Pediatric Hip

Freih Odeh Abu Hassan

F.R.C.S.(Eng.), F.R.C.S.(Tr.& Orth.)

Professor of Orthopedics

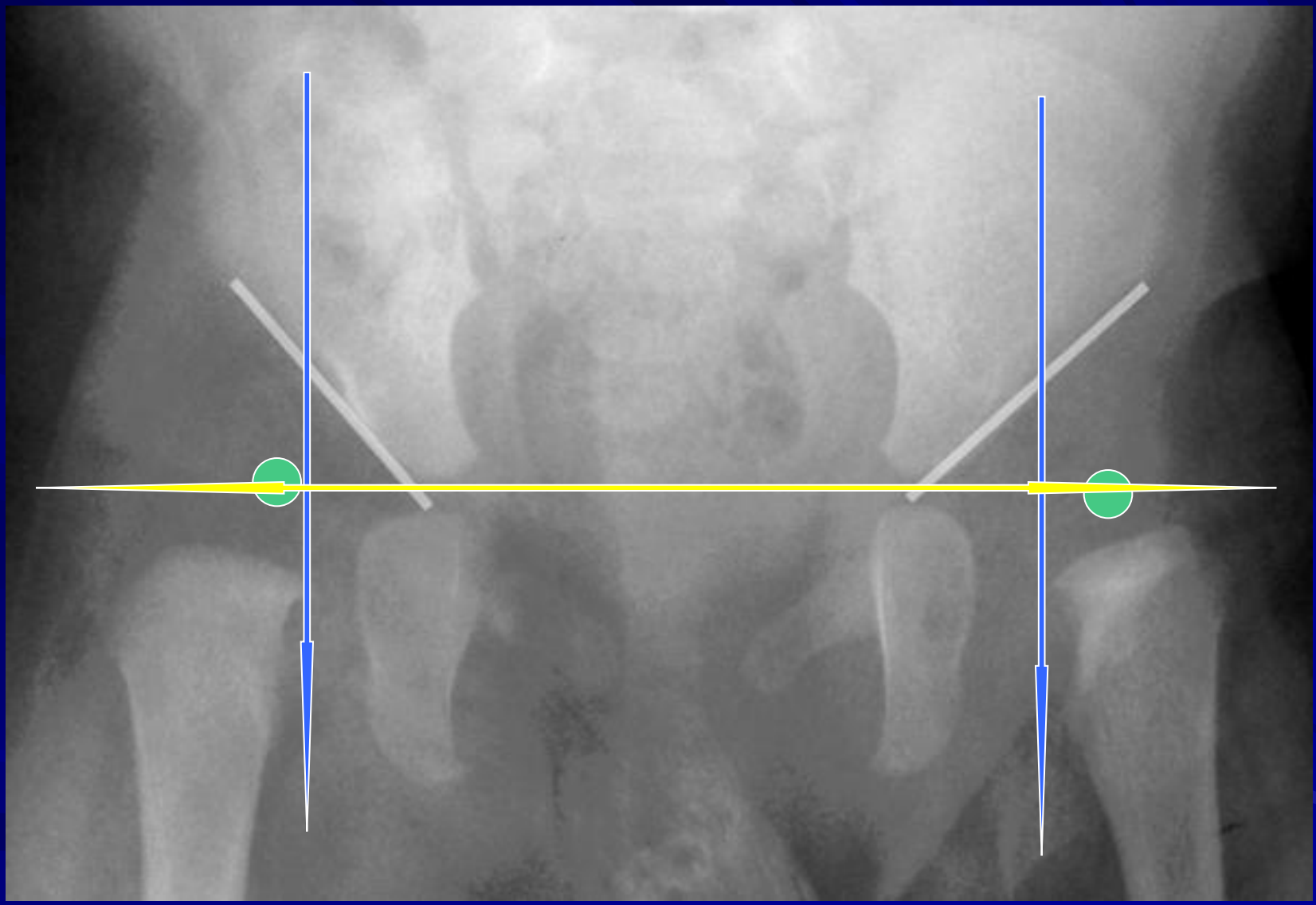
University of Jordan

1-DDH

Dislocation
Subluxation
Unstable hips
Hip dysplasia
AD

10 F(Risk factors for DDH)

1. **F**emale 2. **F**amily history
3. **F**irst born → breech.
4. **F**luid around the fetus.
5. **F**eet deformity : Met. Add./ C.Valgus.
6. **F**ull term or Premature.
7. **F**acial asymmetry.
8. **F**aulty habits 9.**F**etal anomalies



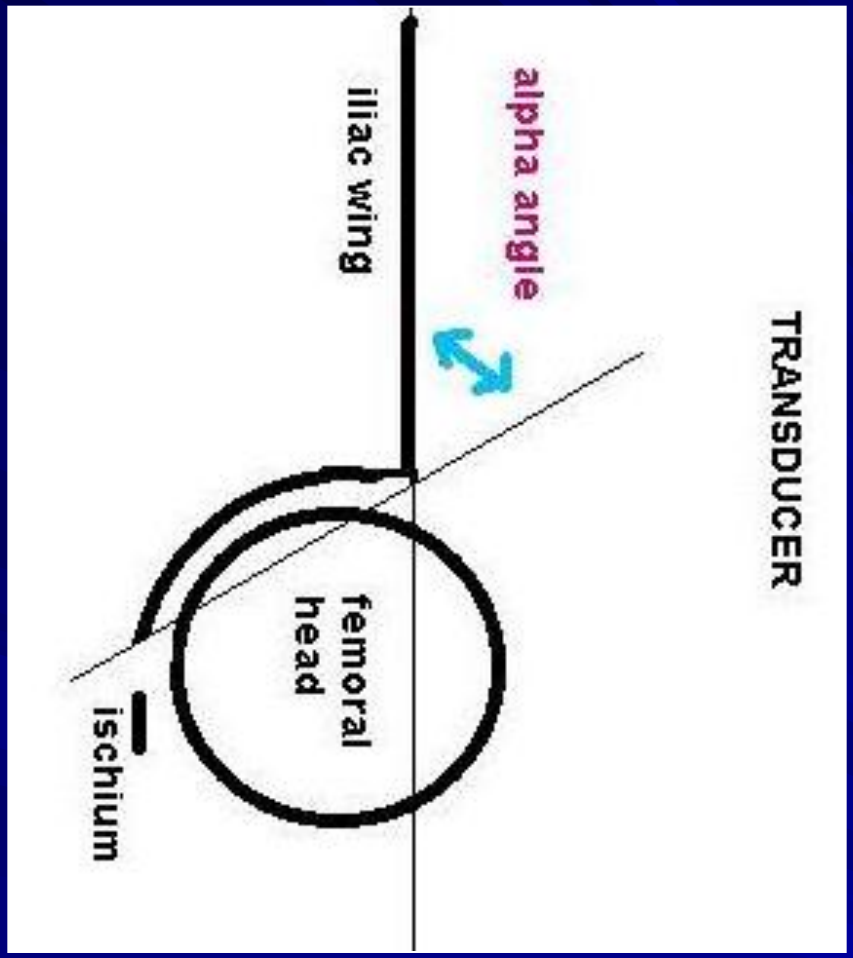
Ultrasound

*Not before 4-6 weeks

*Iliac line must be vertical

*Needs the expert !!!!!!

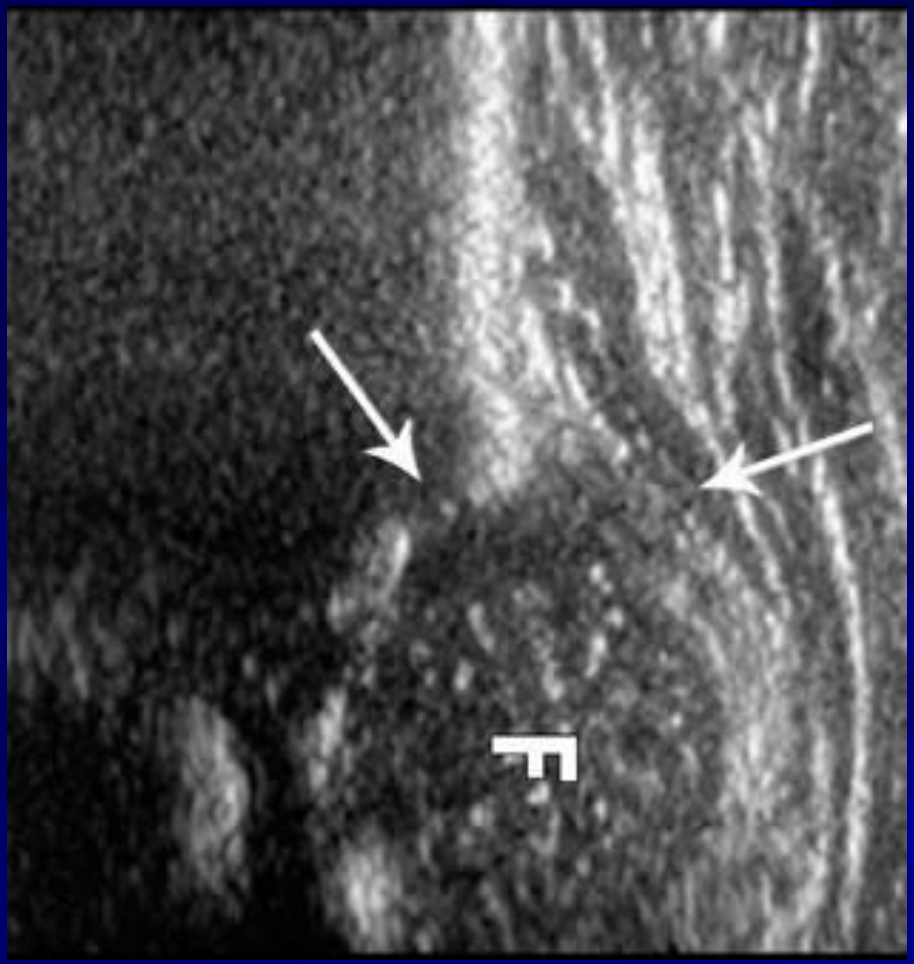
*Dynamic more conclusive



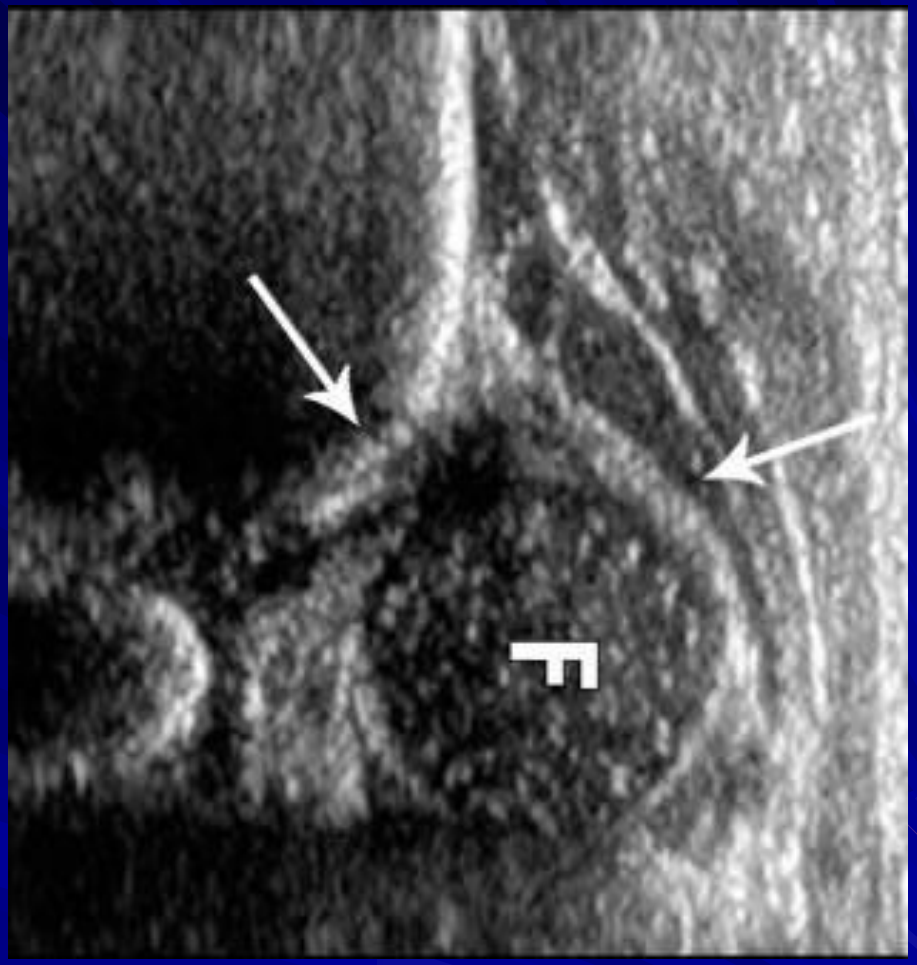
The Alpha angle is = the Acetabular angle
= line along the lateral bony margin.
= line across the bony acetabular roof .

Normal sonographic appearance of Infant Hip

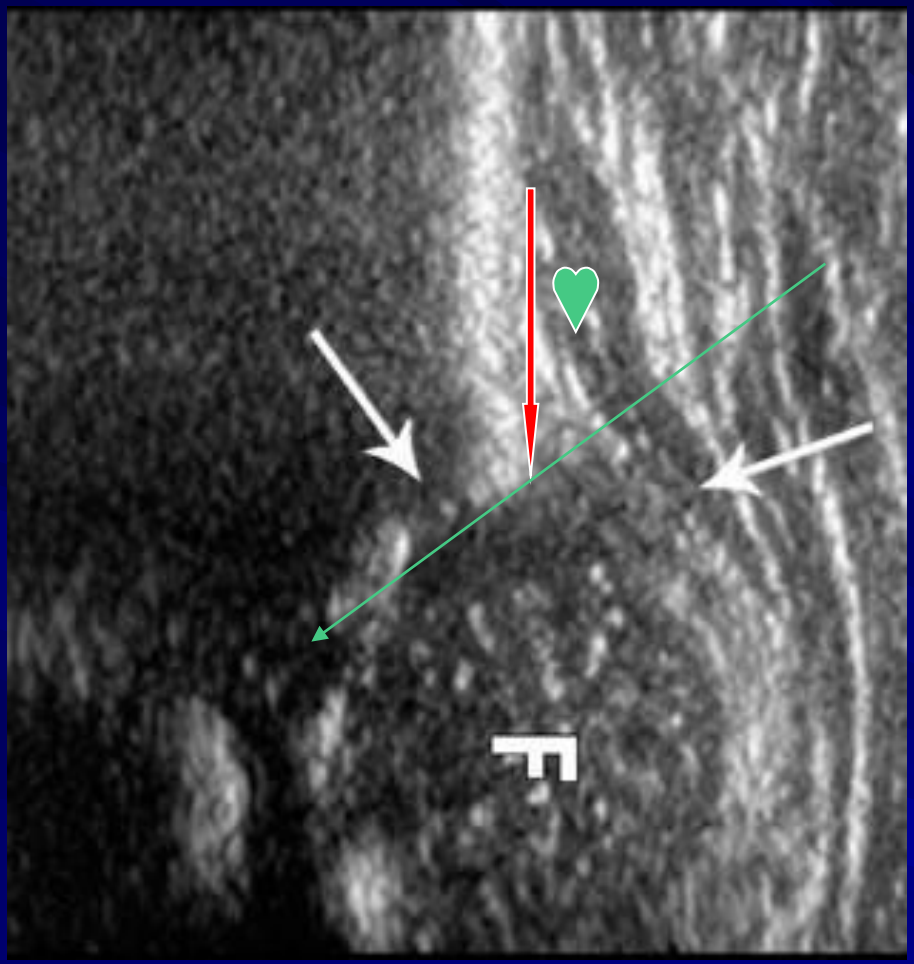
	Sonographic Hip Type	Alpha °
I-	Normal (Mature hip)	> 60°
IIA-	Physiologic Immaturity < 3m old	50 - 59°
IIB-	Delayed Osseous development >3m old	50 - 59°
III-	Sublaxation	<50°
IV -	Dislocation	

