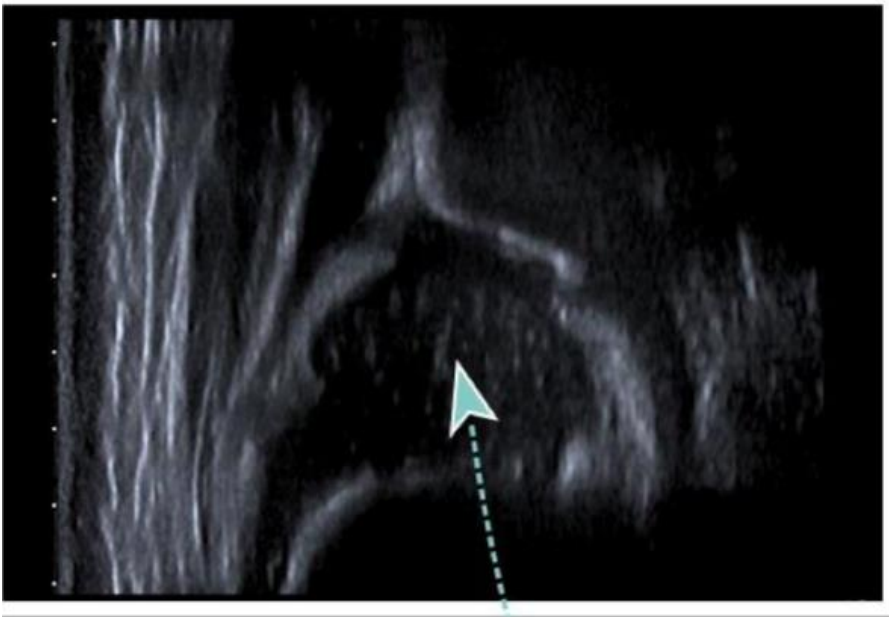
Young child



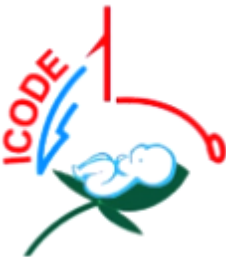
Older child



Femoral head

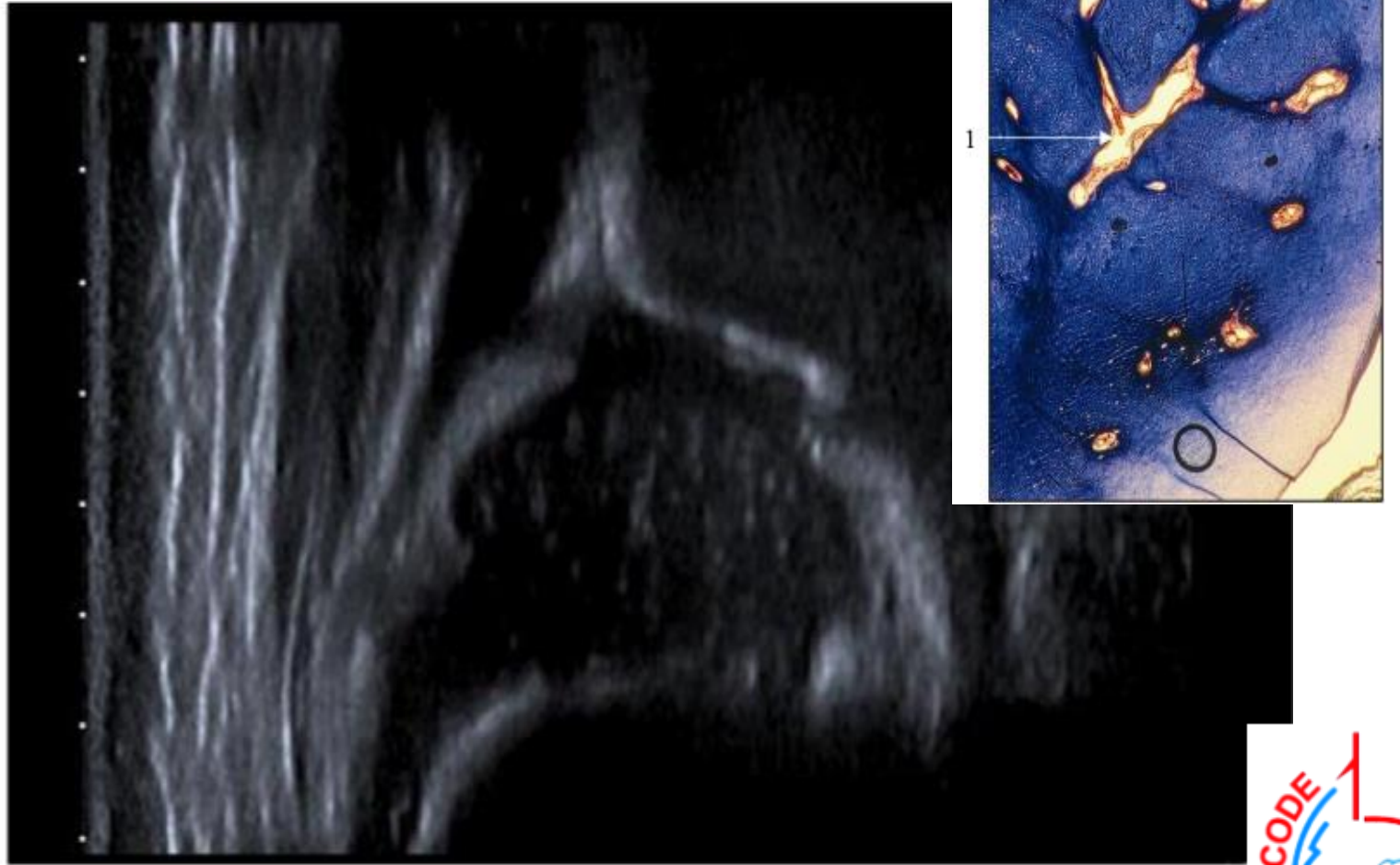


FEMORAL
HEAD



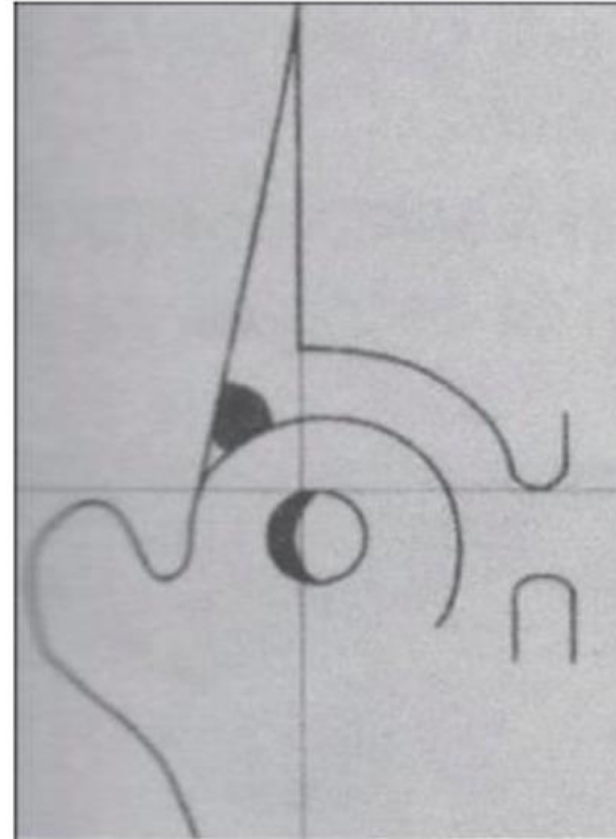
Femoral head

- Not round!
- Flecks = sinusoids containing blood
- No sinusoids at surface (echo-free ring - will become articular cartilage)