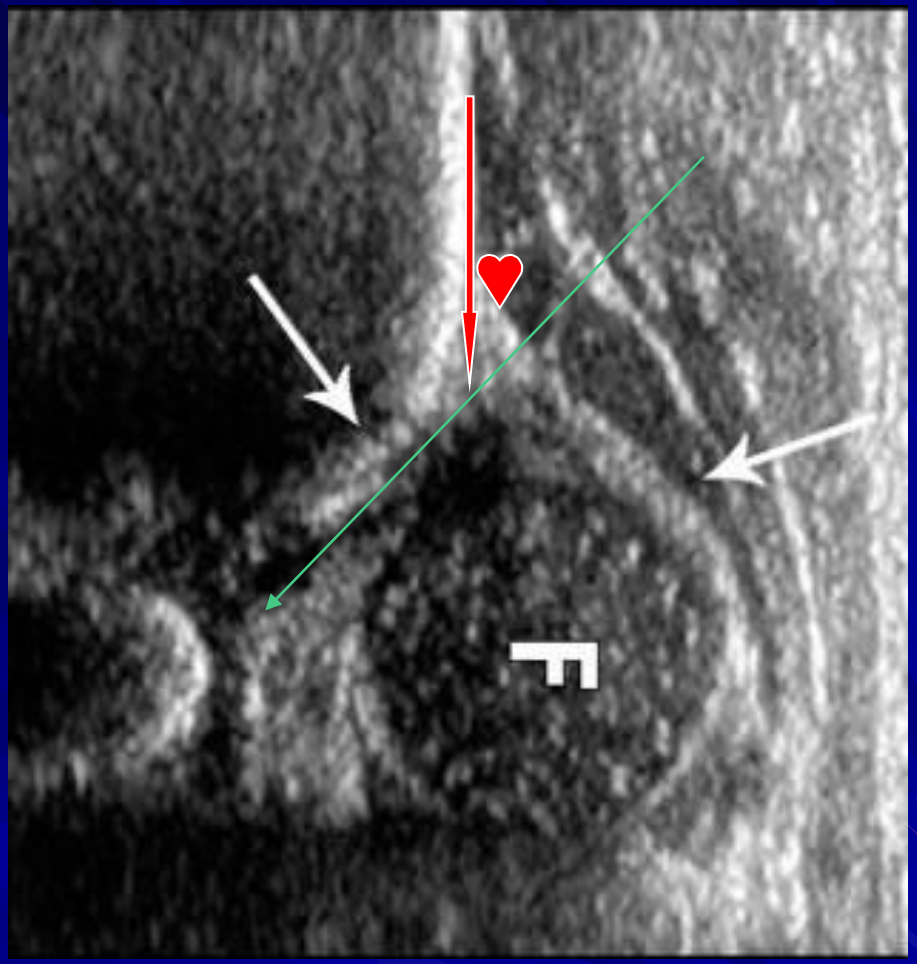


Normal Hip - I



Dysplasia- II



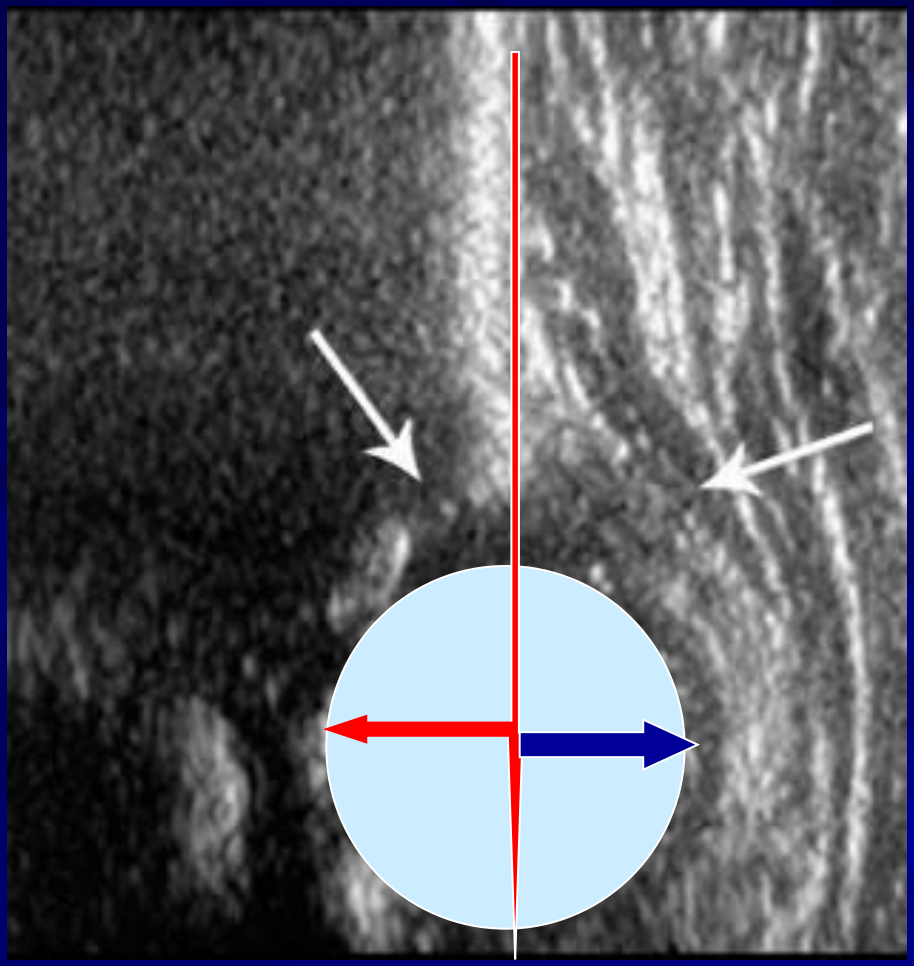


> 60°

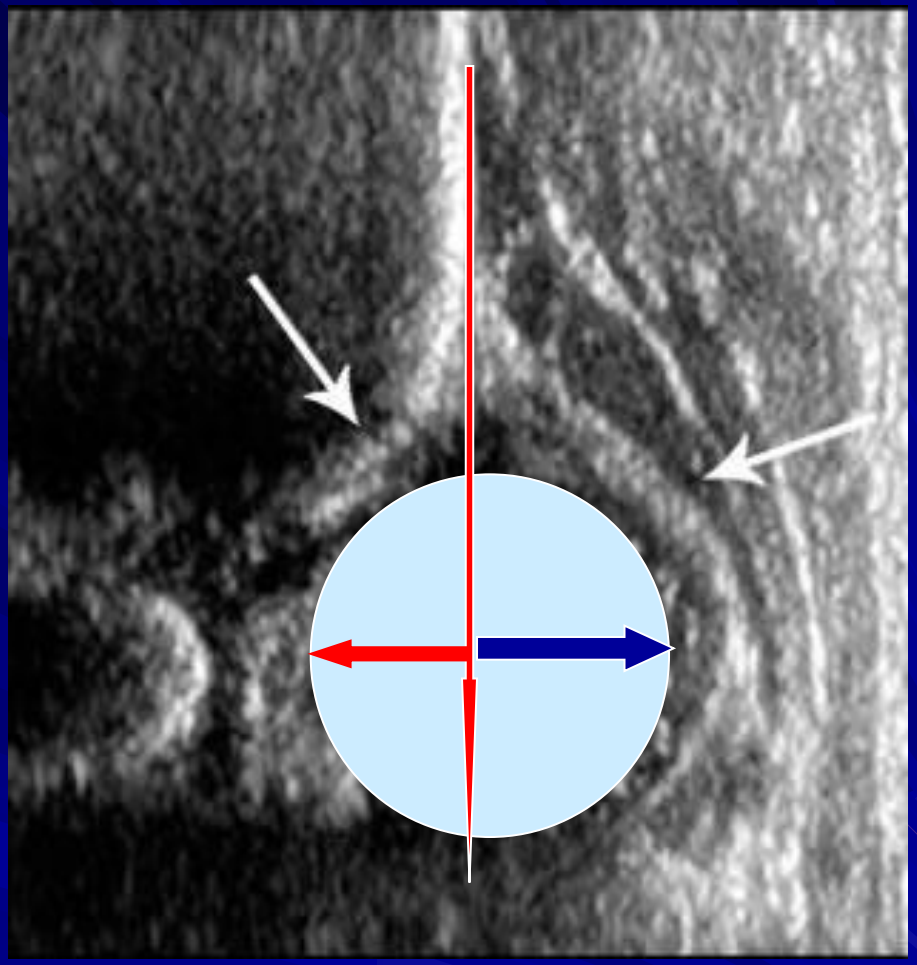
Normal Hip

< 60°

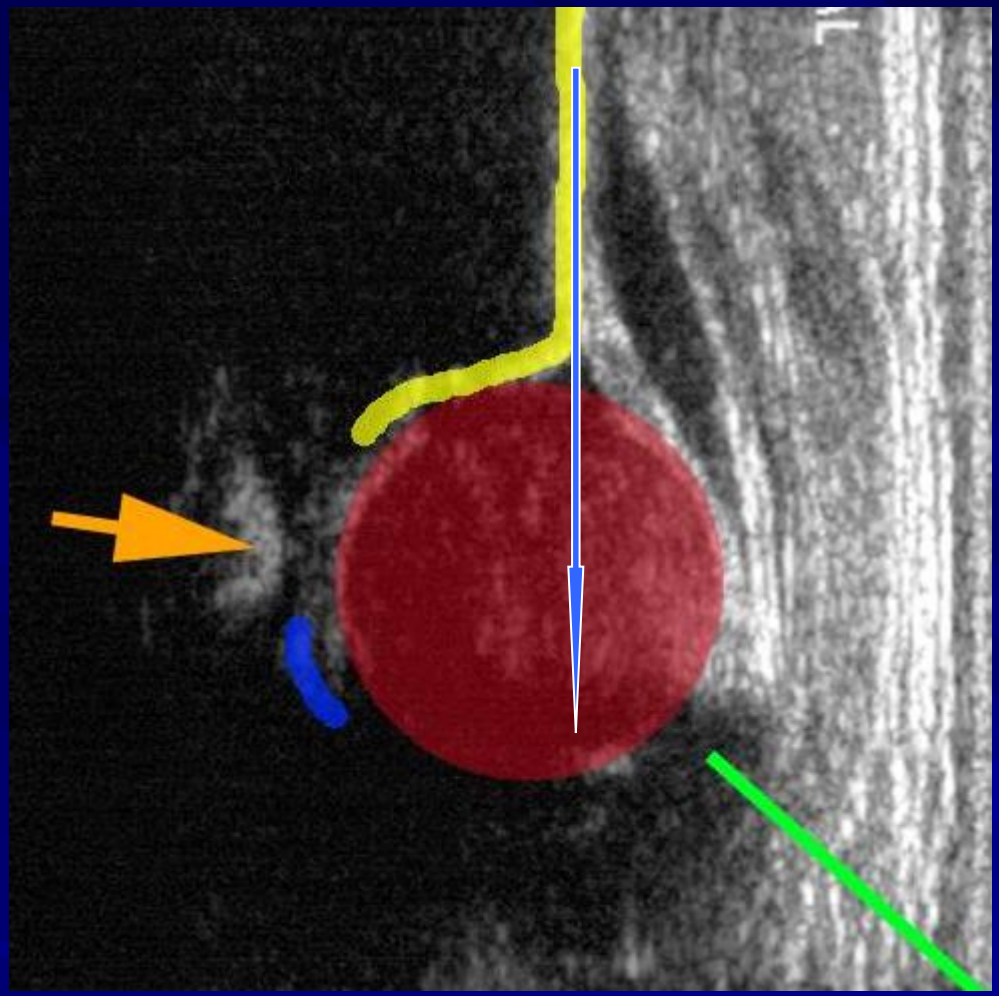
Dysplasia.



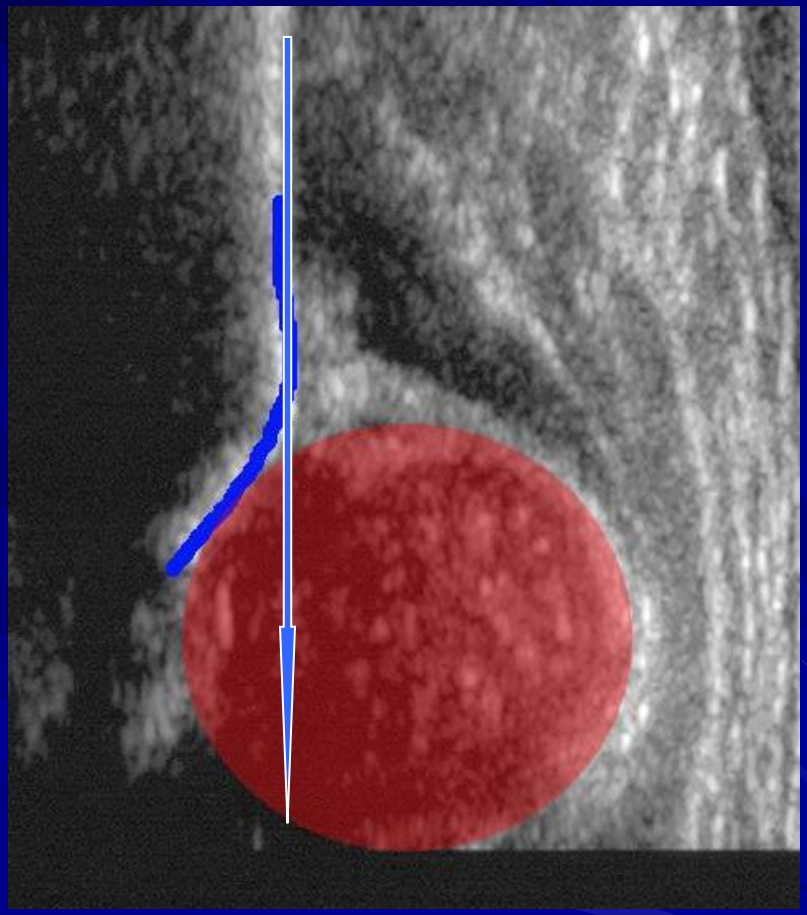
Normal Hip



Dysplasia.



Normal Hip



Sublaxation

Who should perform the Ultrasound examination???

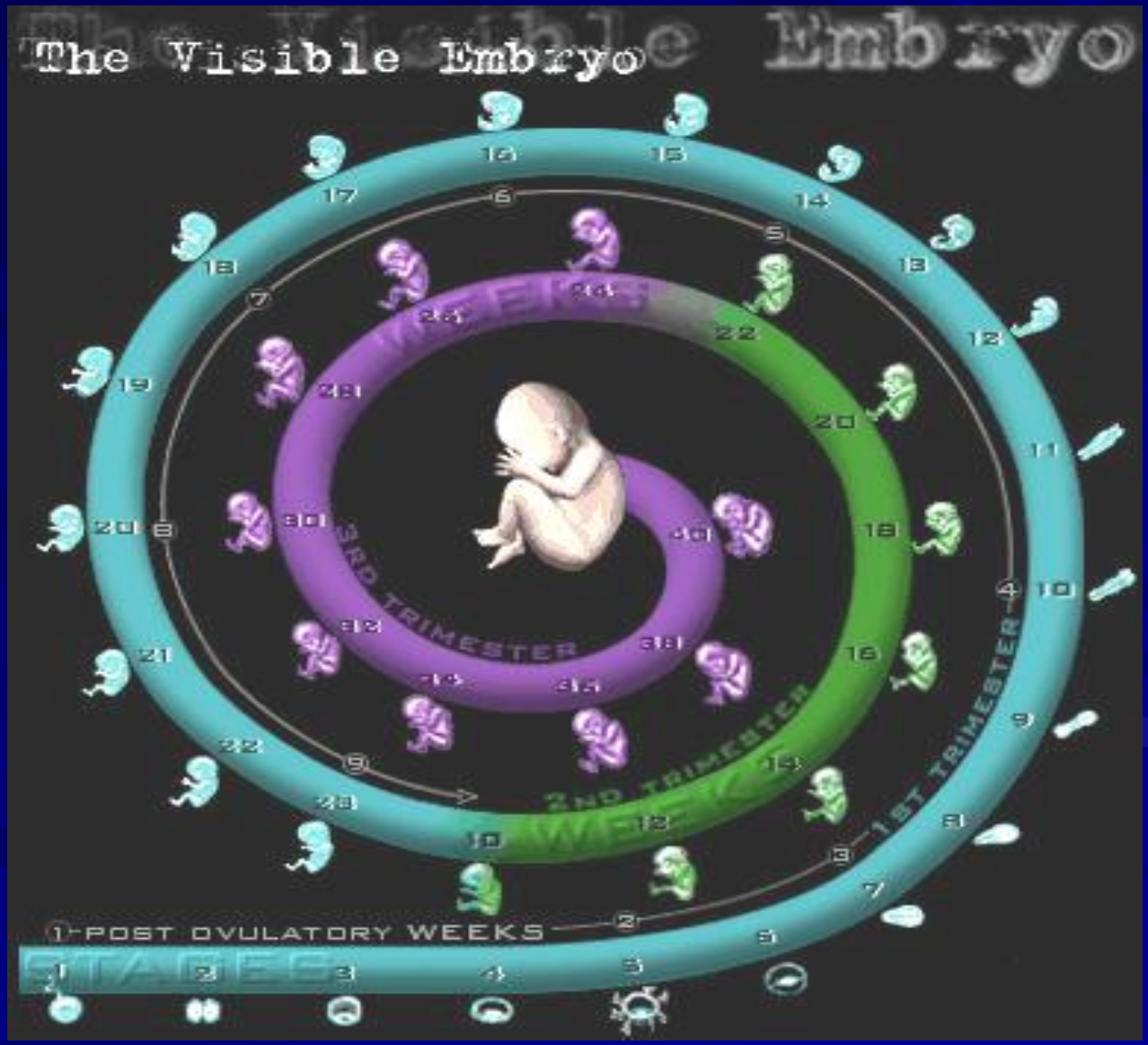
In Europe → Orthopedic surgeons or Pediatricians

In USA → radiologists

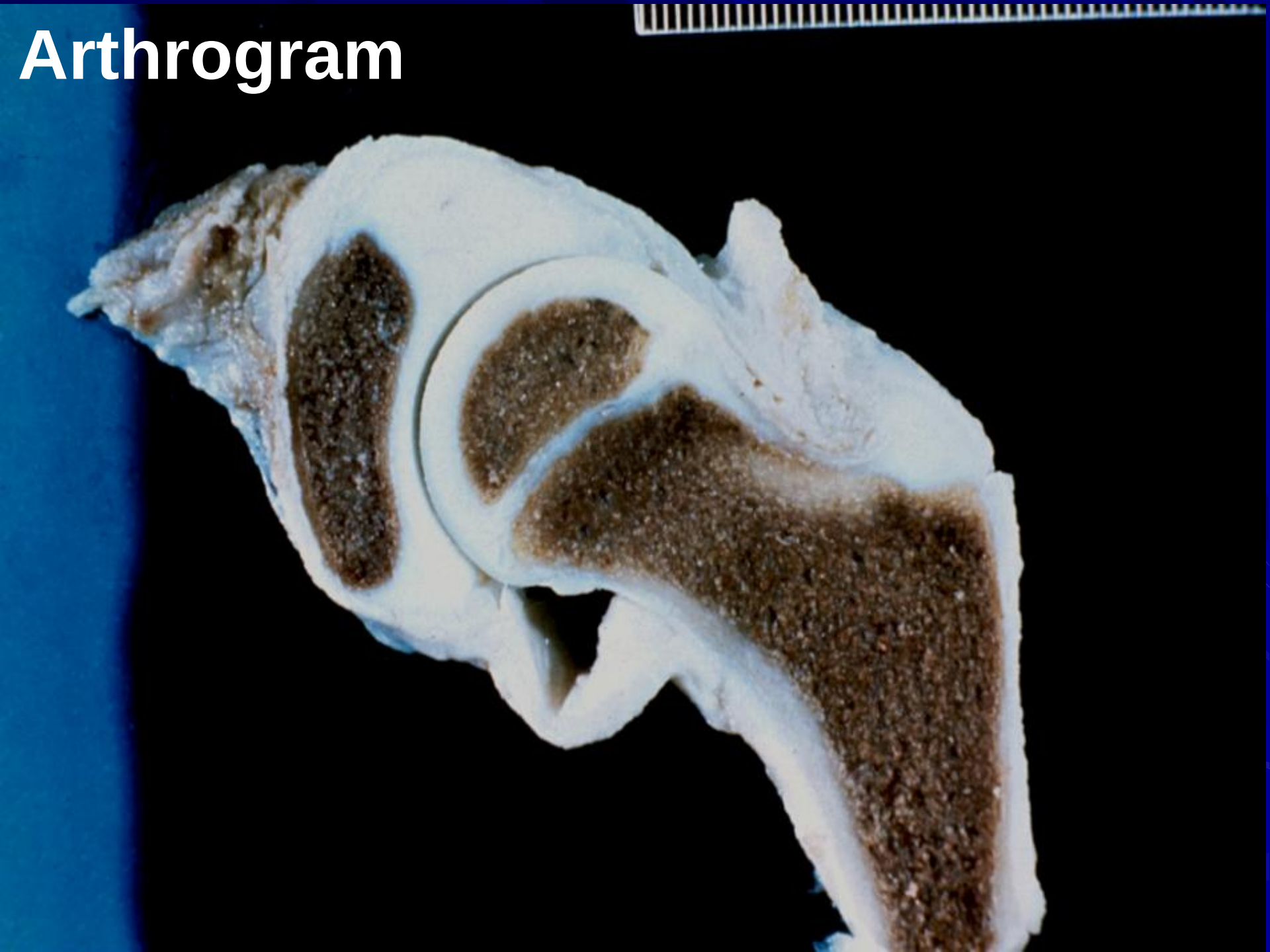
Why Orthopedic surgeons ??

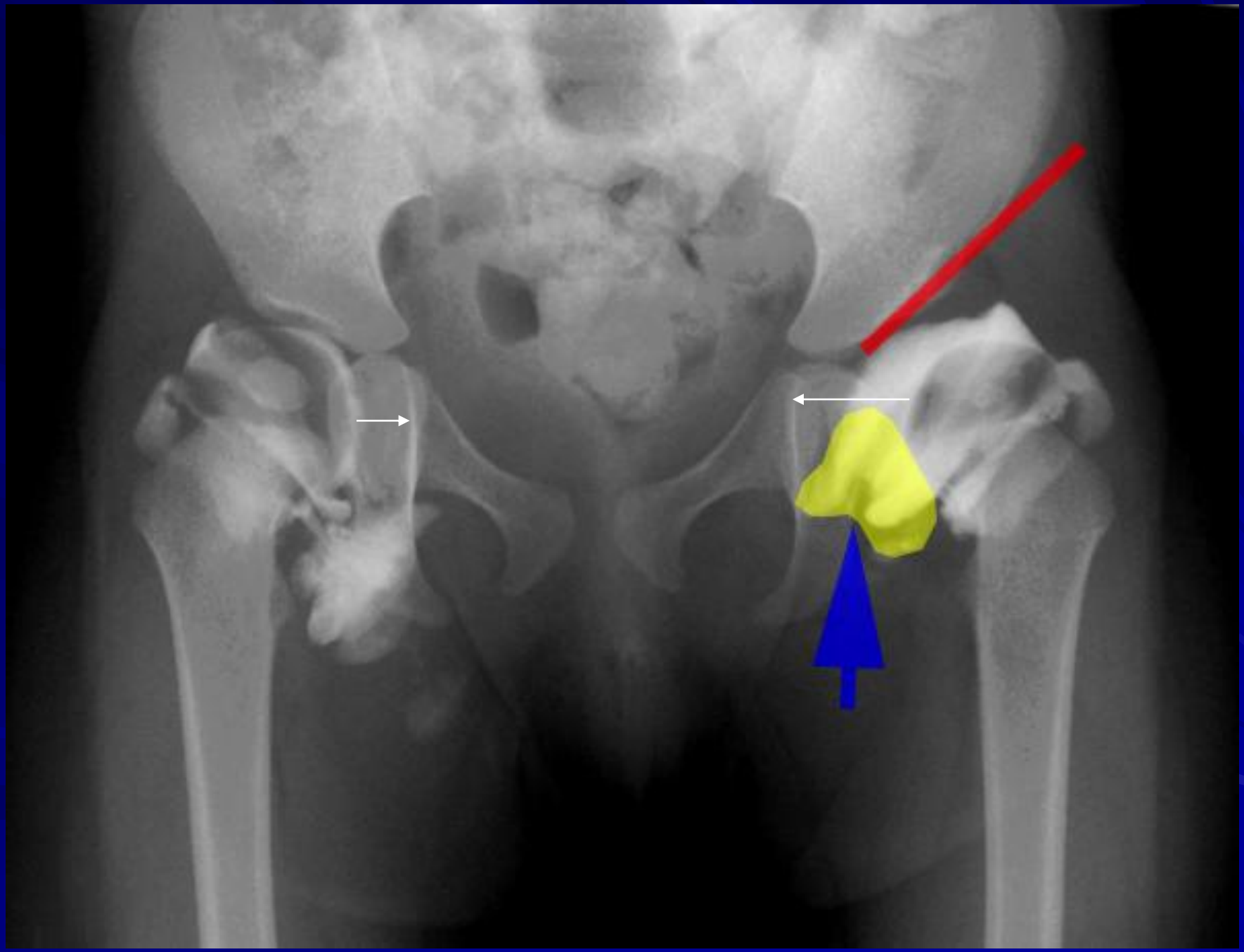
This will allows him to make good correlation with clinical exam and an ability to monitor treatment directly

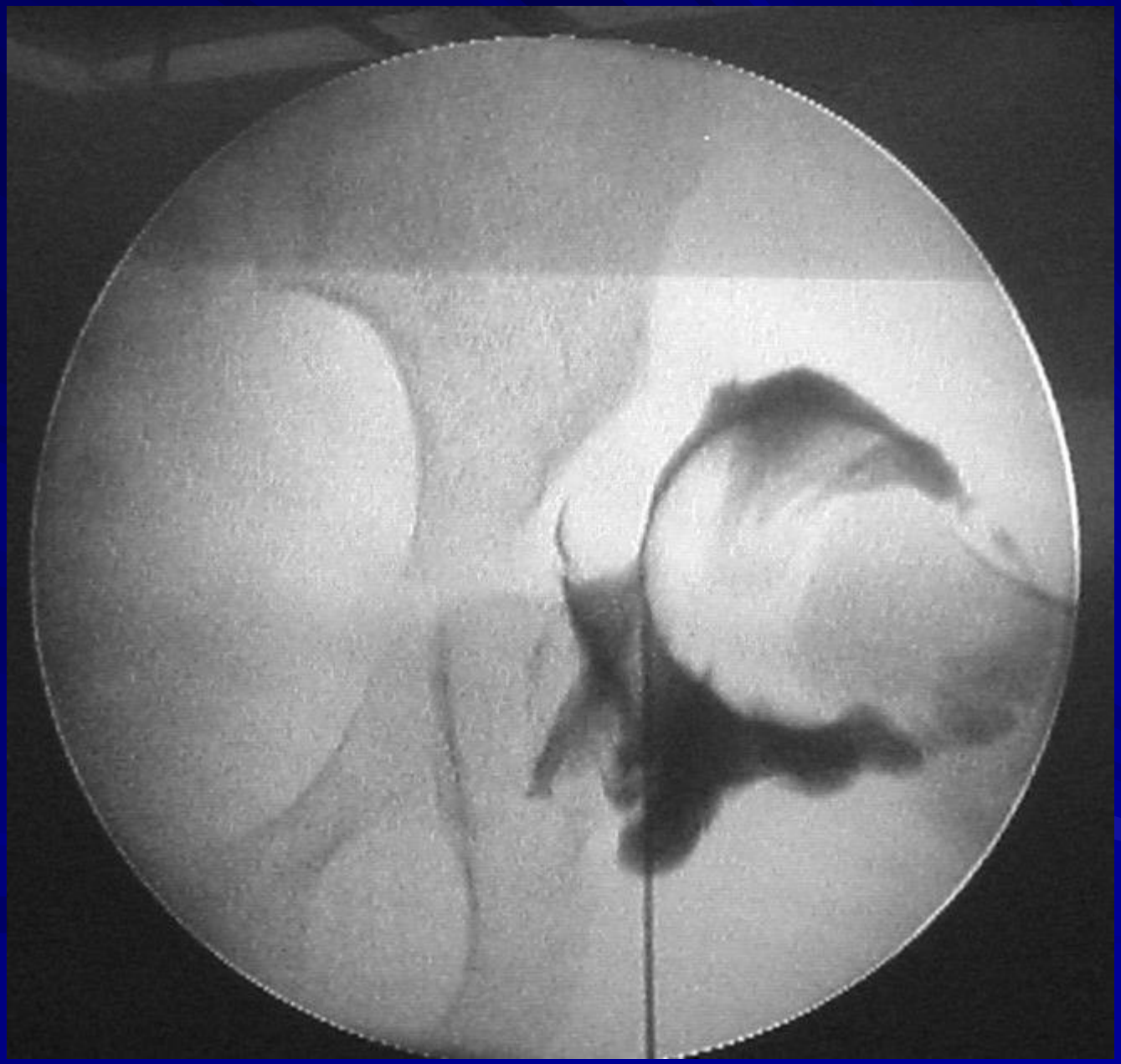
Hesitation in Diagnosis



Arthrogram

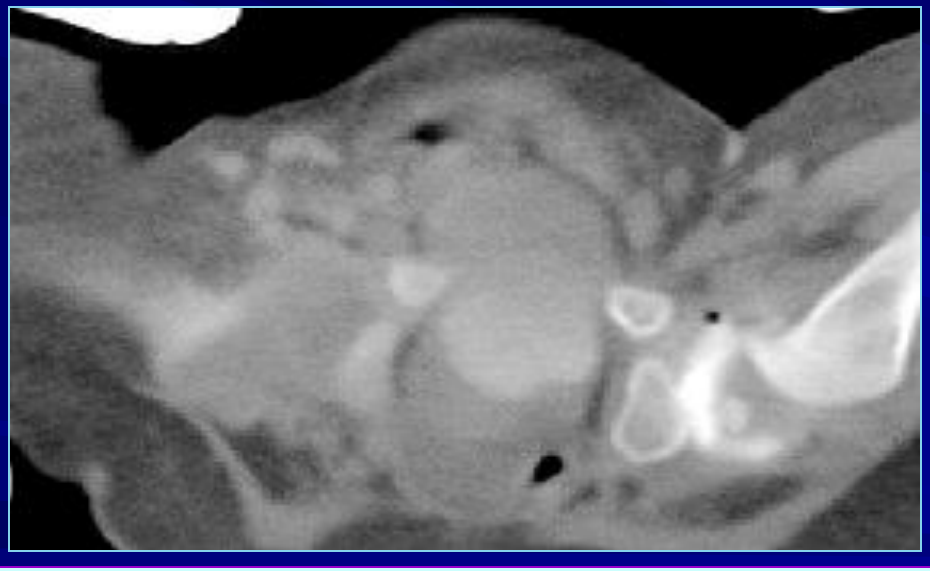




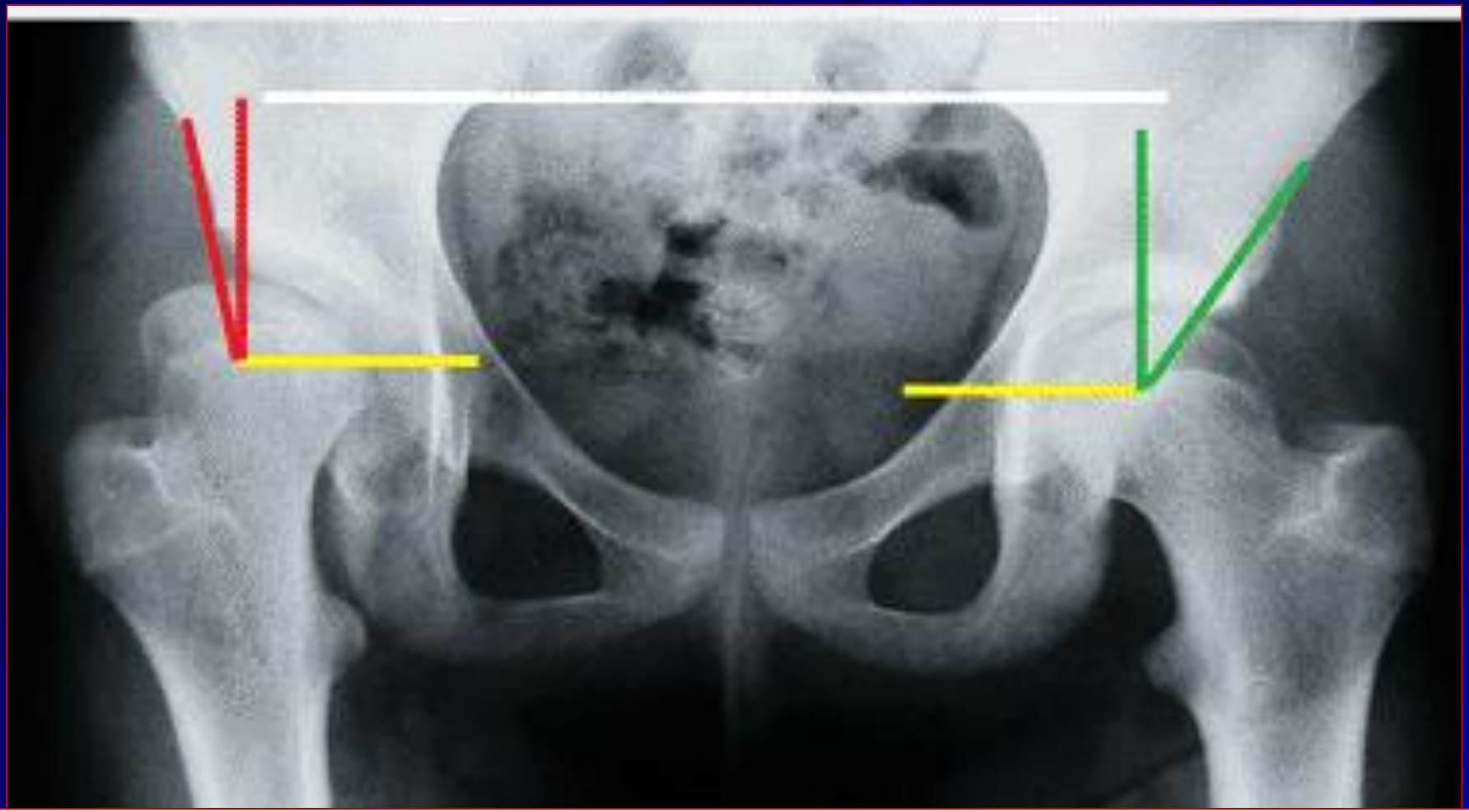


Delay the O.R of a DDH until the appearance of the O.N may slightly decrease the rate of AVN

Delay may → less remodeling potential in older infants, thereby increasing the need for 2ry procedure



Cut the doubt by 2 cuts CT



B **Center-edge (CE) angle** This child has a normal left hip with a CE angle of 30°. The right hip is aspherical and subluxated, and the CE angle is 10°. Note that measures are made with the pelvis level (white line).