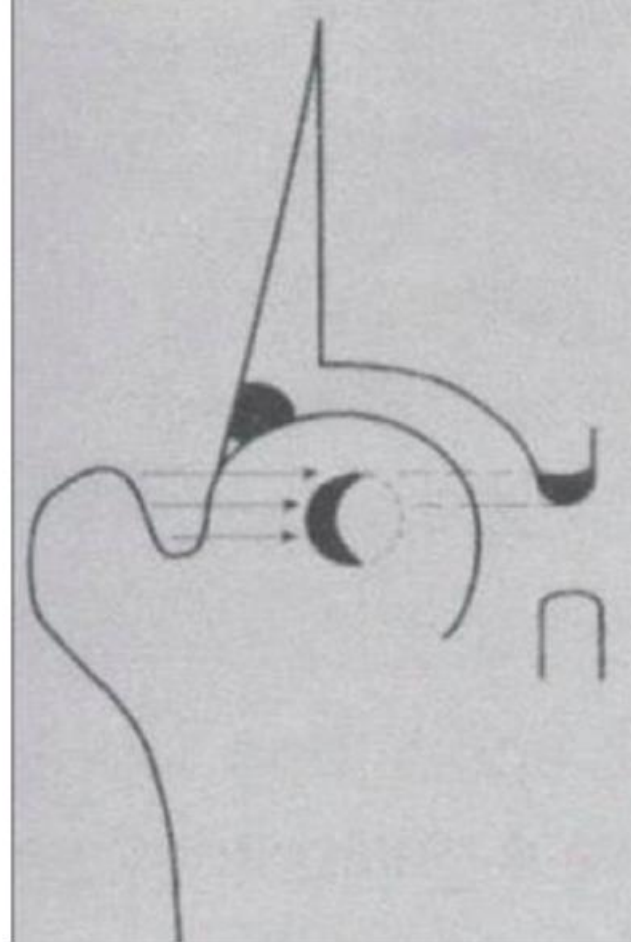
Ossific nucleus

- ❑ Bony nucleus apparent on ultrasound at stage of cell division – earlier than when visible on Xray, by approx 2 months
- ❑ Bony nucleus not round; not necessarily central
- ❑ Only lateral portion of nucleus shown – “half-moon” appearance
- ❑ Appears more lateral than it really is – don't use for diagnosis
- ❑ Cannot judge size of nucleus on ultrasound

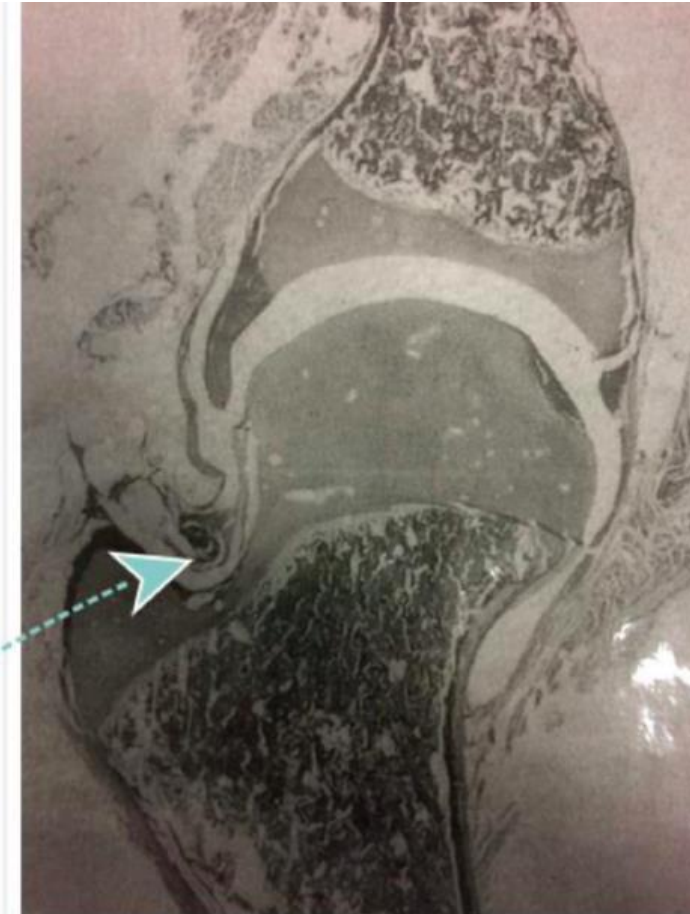
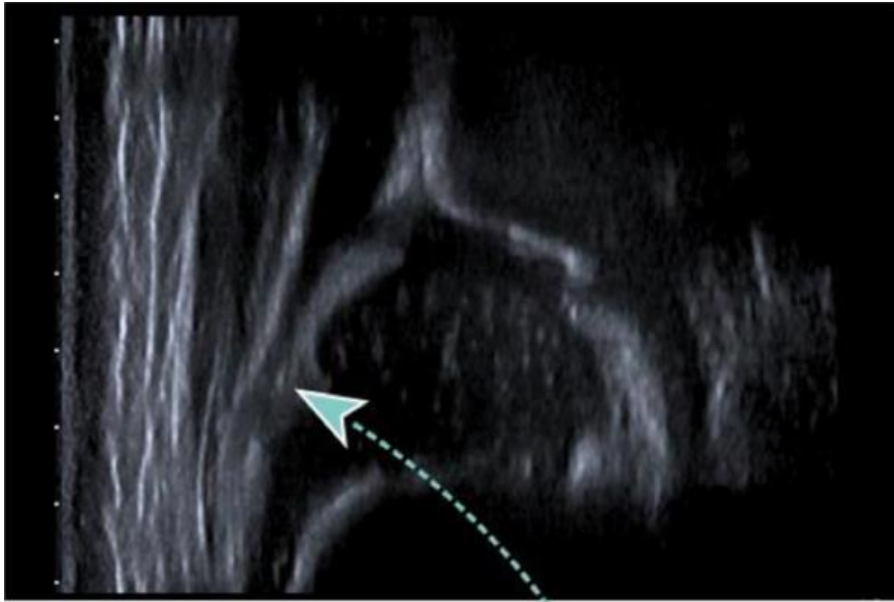


Ossific nucleus

- ❑ Lower limb of ilium must be seen for ultrasound to be useful
- ❑ – ultrasound useful until bony nucleus blocks it – age limit variable

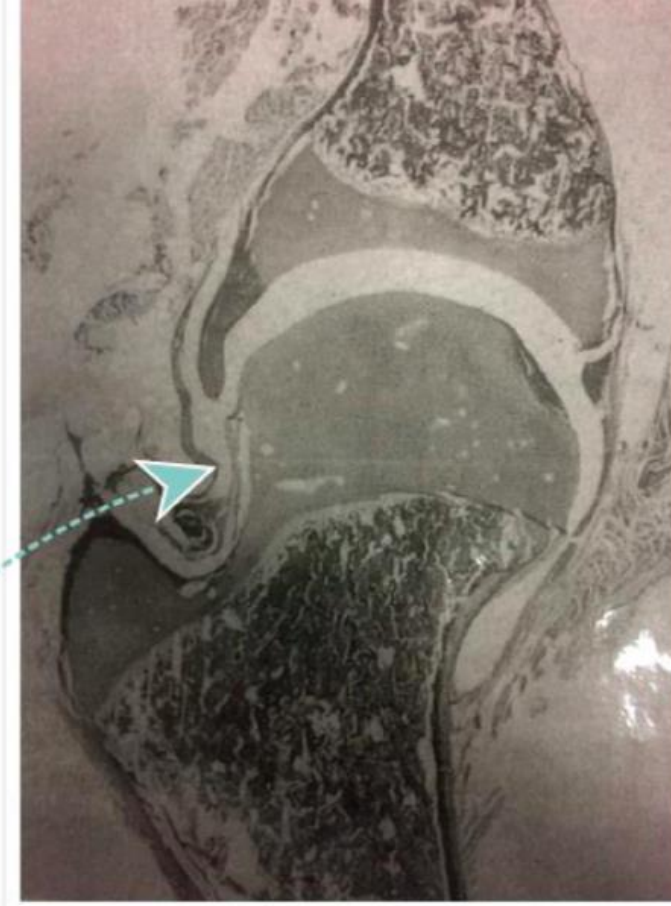
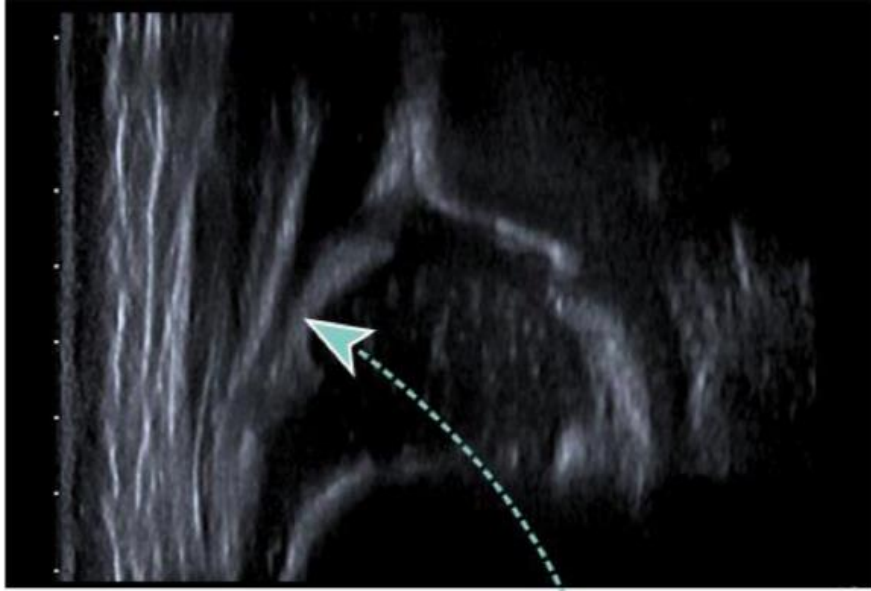


Synovial fold



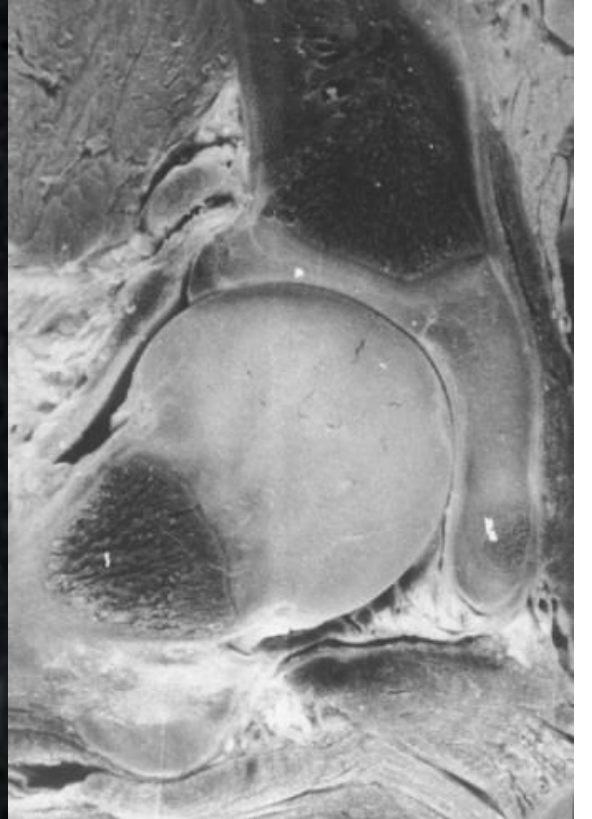
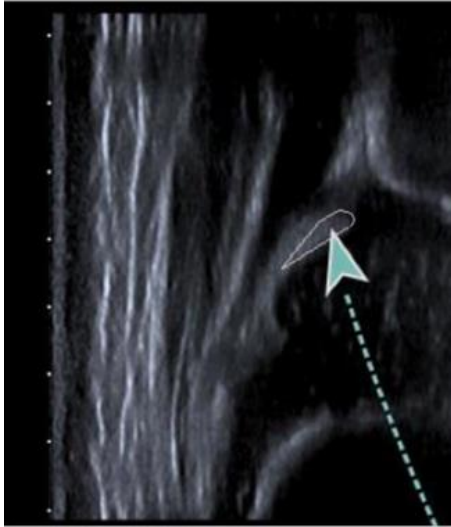
SYNOVIAL
FOLD

Joint capsule



JOINT CAPSULE
(ISCHIO-FEMORAL LIGAMENT –
ECHO WITHIN JOINT CAPSULE)

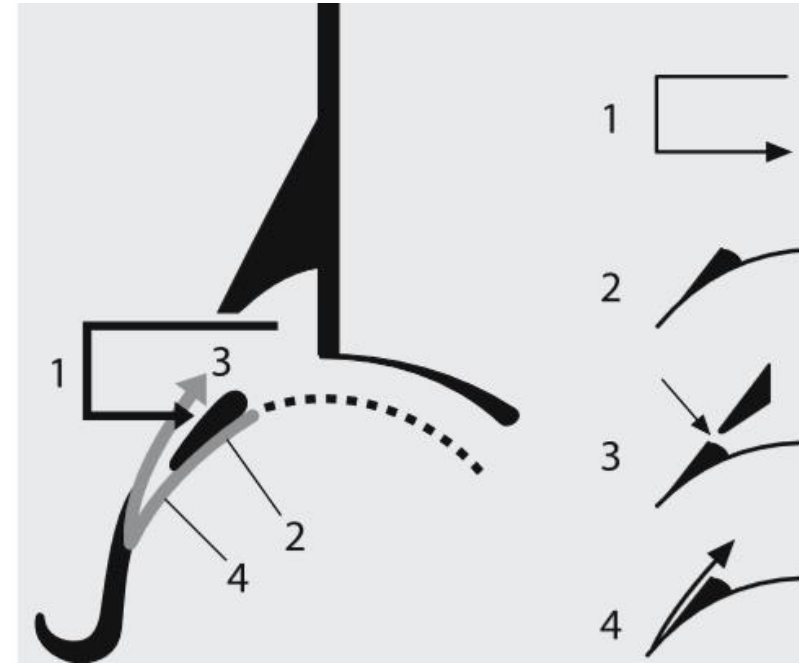
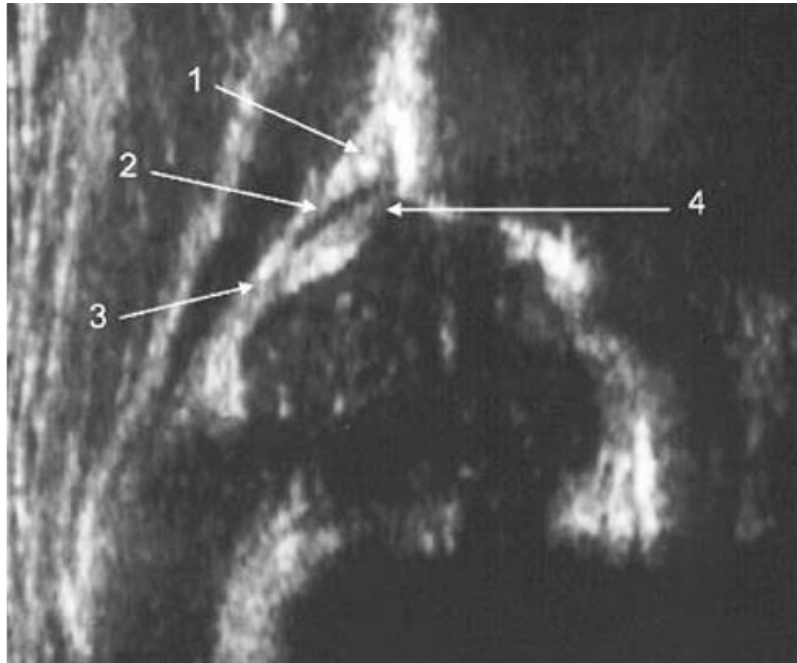
Labrum



LAB

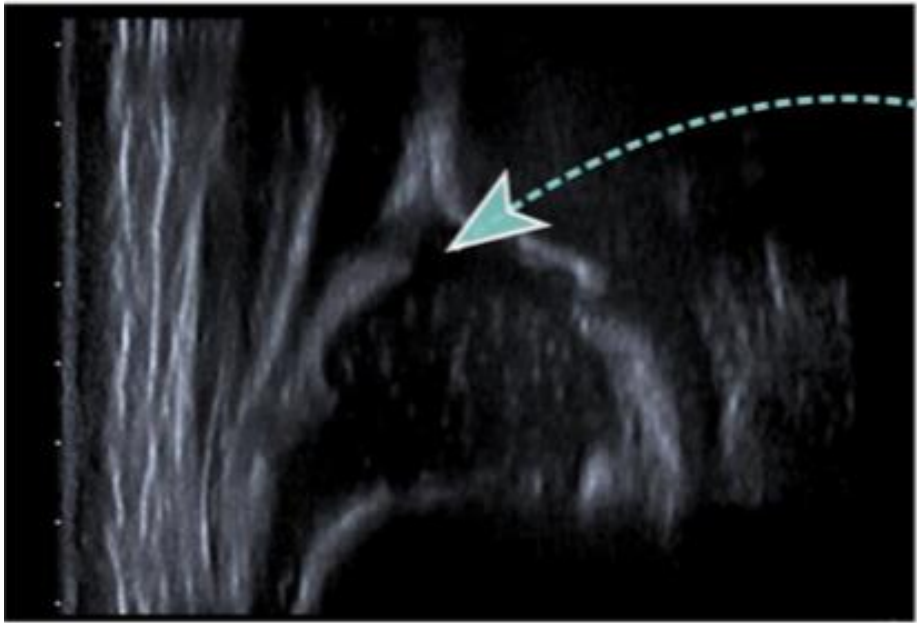
Hyaline cartilag

Labrum (definitions)



- 1. Lateral and distal to hypoechoic cartilage roof
- 2. In contact with femoral head
- 3. Caudal to perichondrial gap
- 4. Where the capsule diverges from the femoral head