Pseudo subluxation

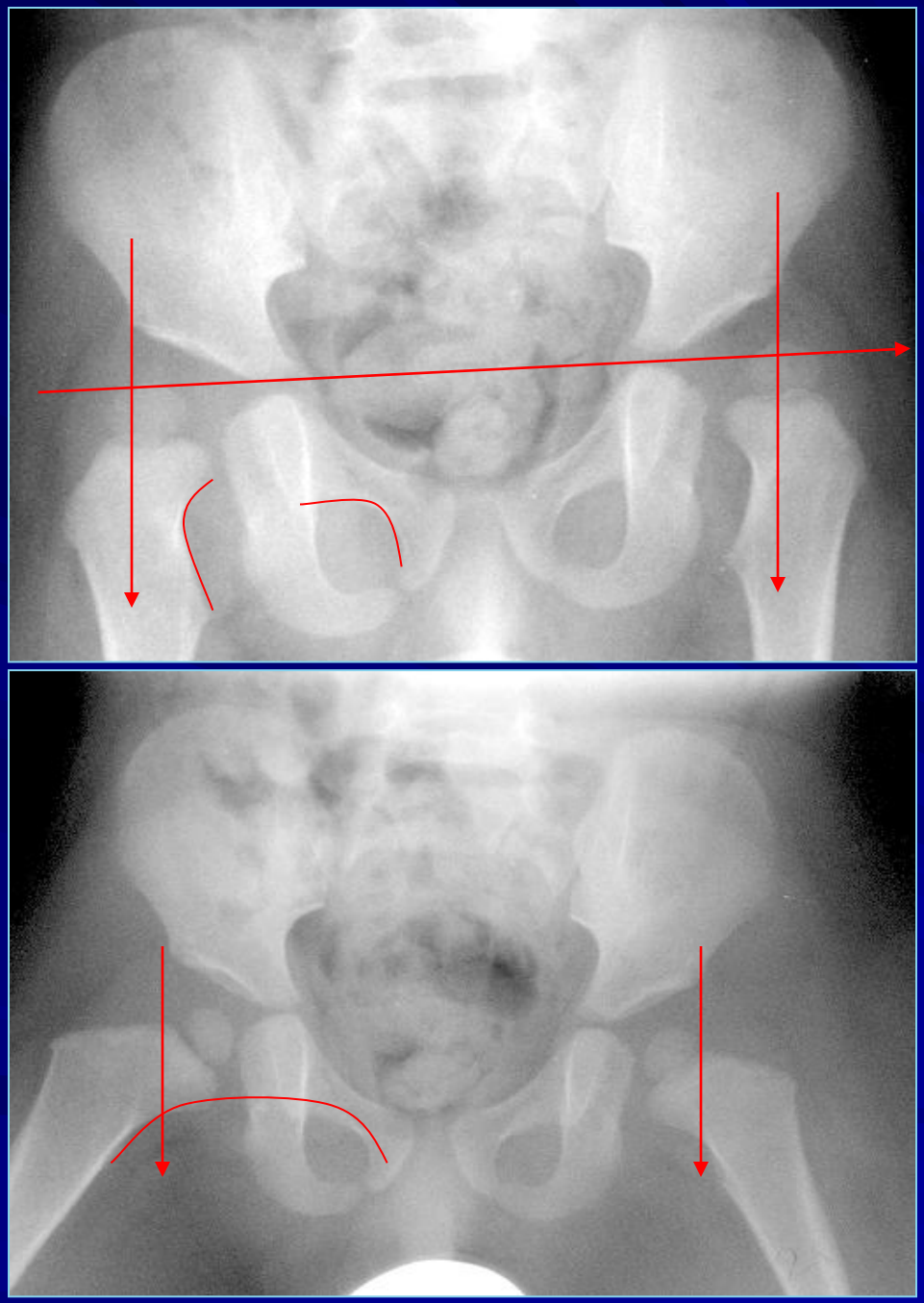
High anteversion

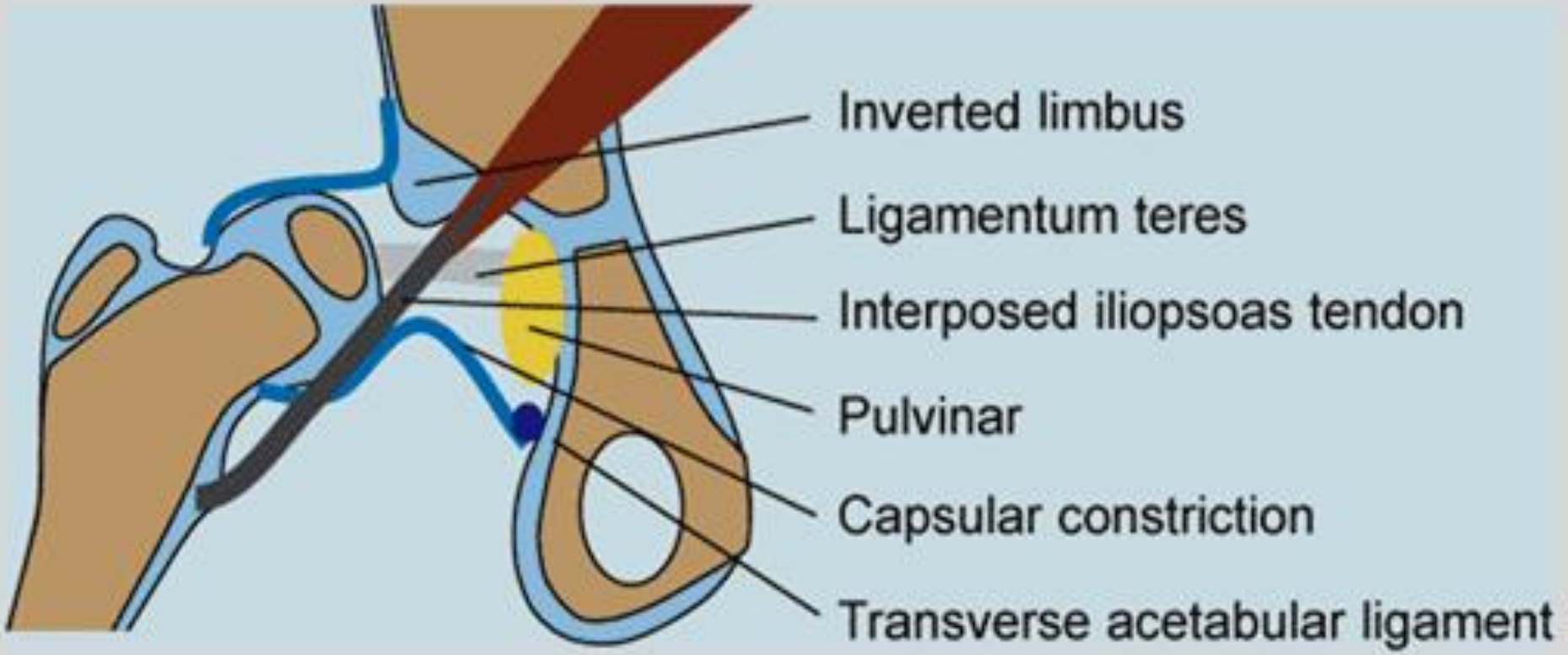
***Straight neck-shaft angle**

***O.N Symmetrical**

***Disturbance of Shenton's lines**

*** ABDIR 30^0, 20^0**




Inverted limbus
Ligamentum teres
Interposed iliopsoas tendon
Pulvinar
Capsular constriction
Transverse acetabular ligament

TREATMENT

0-6m

- **Pavlik Harness**

Fulltime for 6-12 weeks till hips stable Failure to reduce in 2-3 weeks- change treatment plan

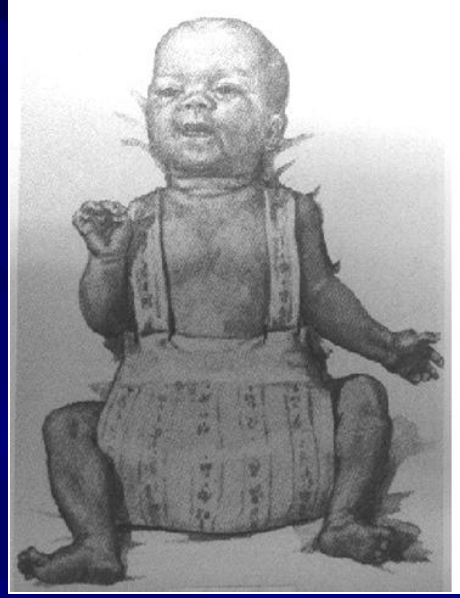
Contraindications of the P Harness

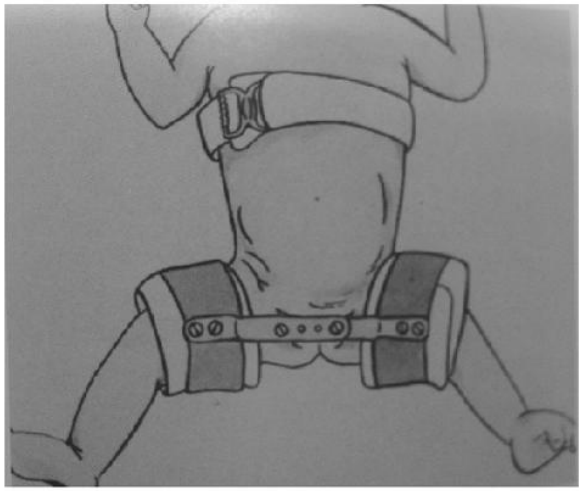
- **Teratologic dislocation (Neuromuscular disorders)**

*** > 6m, Obese child**

***Failure of reduction after 3 w**

*** Irreducible hip**





Poor orthosis for DDH

6-12m

- CR + Arthrogram and Casting: Must achieve stable and concentric reduction, human position for casting

2 cuts CT

Fig. 3.164. Child in a *Fettweis cast*. This hip spica holds the hips in over 90° flexion and approx. 60° abduction

12-18M

- CR + Arthrogram and Casting

MOSTLY NEEDS

- OR: if reduction failure, hip not stable in a favourable position, or if reduction not concentric

18-24M

- OR and Innominate osteotomy with casting

2-6 years

= Soft Tissue Release
= Open Reduction
= Femoral Shortening
= Pelvic Innominate Osteotomy

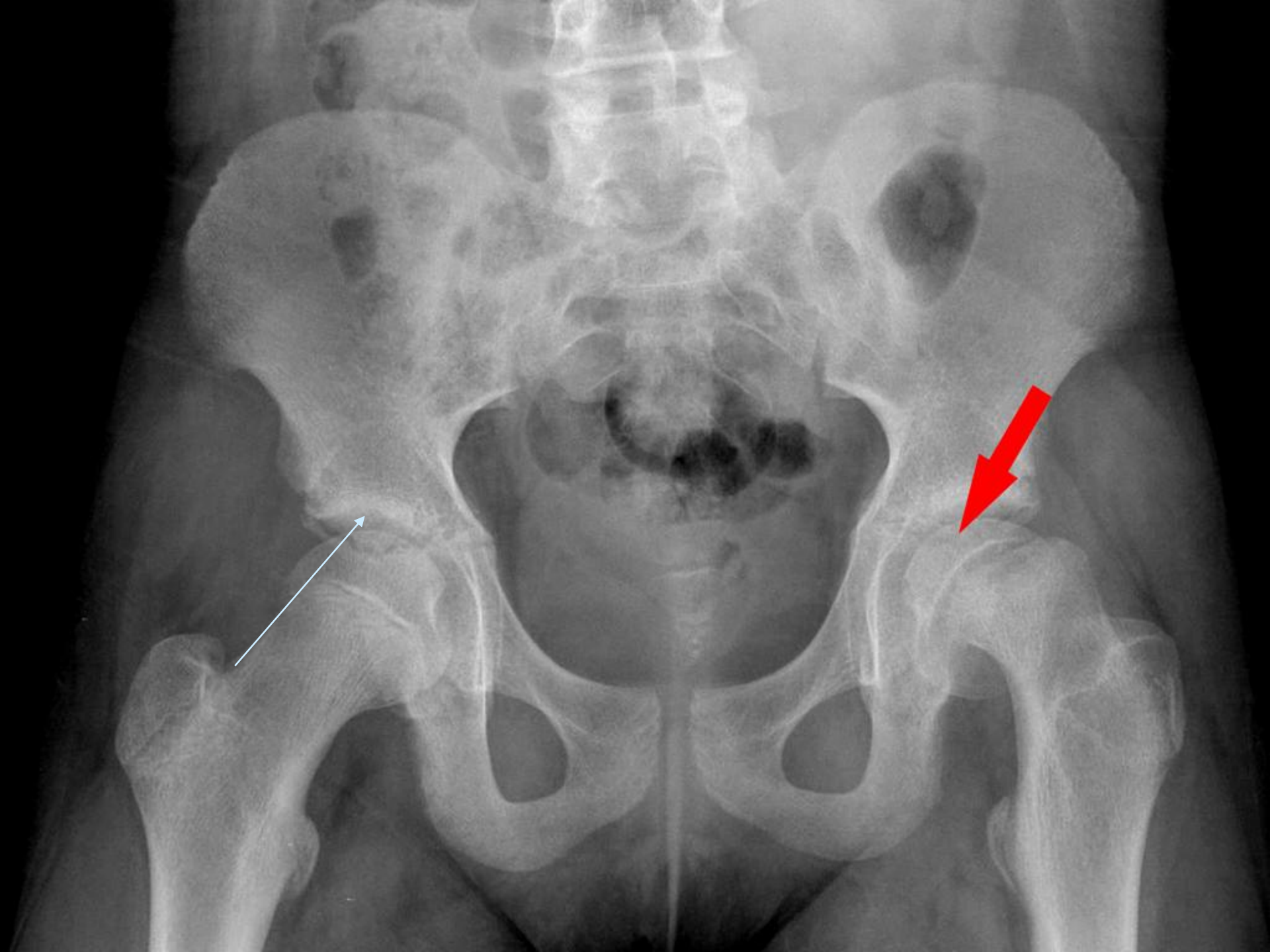
2-SCFE

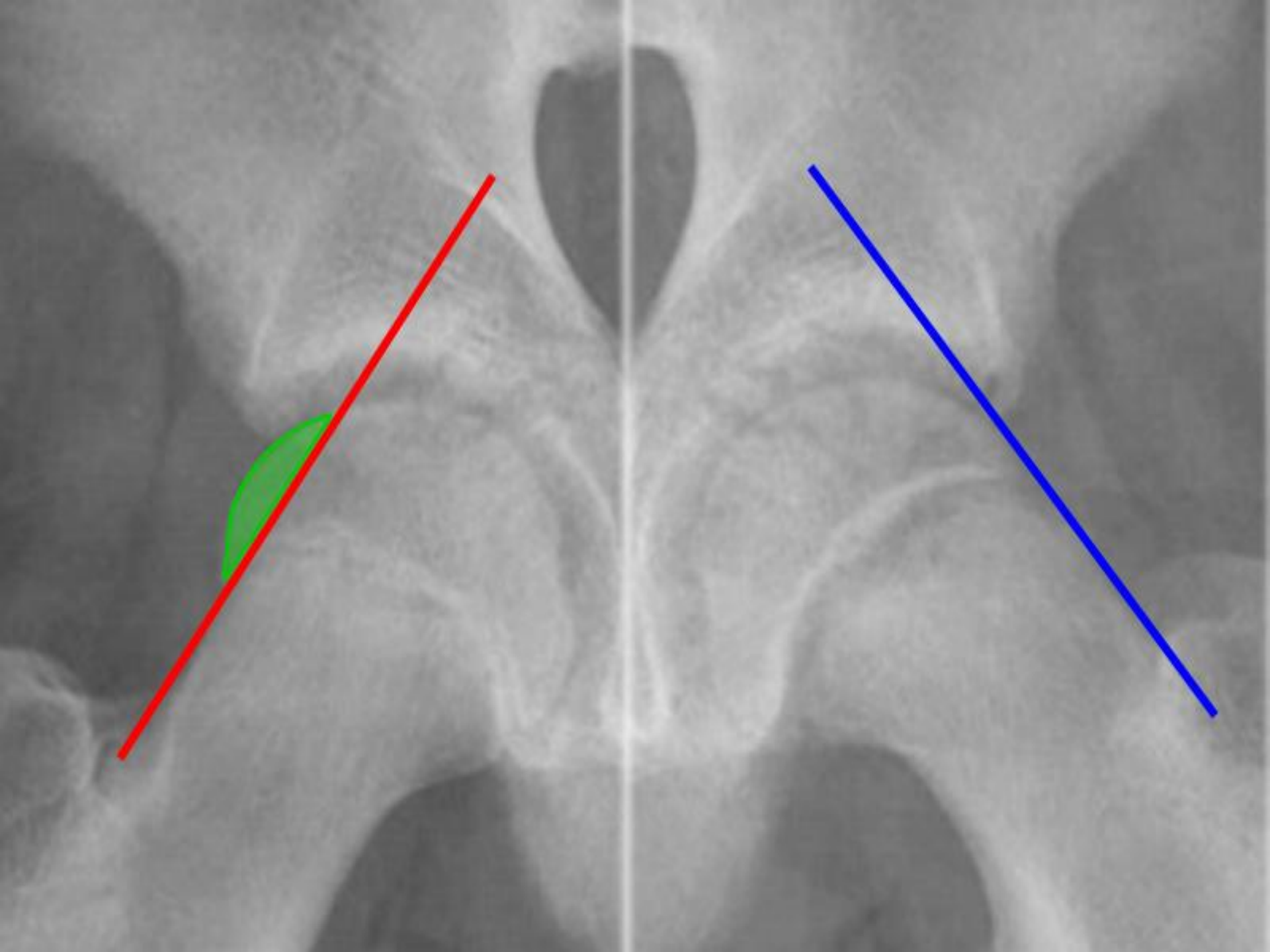
= Femoral neck displaces ant. producing an apparent varus, the head is posterior

= Occurs through **Zone of hypertrophy**

Most common orthopaedic Adolescents hip condition.