Structures above femoral head

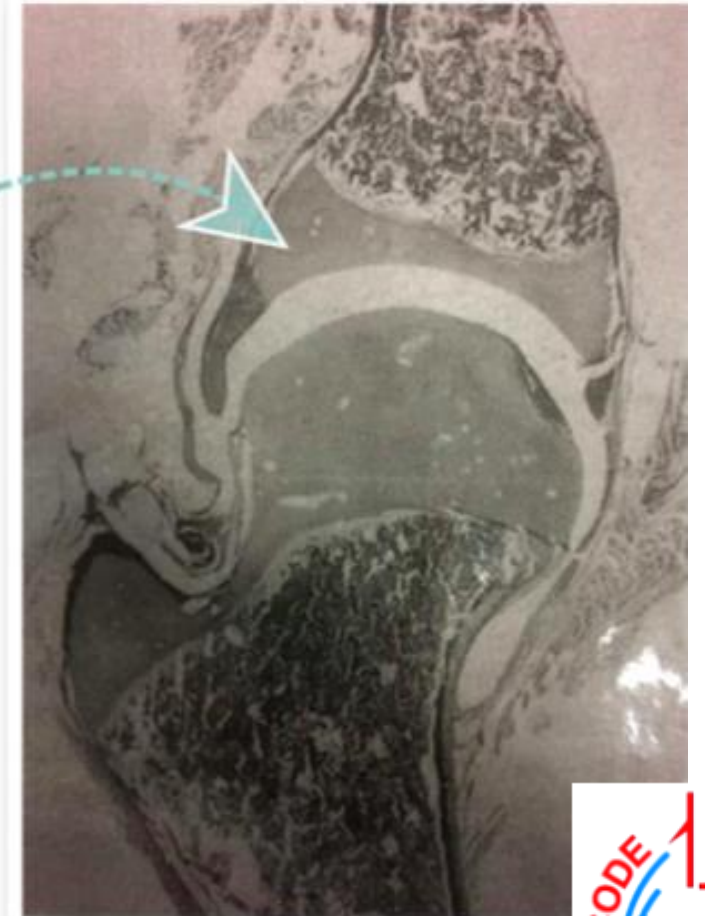


Hyaline cartilage
no echoes

PROXIMAL
PERICHONDRIUM

PERICHONDRIAL GAP

LABRUM



Cartilage roof (hyaline)





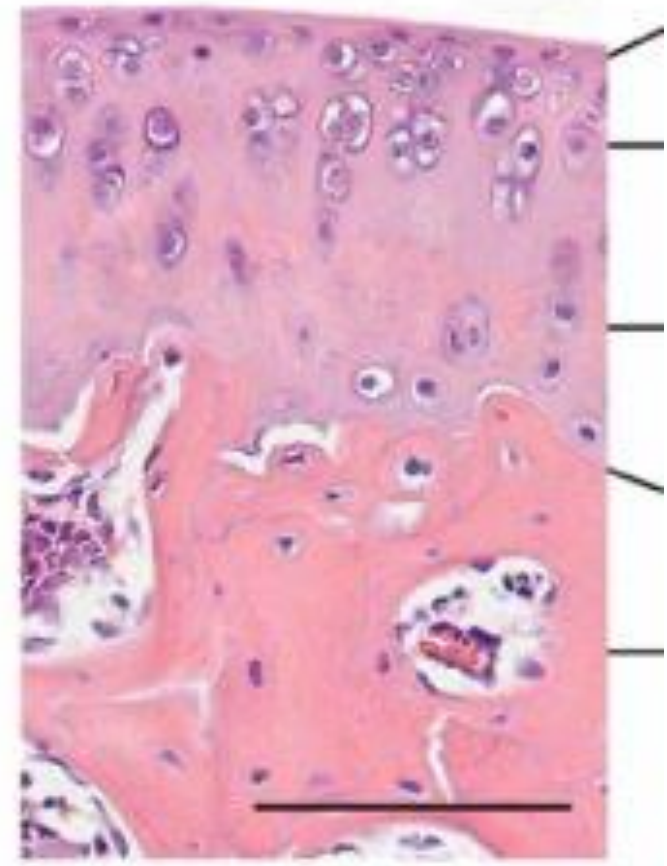
Resting zone

Proliferating zone

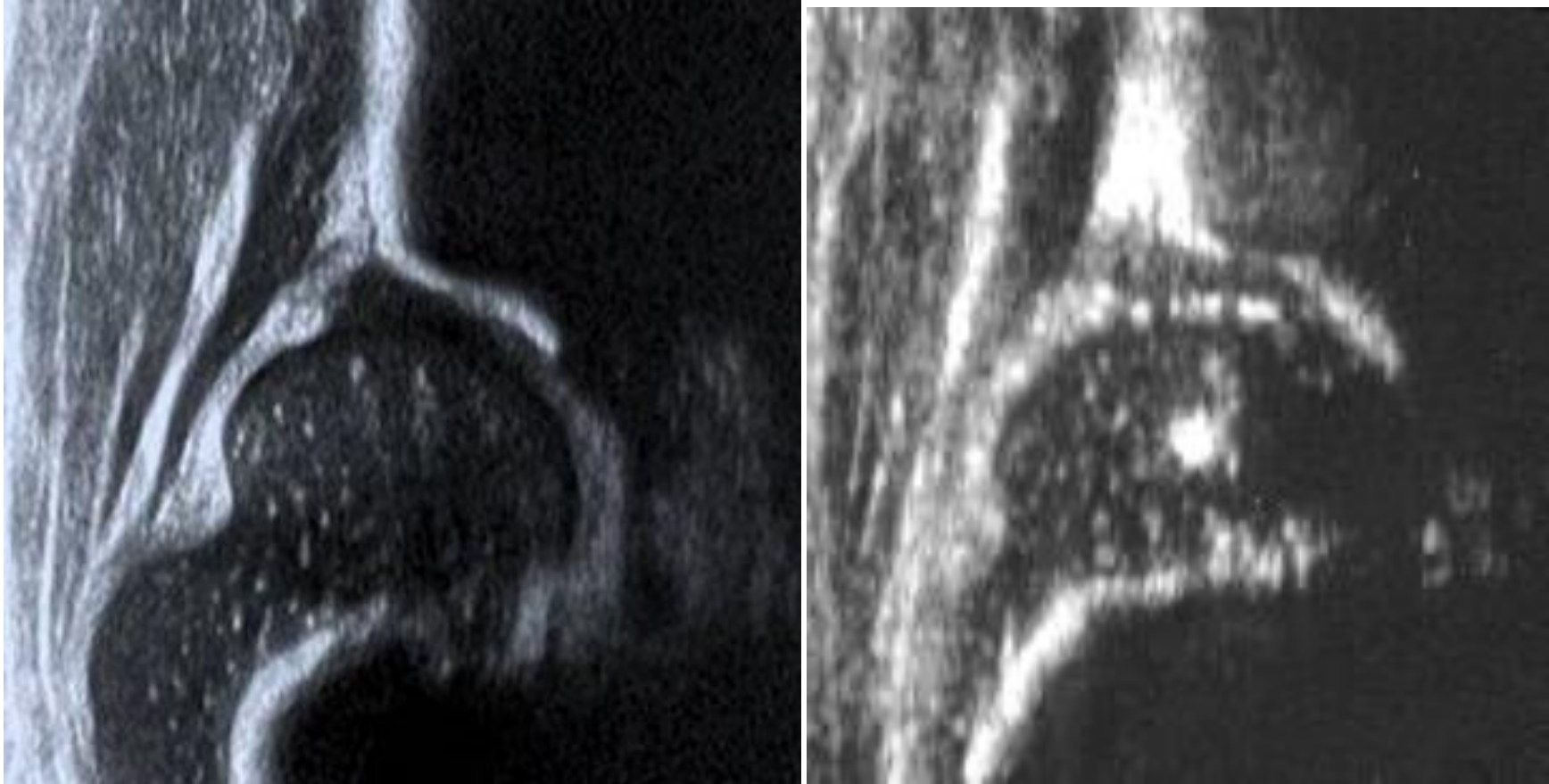
Prehypertrophic zone

Hypertrophic zone

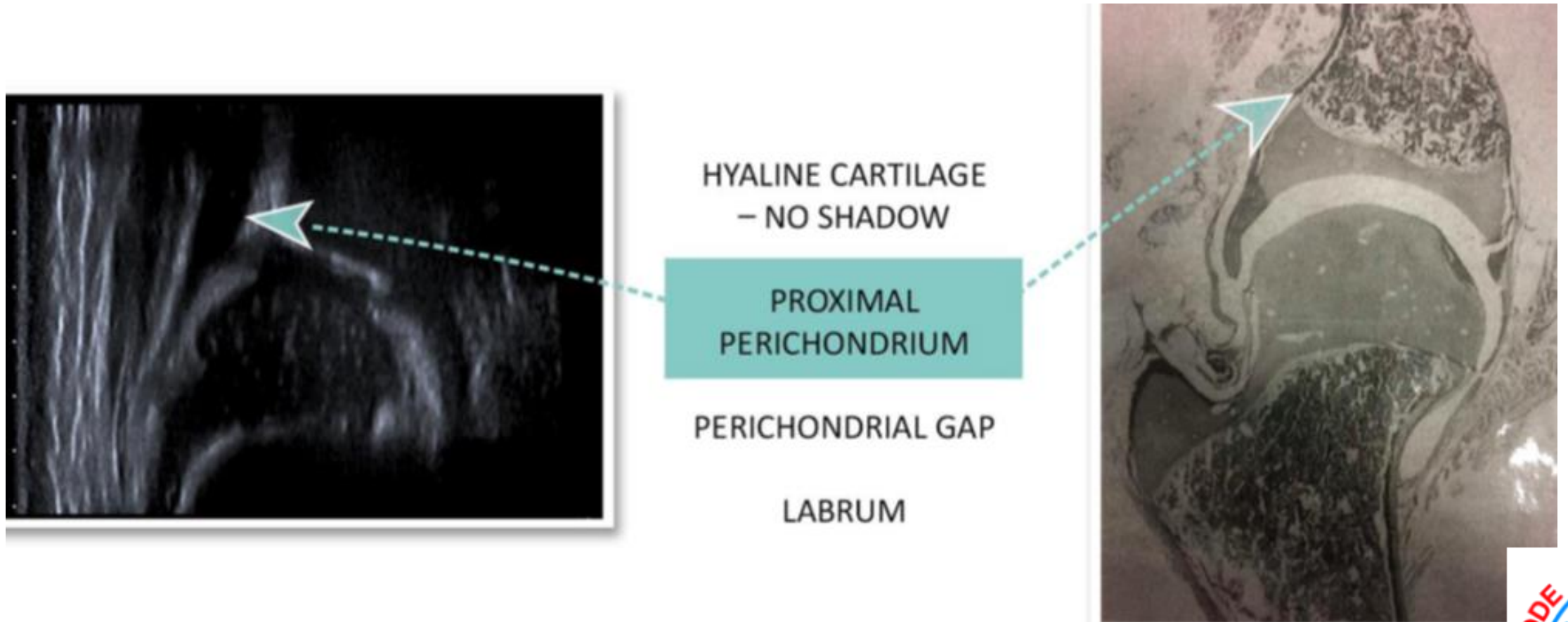
b



Vacuum phenomenon

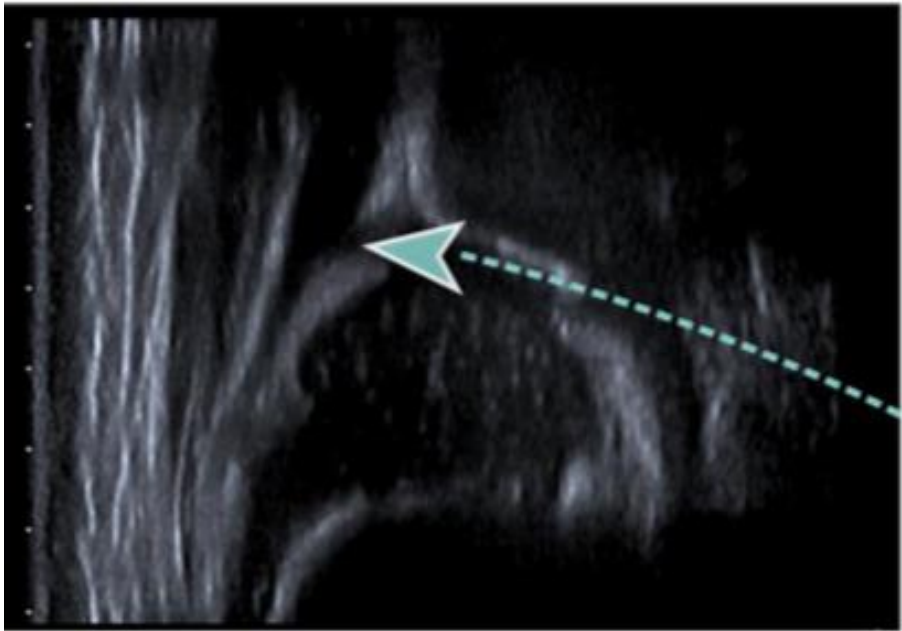


Structures above femoral head



High resolution - 2 shadows - outer one is the reflected head of Rectus Femoris

Structures above femoral head