The Dx is frequently delayed or missed due to its often subtle presentation

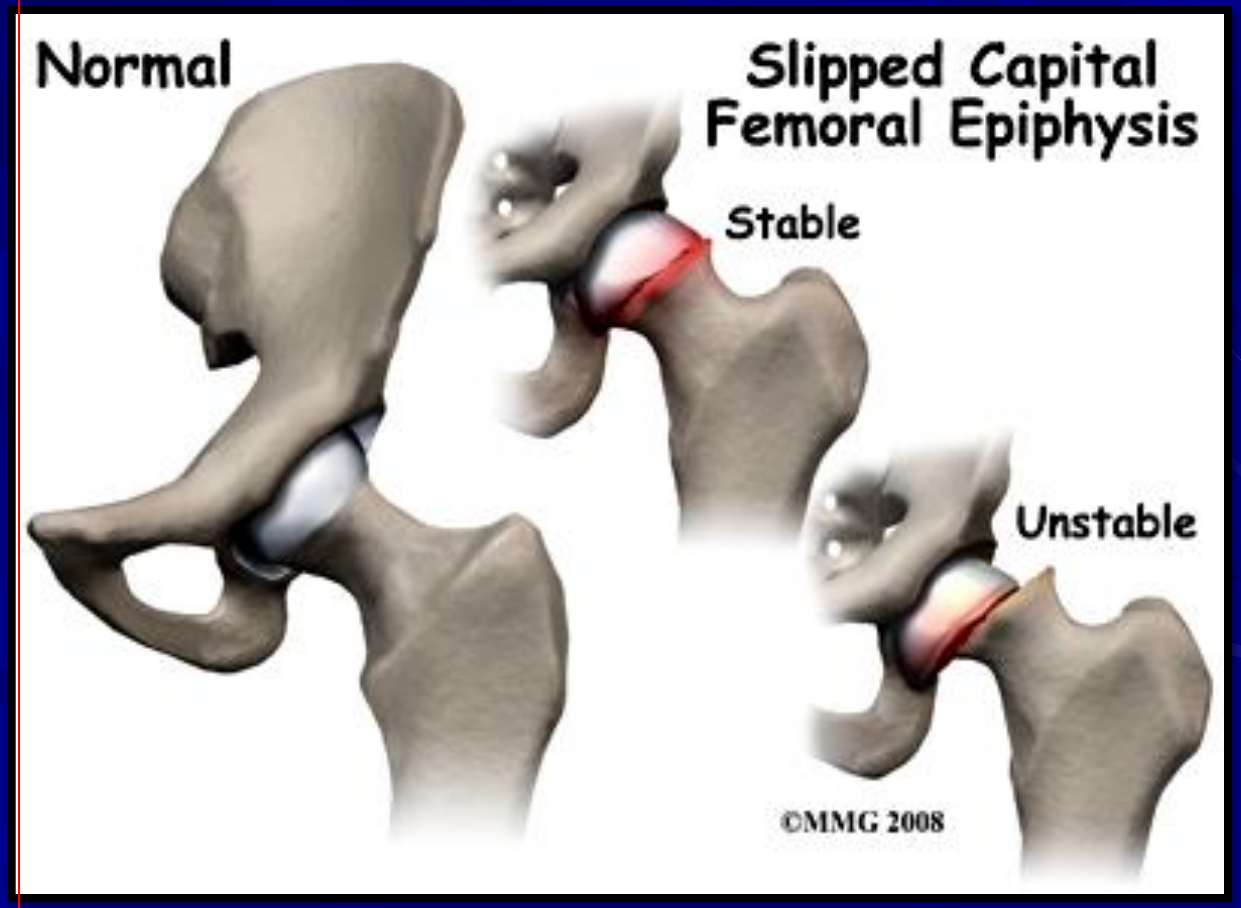




It is important to determine

1. Stable allow the patient to (walk) with or without crutches

2. Unstable do not allow the patient to ambulate <u>at all</u>; these cases carry a higher rate of complication, particularly of AVN.

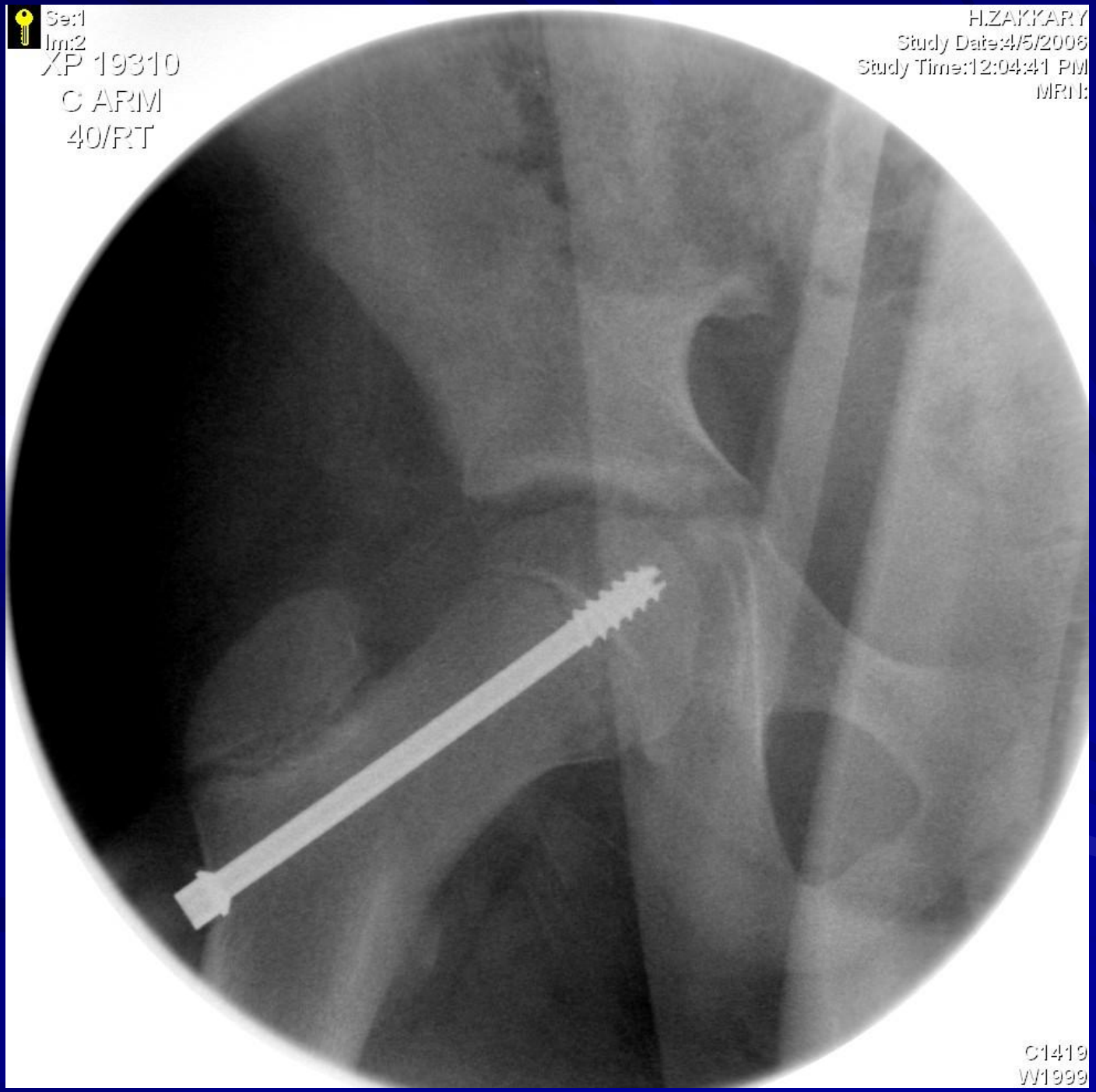


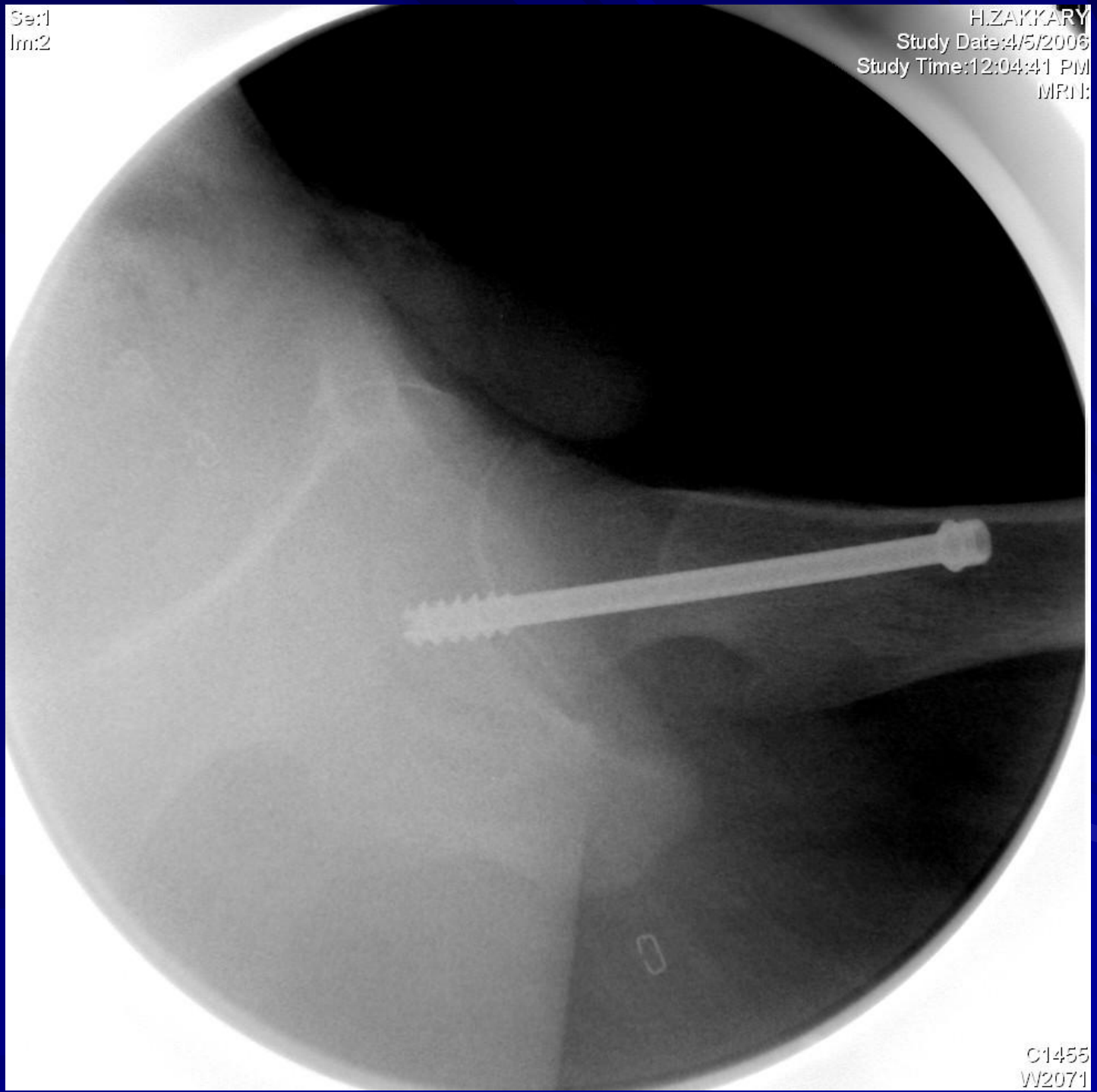
The goal of treatment for SCFE is to prevent further slippage and to stabilize the epiphysis

Screw advancement until

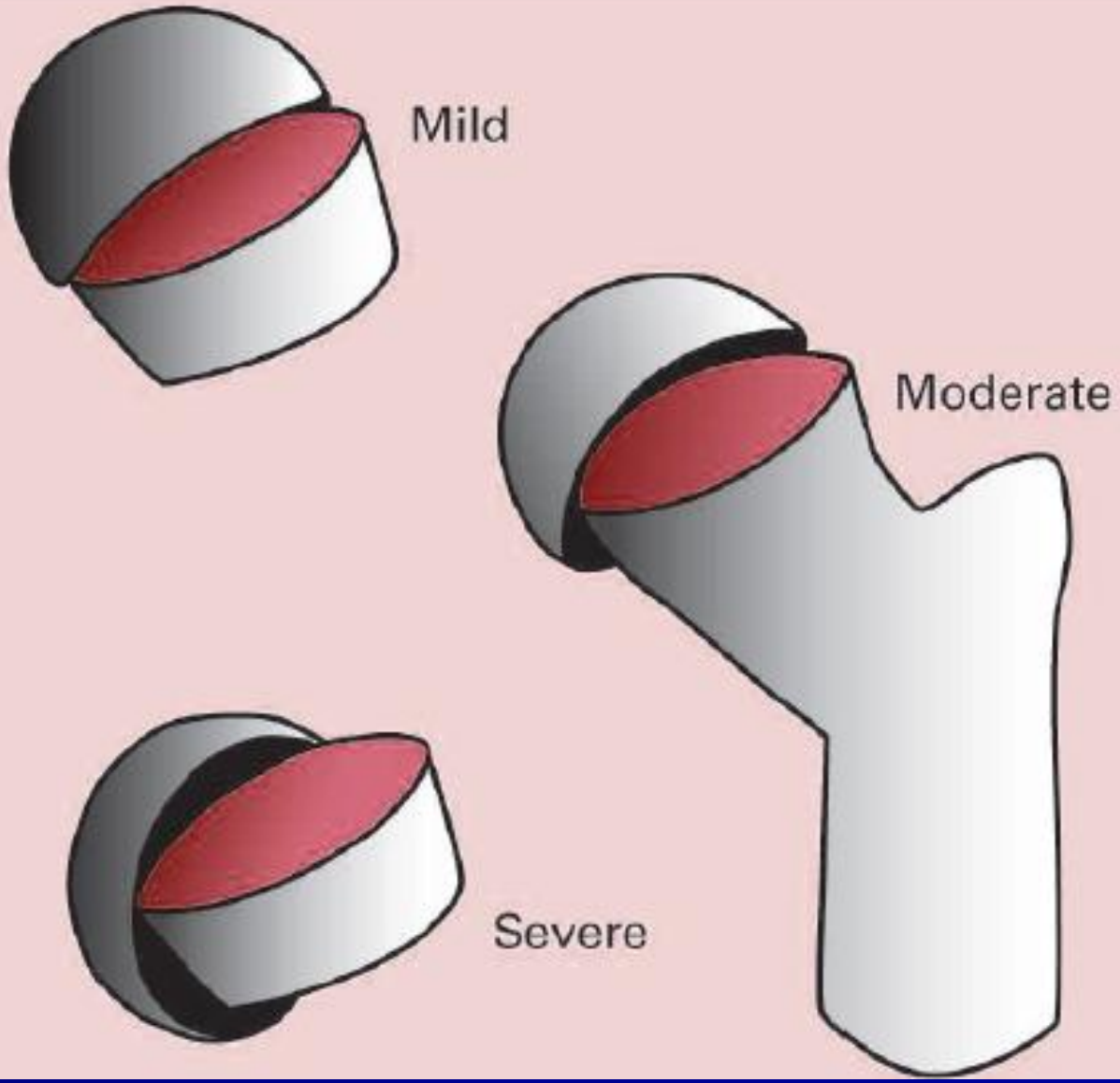
FIVE

threads engage the epiphysis


Se:1
Im:2
XP 19310
C ARM
40/RT
H.ZAKKARY
Study Date:4/5/2006
Study Time:12:04:41 PM
MRN:
01419
W1999