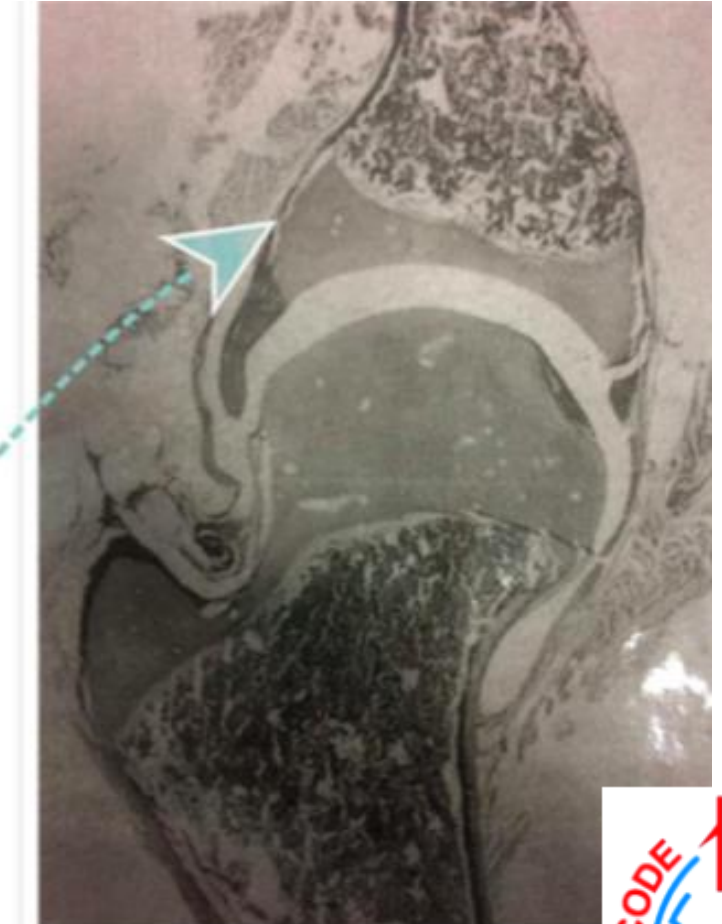


HYALINE CARTILAGE
– NO SHADOW

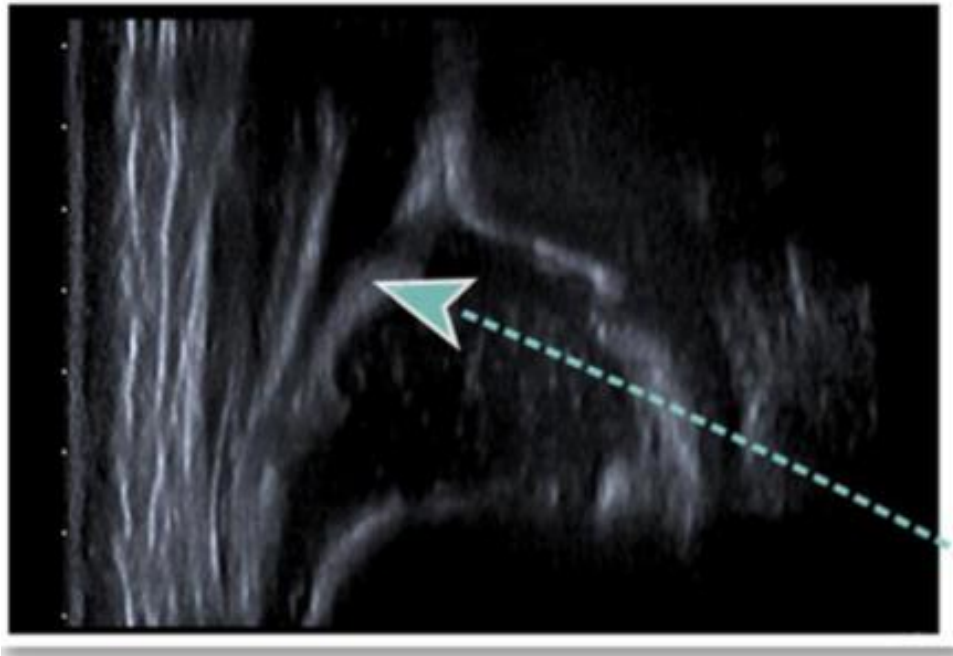
PROXIMAL
PERICHONDRIUM

PERICHONDRIAL GAP

LABRUM



Structures above femoral head

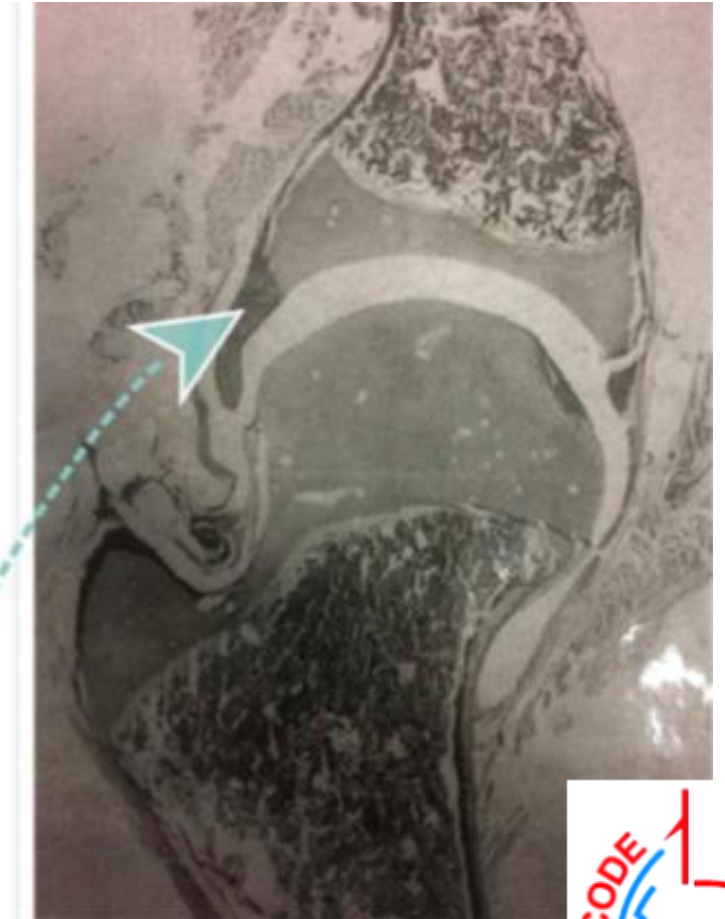


HYALINE CARTILAGE
– NO SHADOW

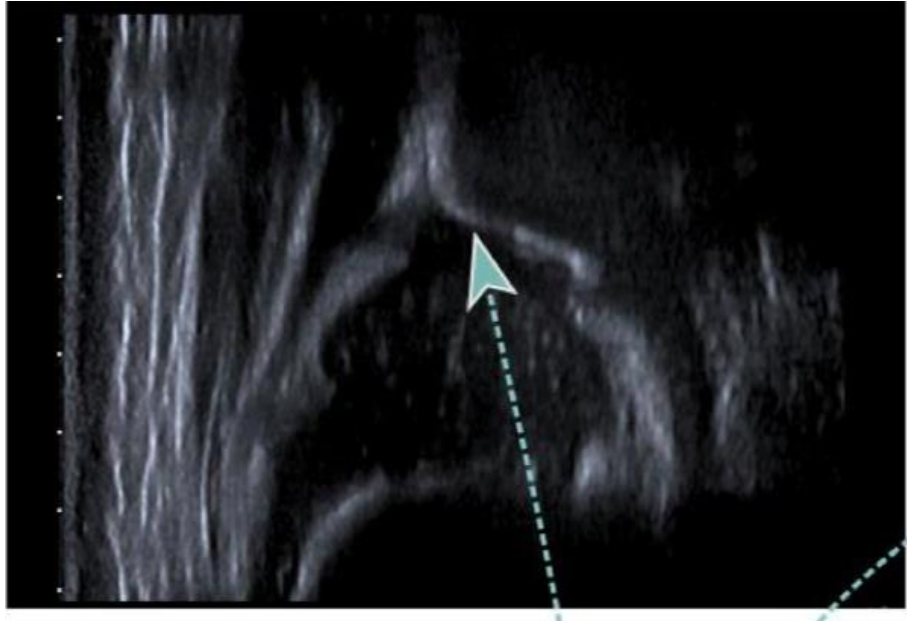
PROXIMAL
PERICHONDRIUM

PERICHONDRIAL GAP

LABRUM

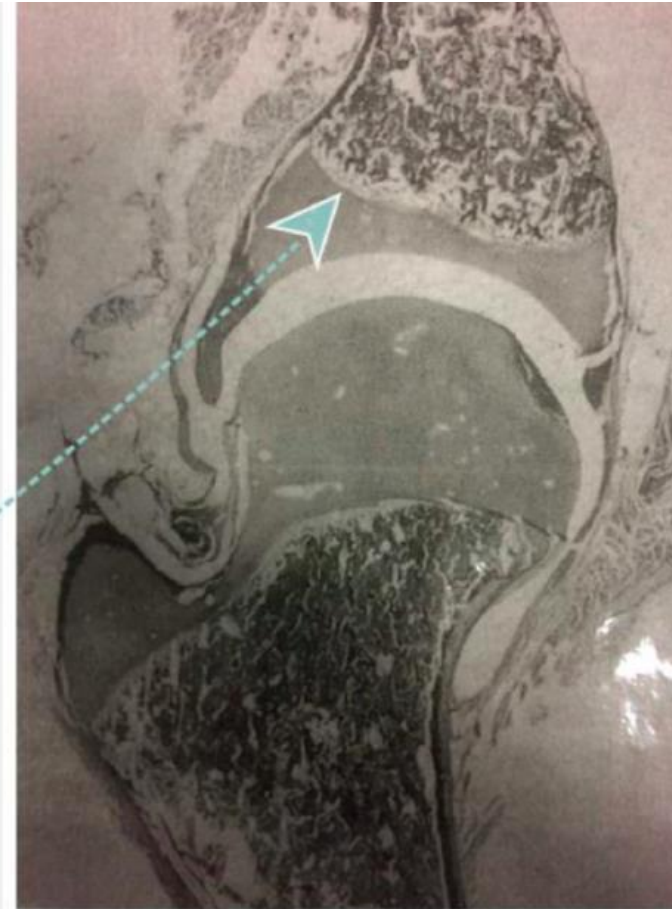
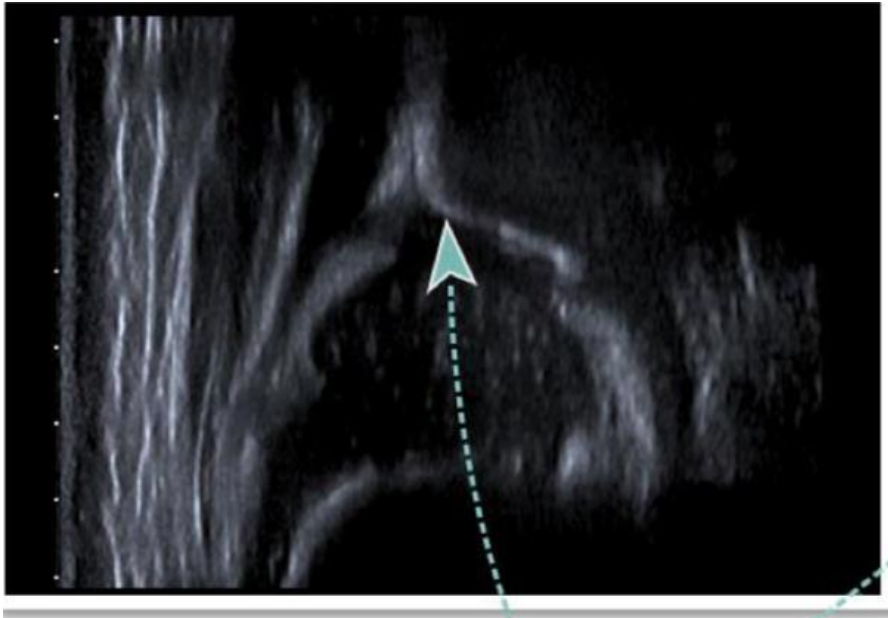