Se:1
Im:2
H.ZAKKARY
Study Date:4/5/2006
Study Time:12:04:41 PM
MRN:
C1455
W2071

Model of SCFE

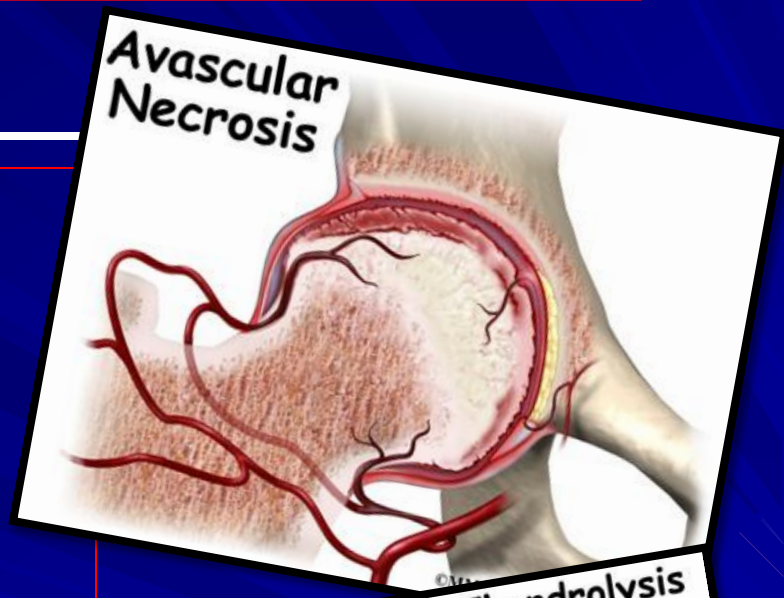


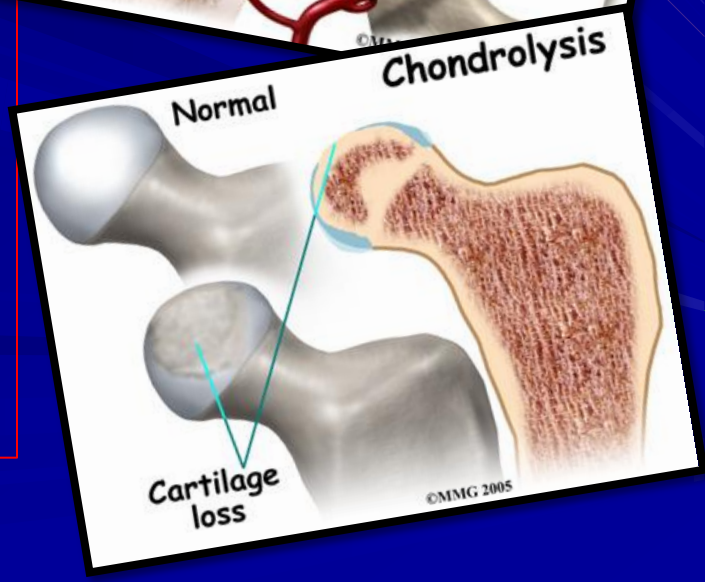
Complications

1. **Avascular necrosis.**
2. **Chondrolysis.**
3. **Osteoarthritis.**
4. **Coxa vara**

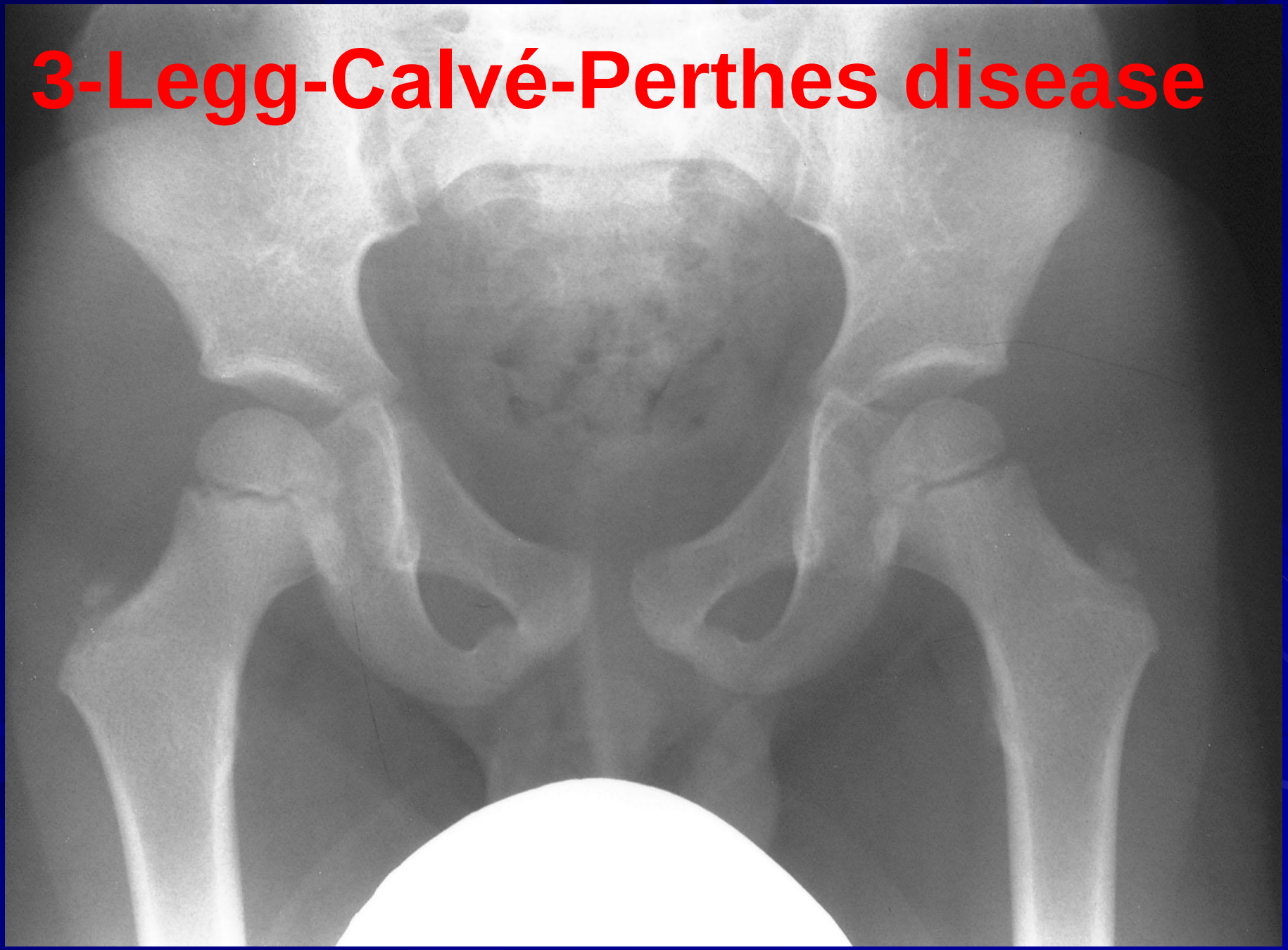
NSA less than 120 degrees.

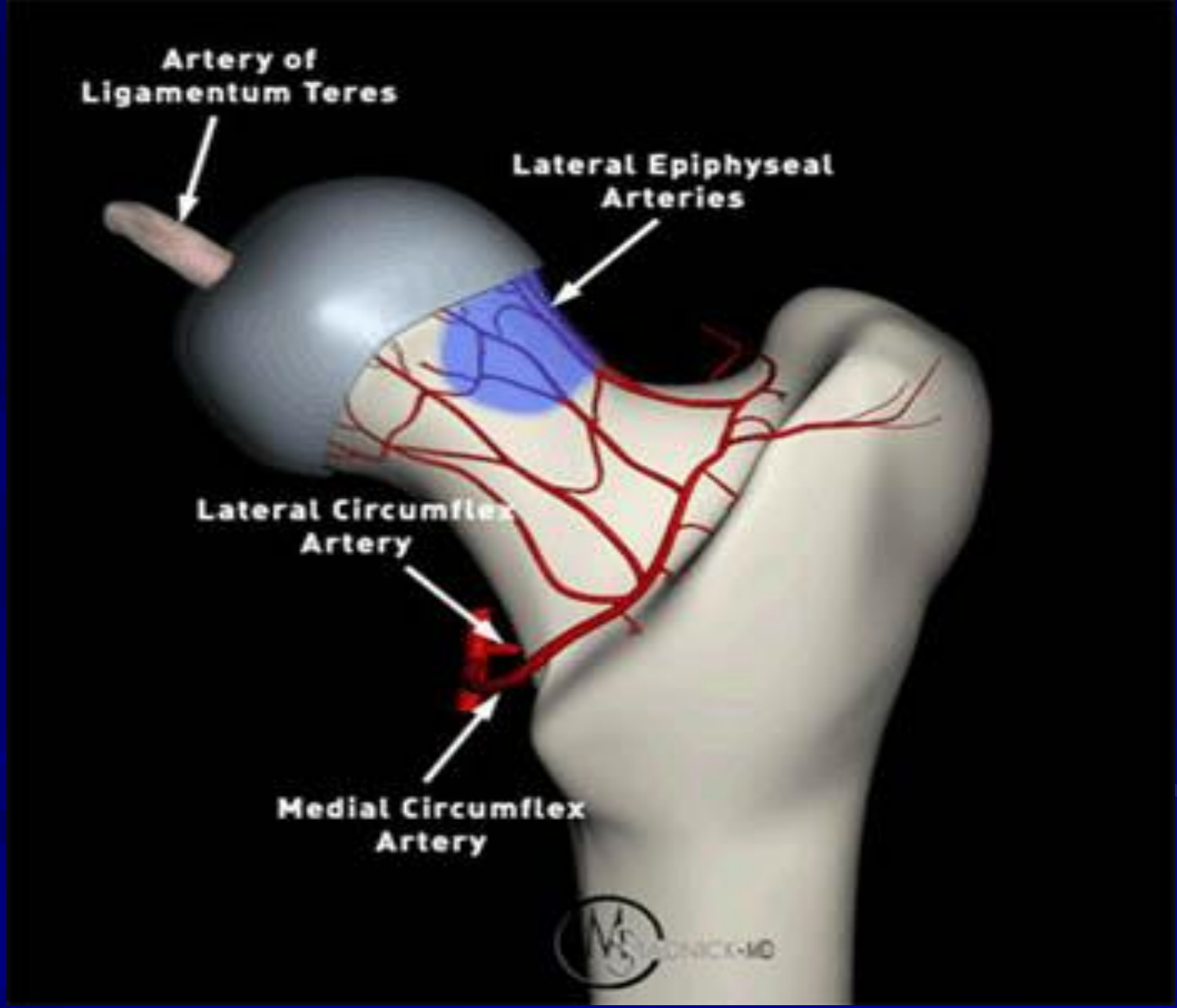
5. **Slipping of the opposite hip** ≈ 20% of cases

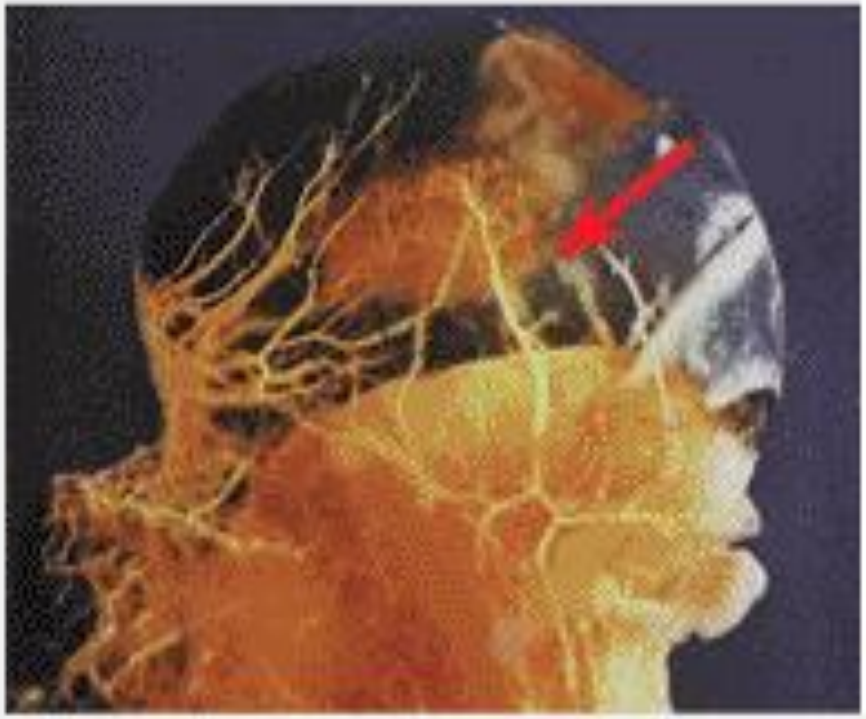


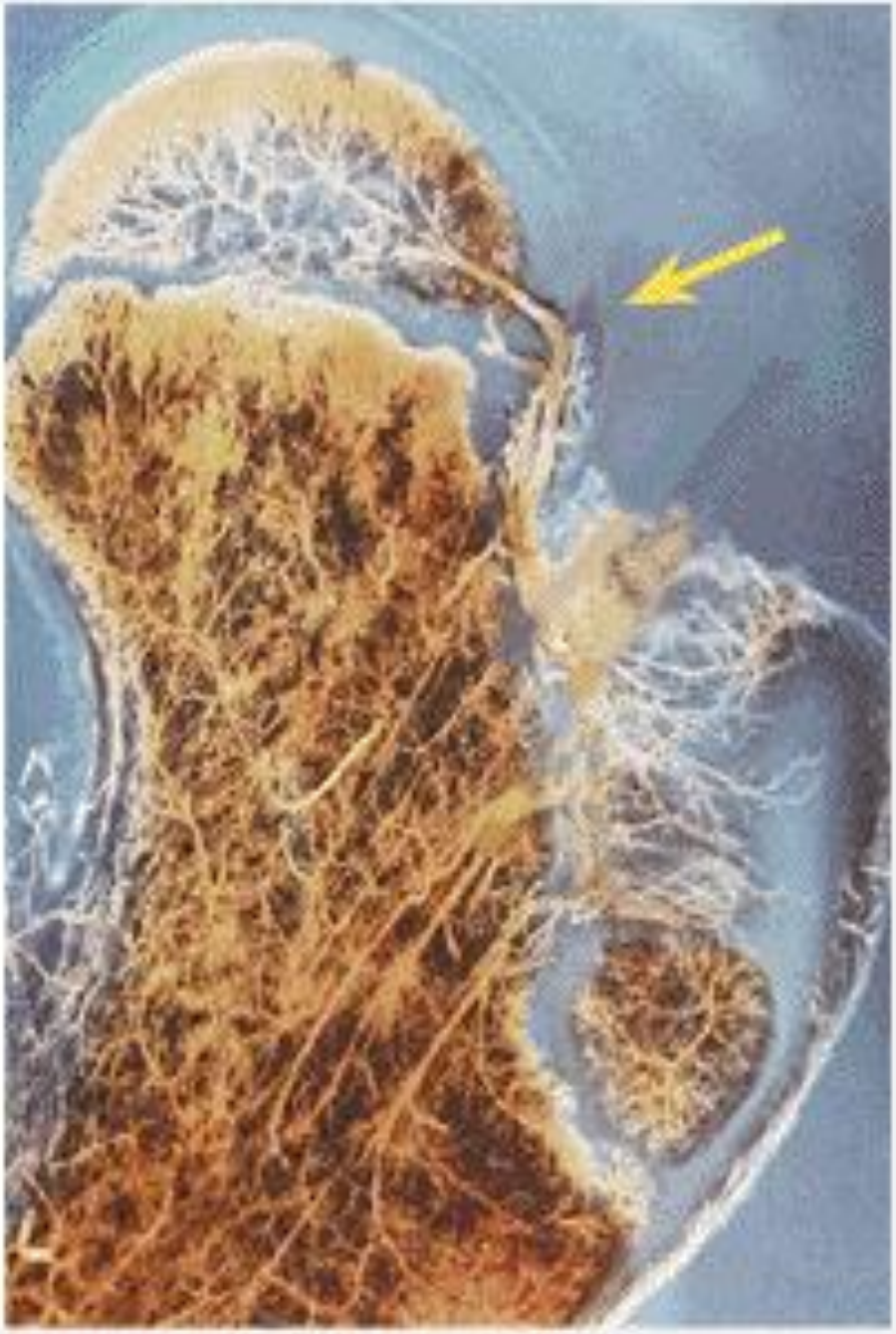


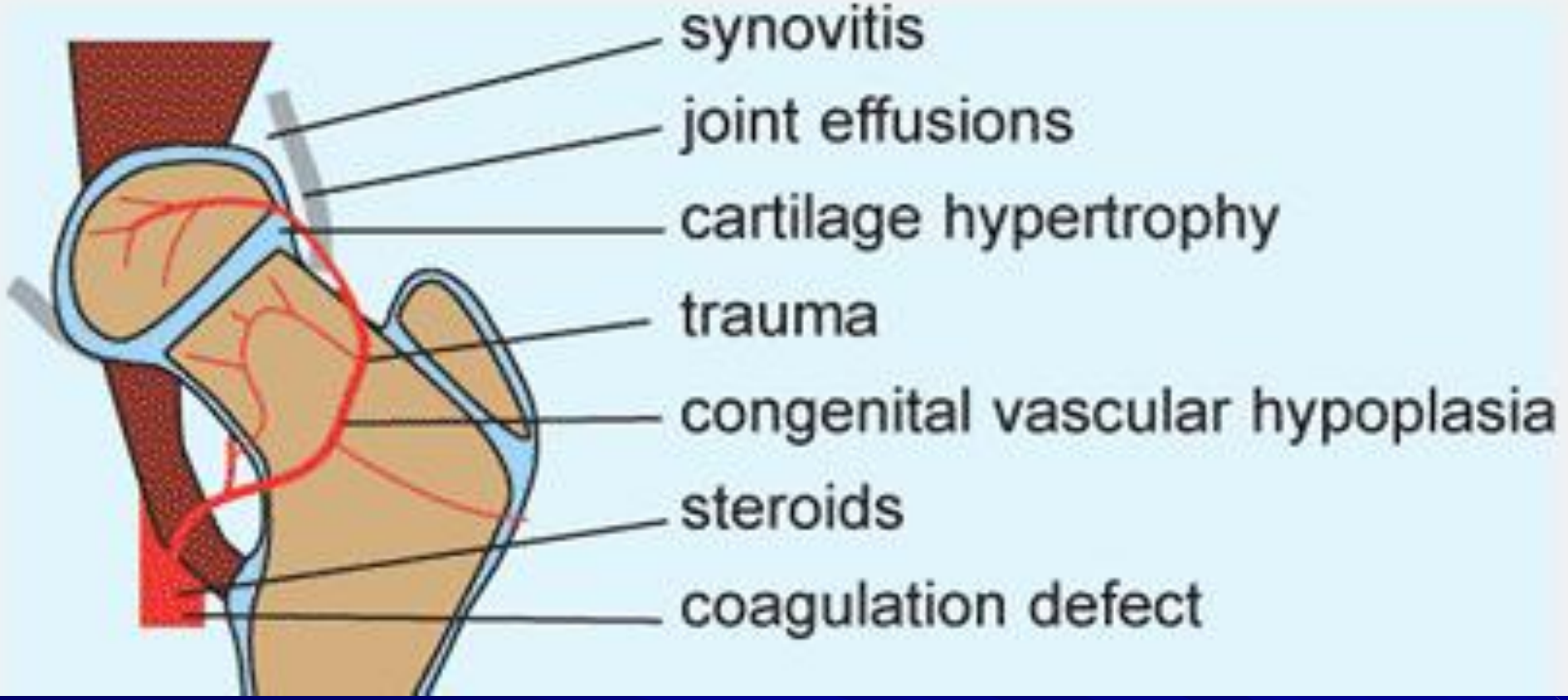
3-Legg-Calvé-Perthes disease




Artery of
Ligamentum Teres
Lateral Epiphyseal
Arteries
Lateral Circumflex
Artery
Medial Circumflex
Artery

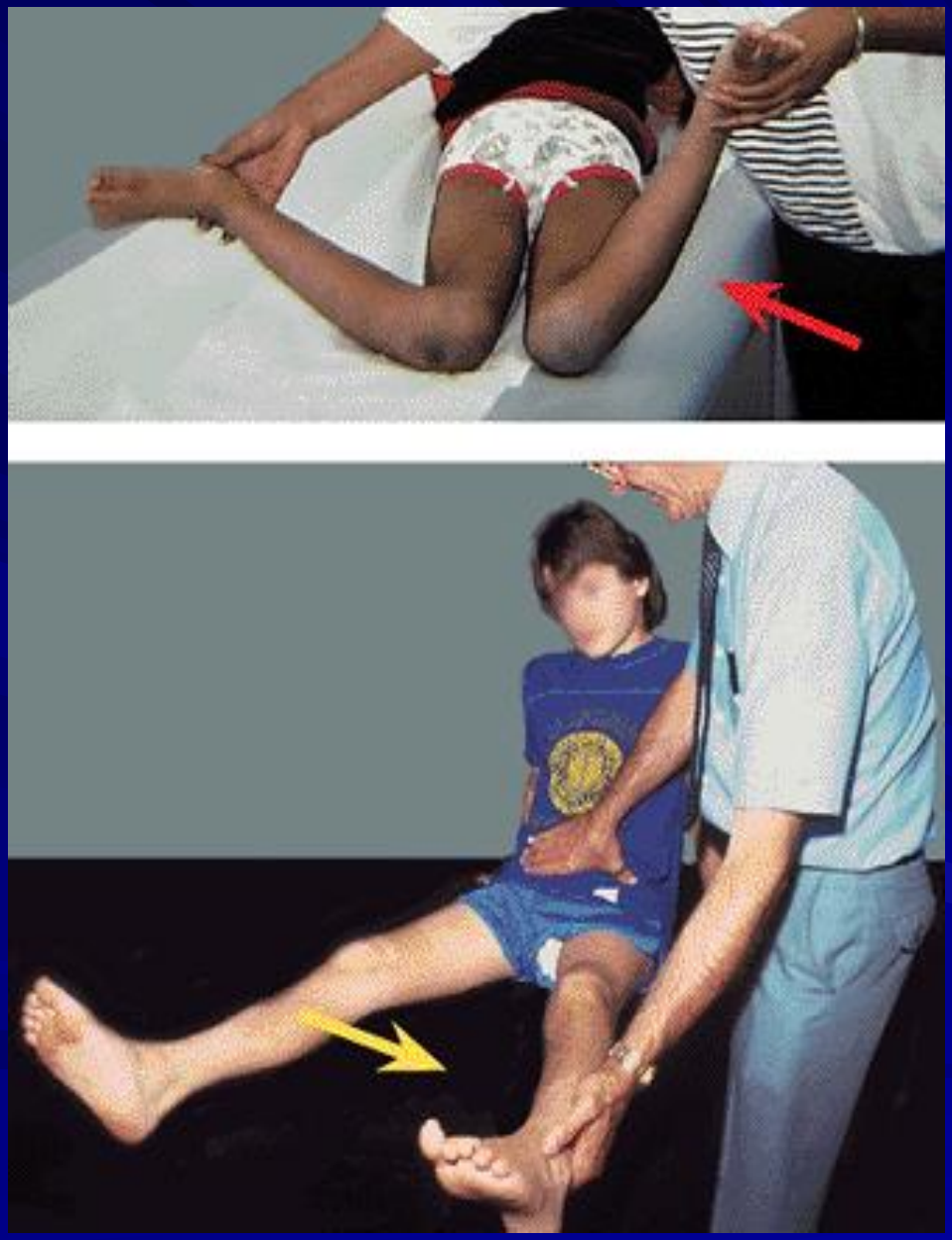




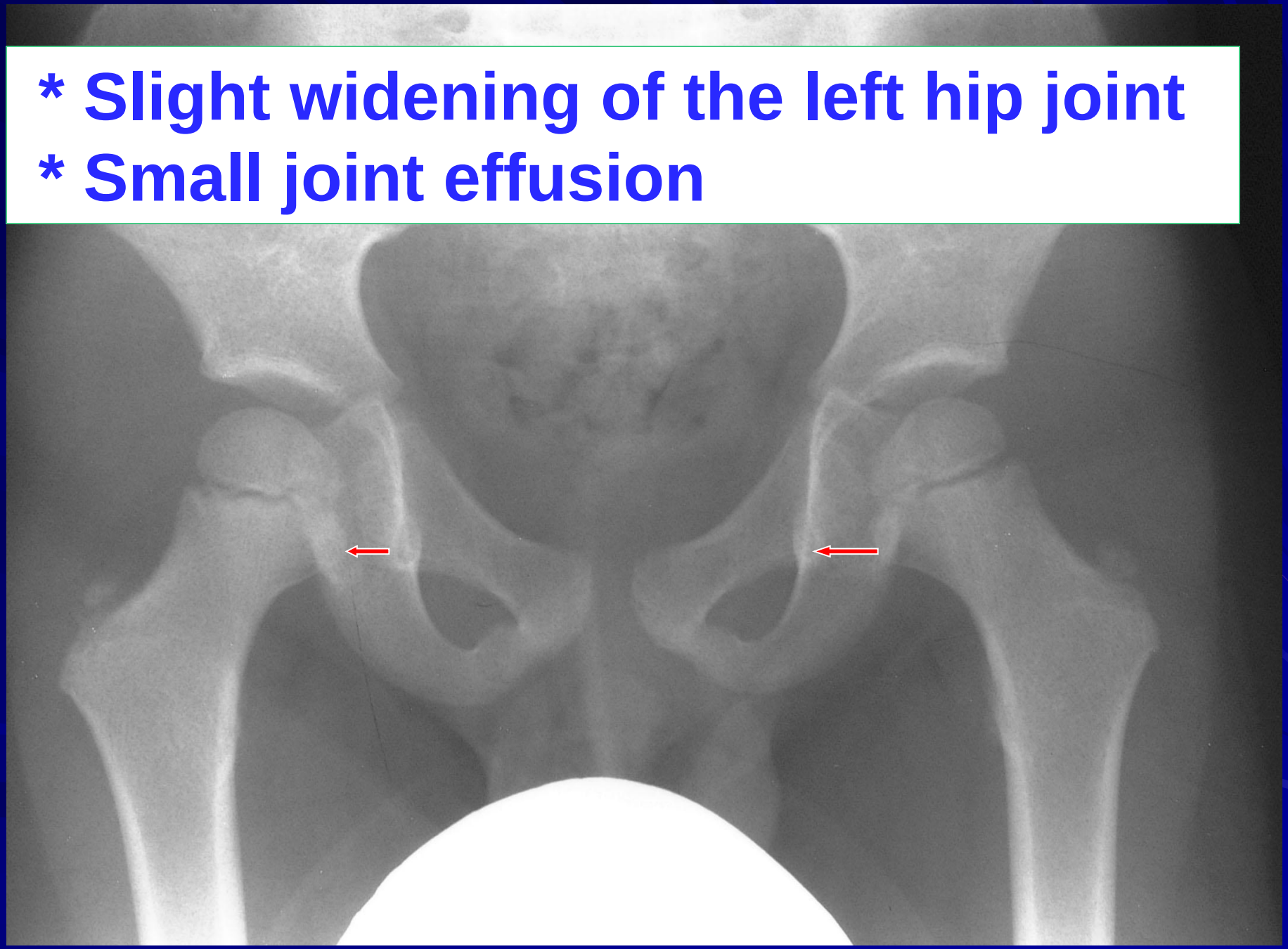

synovitis
joint effusions
cartilage hypertrophy
trauma
congenital vascular hypoplasia
steroids
coagulation defect

Symptoms of Legg-Calvé -Perthes disease usually have been present for weeks because the child often does not complain.

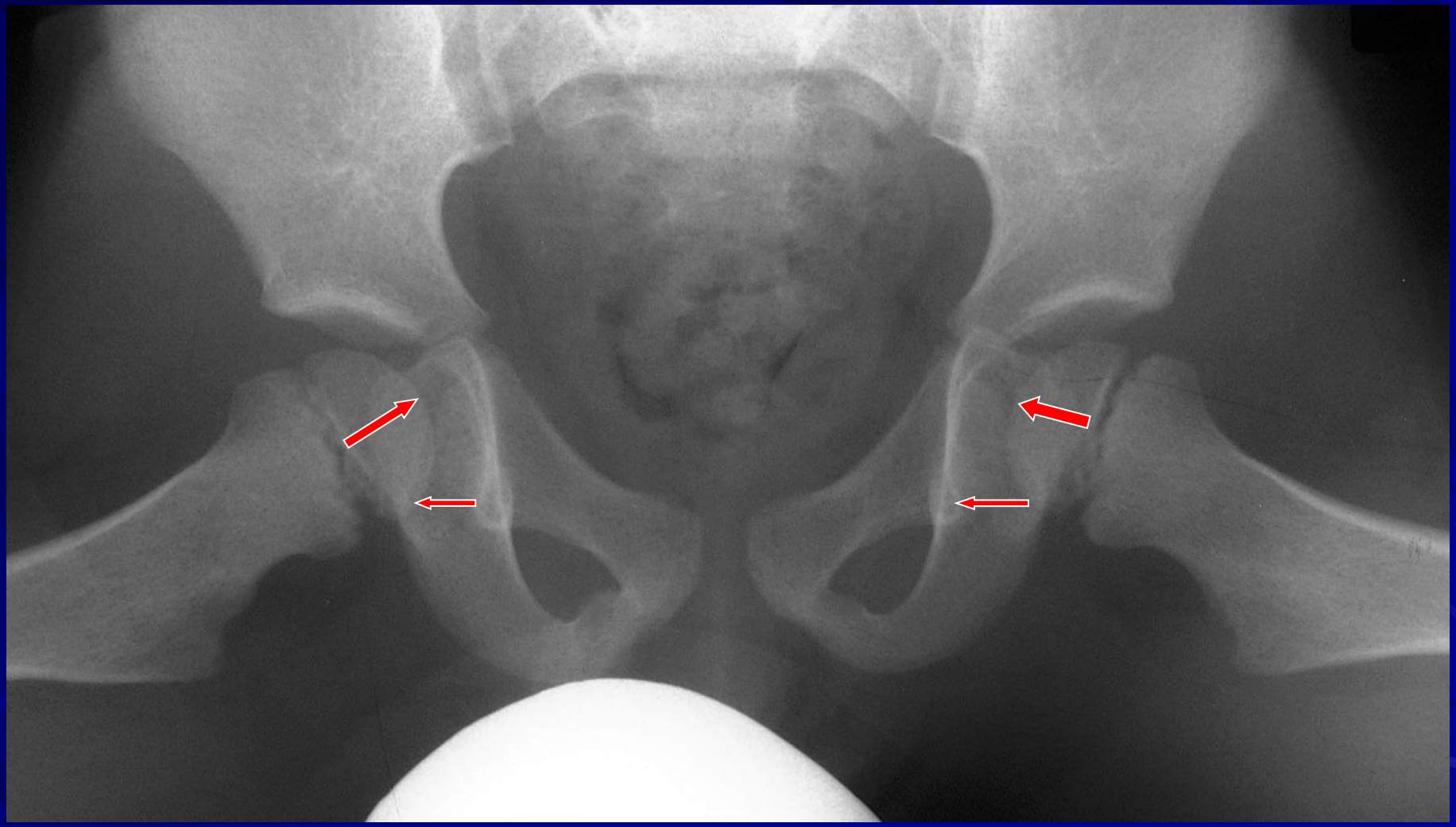
- **Hip or groin pain**, which may be referred to the inner side of the thigh.
- Mild pain in **anterior thigh or knee**.
- **Limp** which is painless and intermittent.
- Limitation of **internal rotation**.