Bony roof



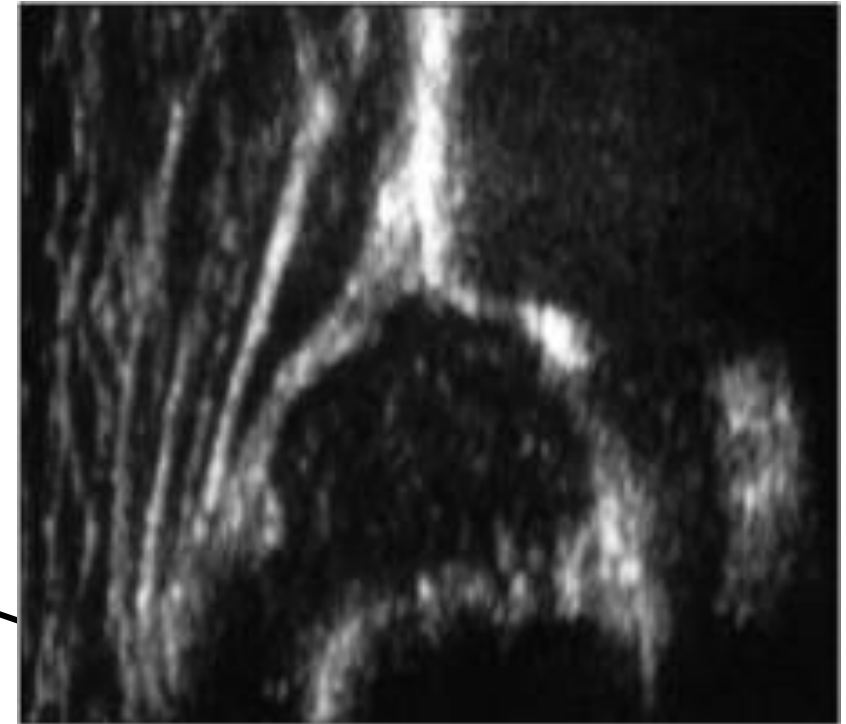
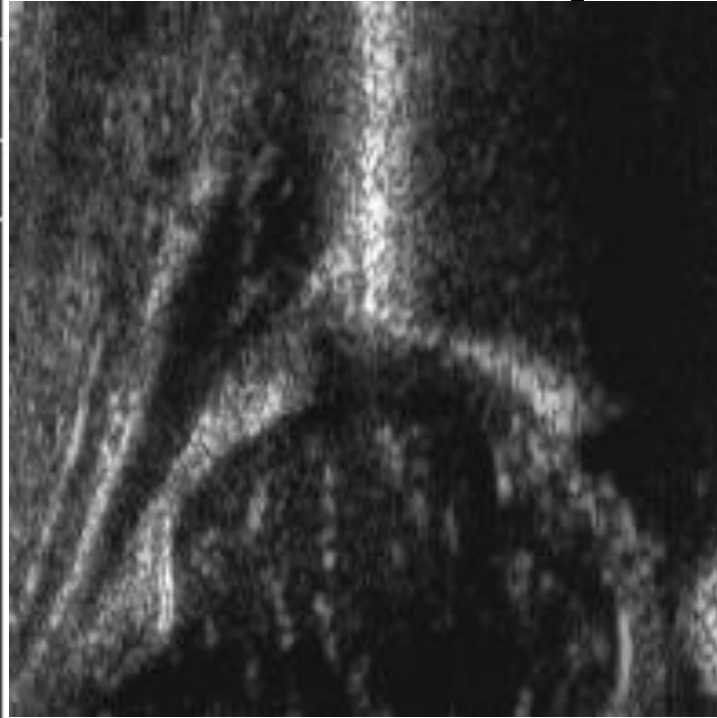
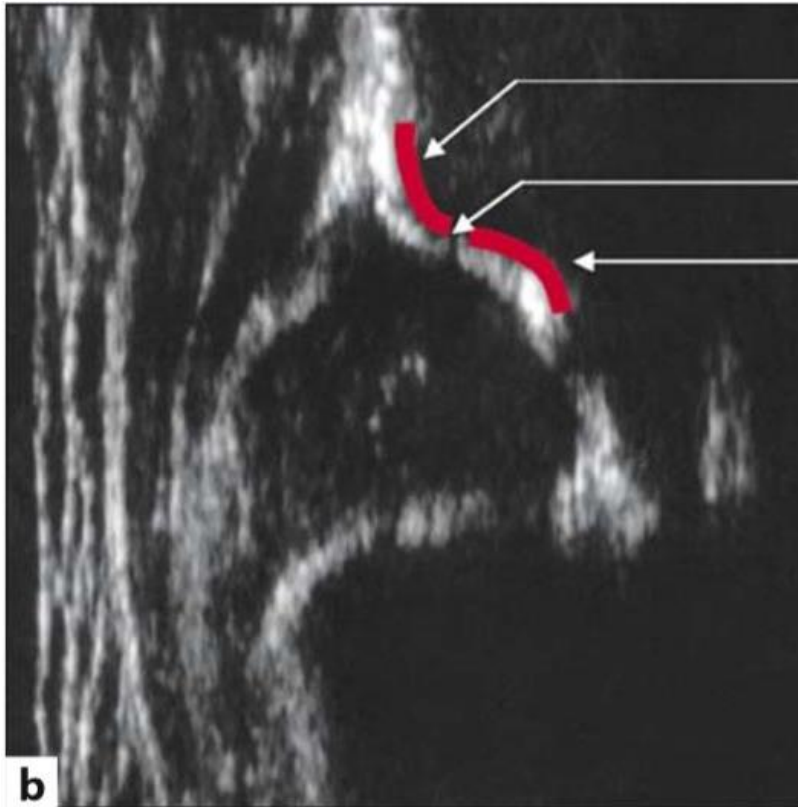
BONY ROOF

Turning point



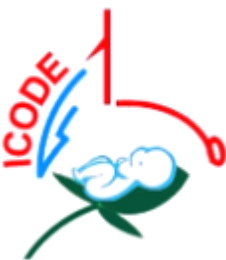
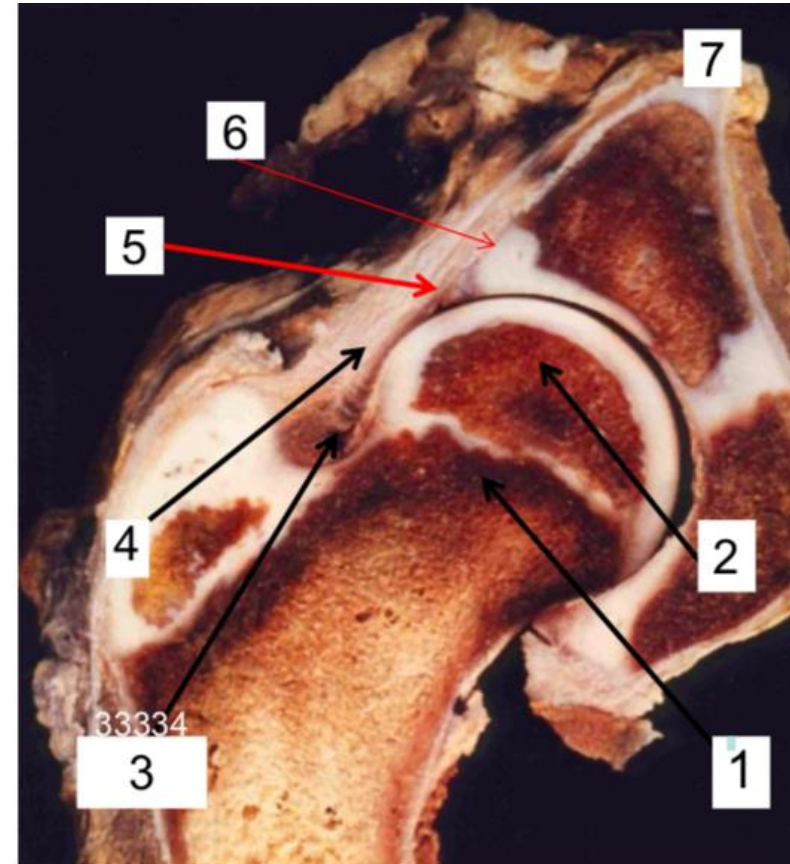
TURNING POINT
CHANGE FROM CONCAVITY TO CONVEXITY

Turning point



Anatomy

1. Chondro-osseous border
2. Femoral head
3. Synovial fold
4. Capsule
5. Labrum
6. Cartilage
7. Bony roof



Anatomical Identification

1) Chondro-osseous border

2) Femoral head

3) Synovial fold

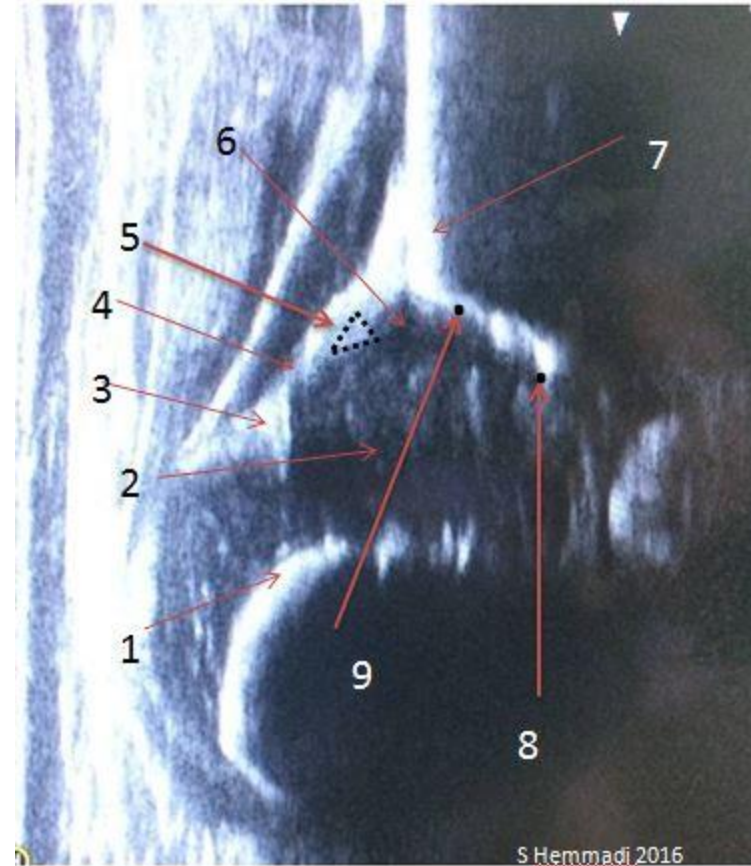
4) Joint capsule

5) Labrum

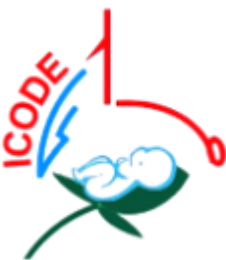
6) Hyaline cartilage roof

7) Bony roof

8 + 9 concavity to convexity (turning point)



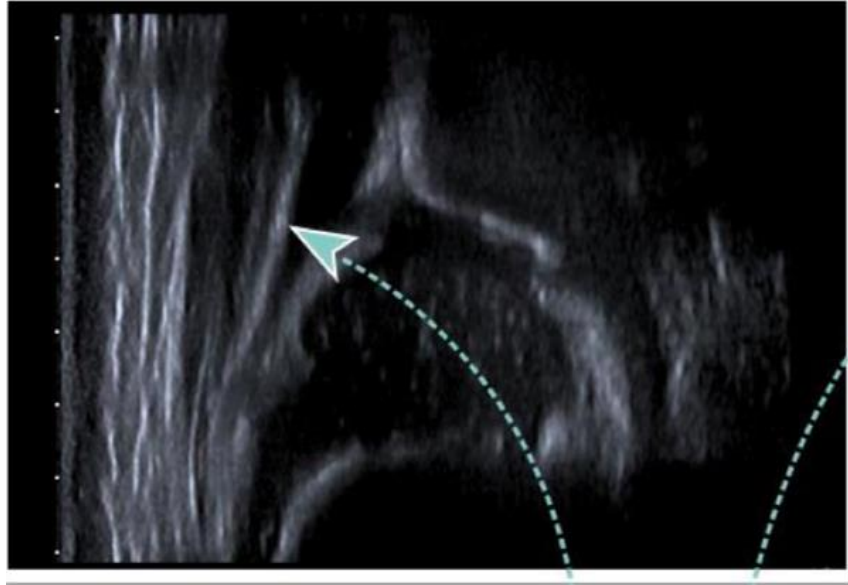
50% of diagnostic errors due to this list being incomplete or incorrectly identified!



Example of incorrect anatomical identification



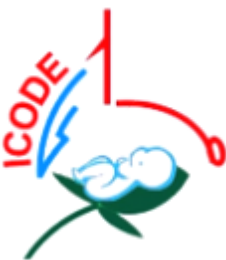
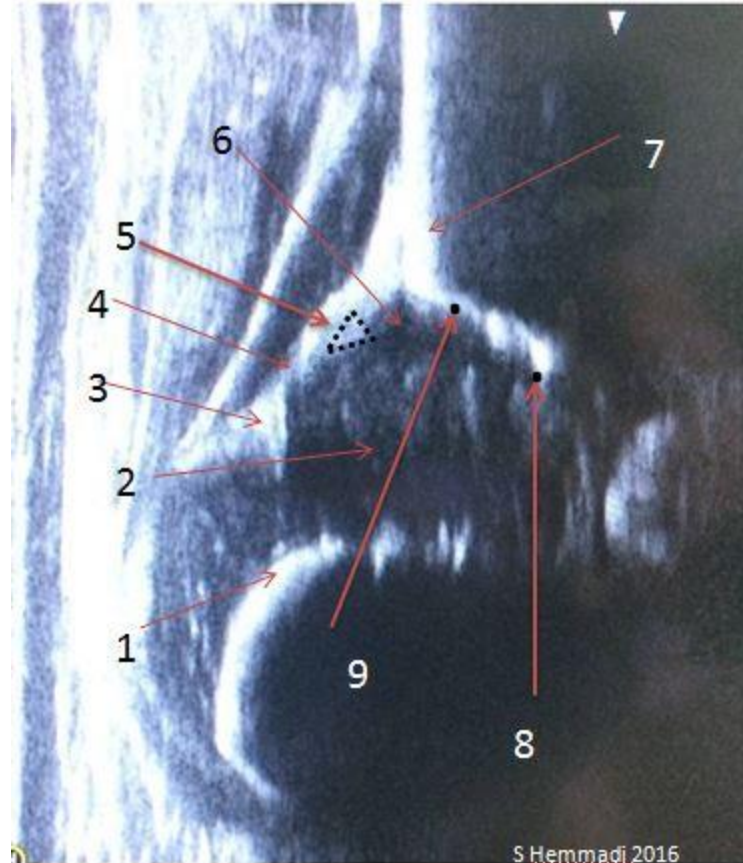
Intermuscular septum



**INTERMUSCULAR
SEPTUM**
DON'T MISTAKE FOR CAPSULE!

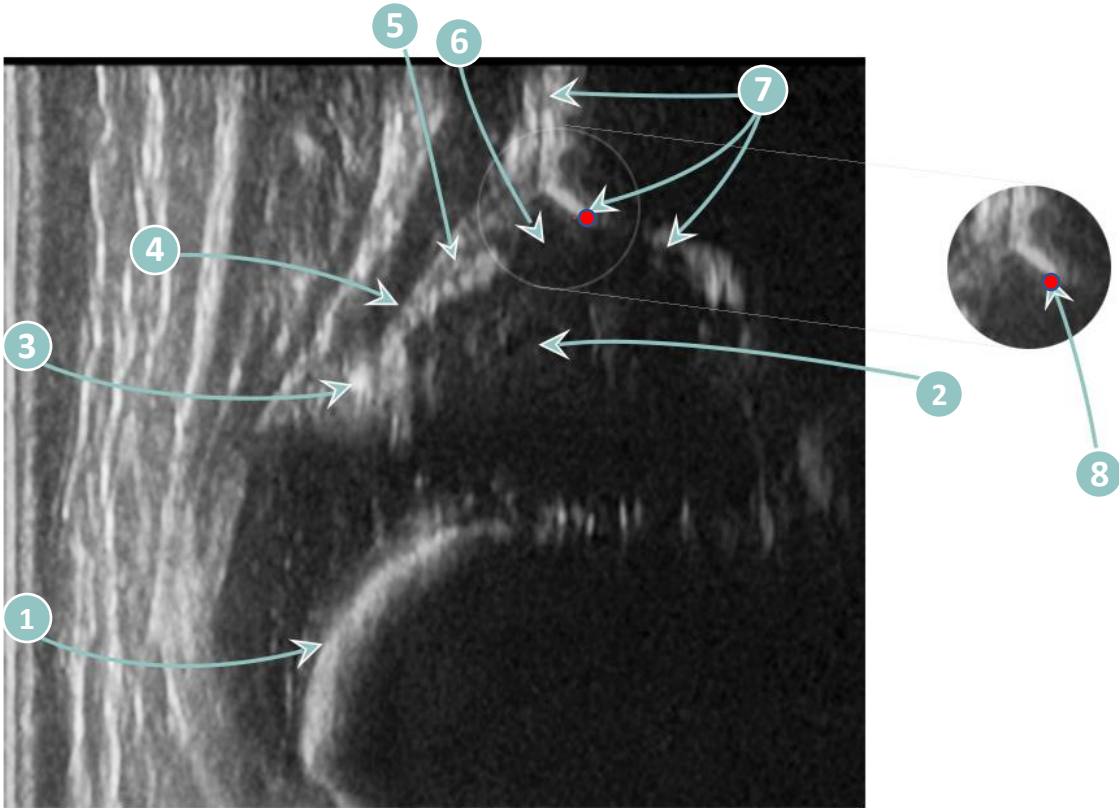
Anatomical Identification

50% of diagnostic errors due to this list being incomplete!



Anatomical Identification checklist 1

- 1) Chondro-osseous border
- 2) Femoral head
- 3) Synovial fold
- 4) Joint capsule
- 5) Labrum
- 6) Hyaline cartilage roof
- 7) Bony roof
- 8) Concavity to convexity (turning point)



Is the labrum below the turning point? Centered/Decentered



?