* Slight widening of the left hip joint
* Small joint effusion



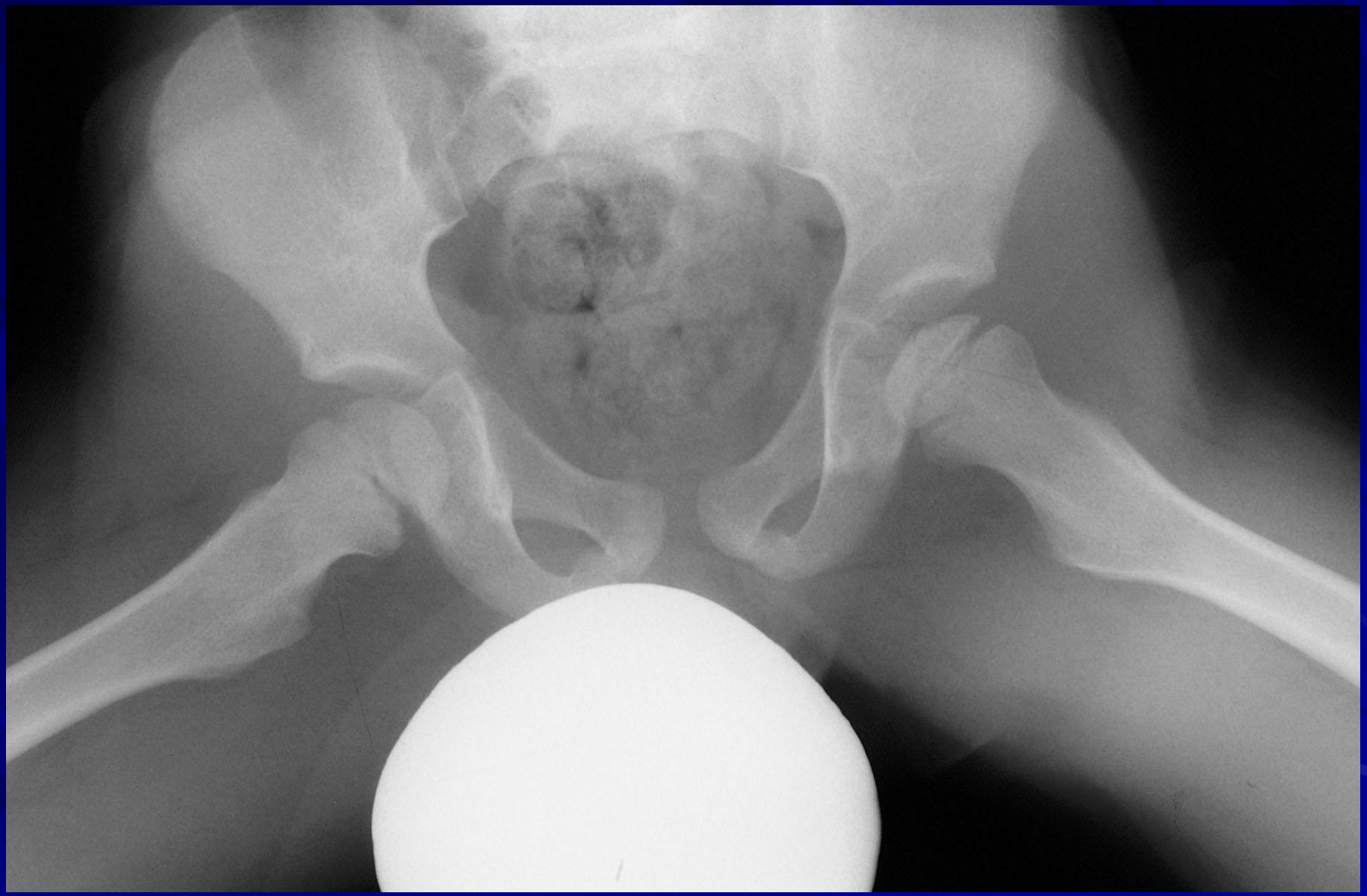
* Decrease epiphyseal hight

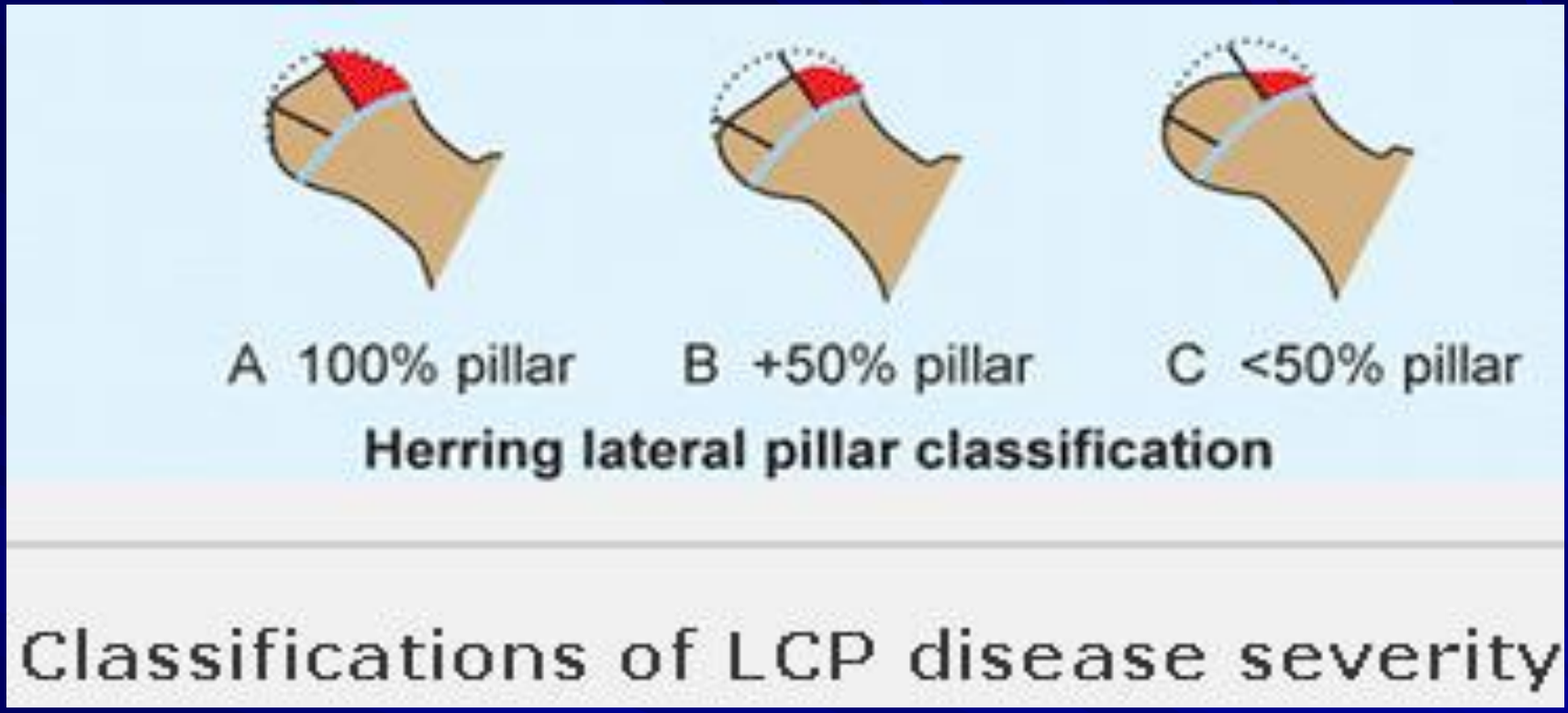


=The F.H smaller on the left

=The F.H denser on the left side.

=Joint widening can also be 2ry to hypertrophy of the cartilage .





Classifications of LCP disease severity

Head-at-risk signs

= Extrusion- subluxation (red arrow),

= Metaphyseal reaction (yellow arrow),

= Lateral rarifaction or Gage sign (white arrow)

Management according to Lat. Pillar

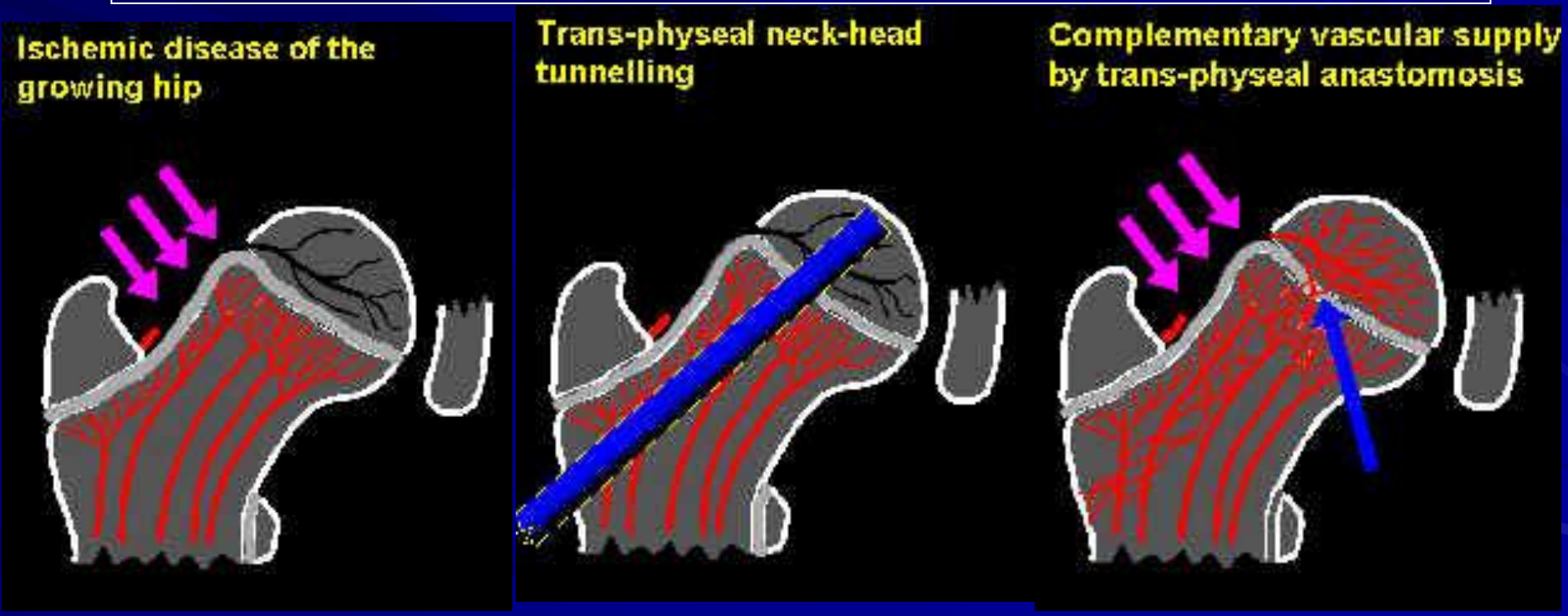
(BONE AGE)

* Age < 6Y at any stage --- Conservative.
* Group A any age --- Conservative.

==========

* Group B 6→>8Y --- Containment
* Group C > 6Y --- Surgery.

Bisphosphonates Drilling of the head



PROGNOSTIC FACTORS

- **Sex**: girls have poorer prognosis
- **Age at Onset**: younger children have better prognosis
- **Extent of Head Involvement**: more involved- Worst Prognosis
- **Femoral Head Containment**: loss of containment-greater risk of deformity

4-Irritable vs. Septic Hip

	Irritable Hip	Septic Hip
Preceding illness	29%	-
Fever	4%	64%
Malaise	16%	64%
Weight bearing	55%	0

Septic Hip: Sensitivities

- **Presenting features**

1.History of fever / malaise	77%
2.Fever >38^0 on admission	77%
1 and 2	86%
3.WCC > 12000	72%
1 or 2 and 3	100%

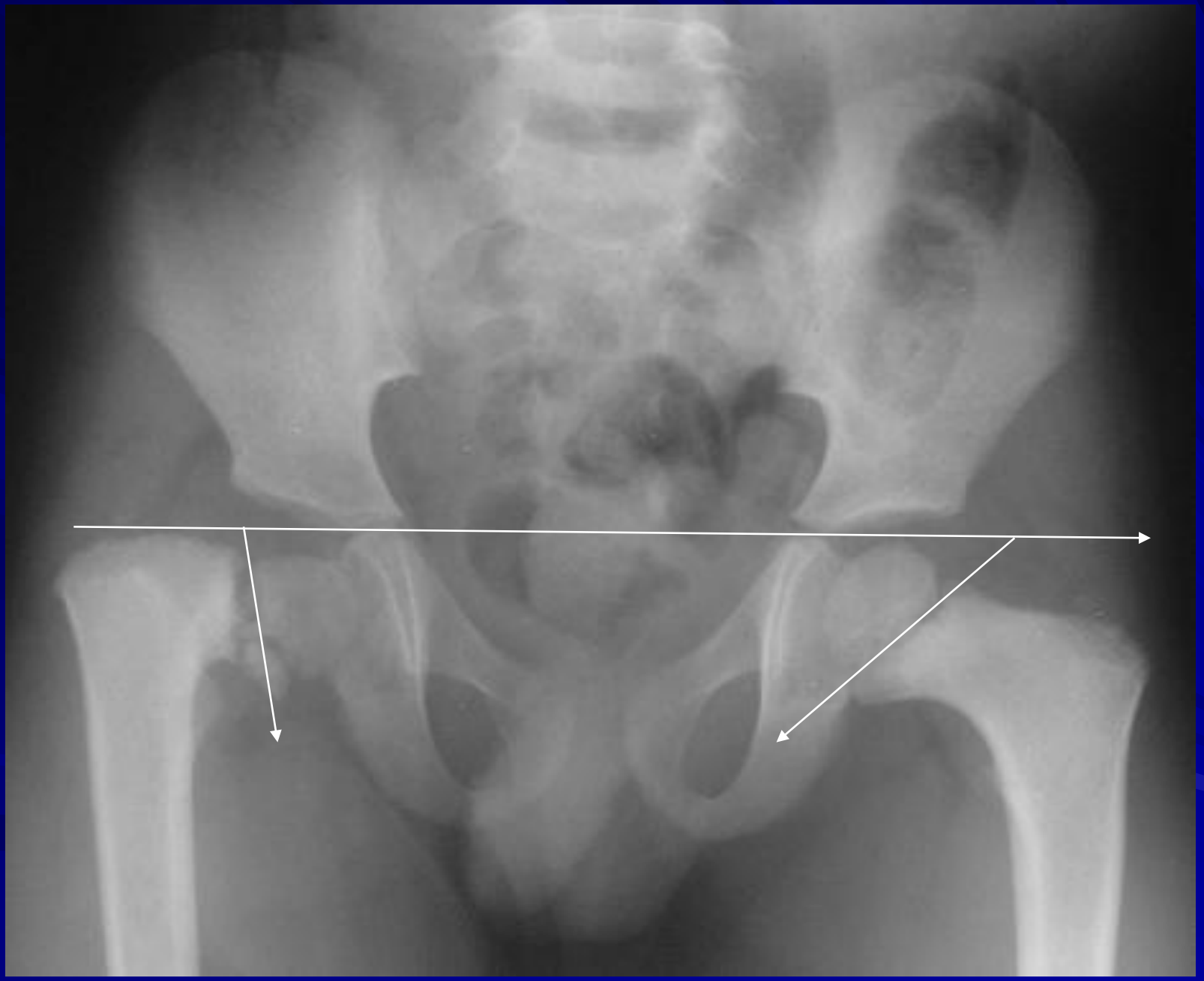
5-Developmental Coxa Vara

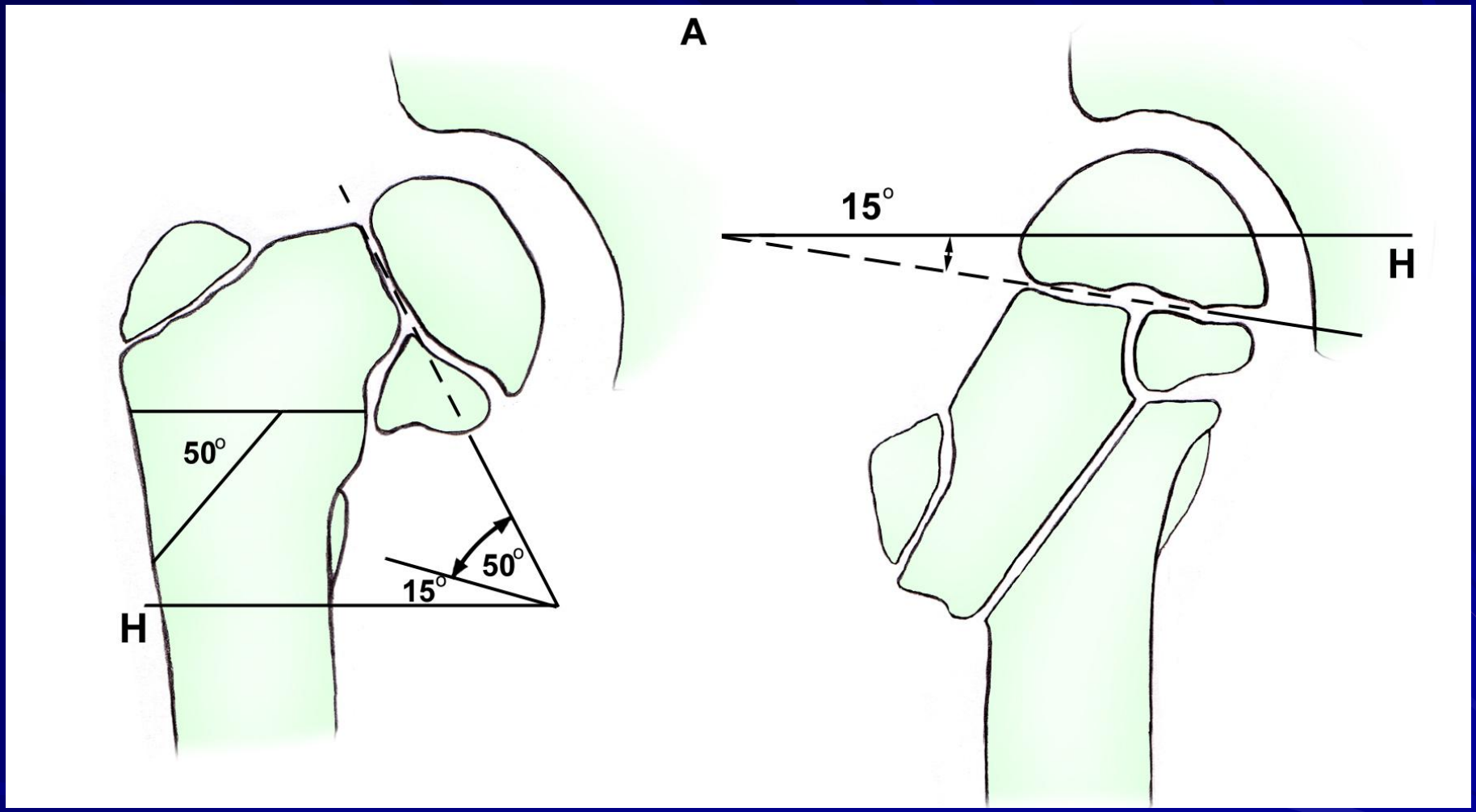
Hilgenreiner's Epiphyseal angle

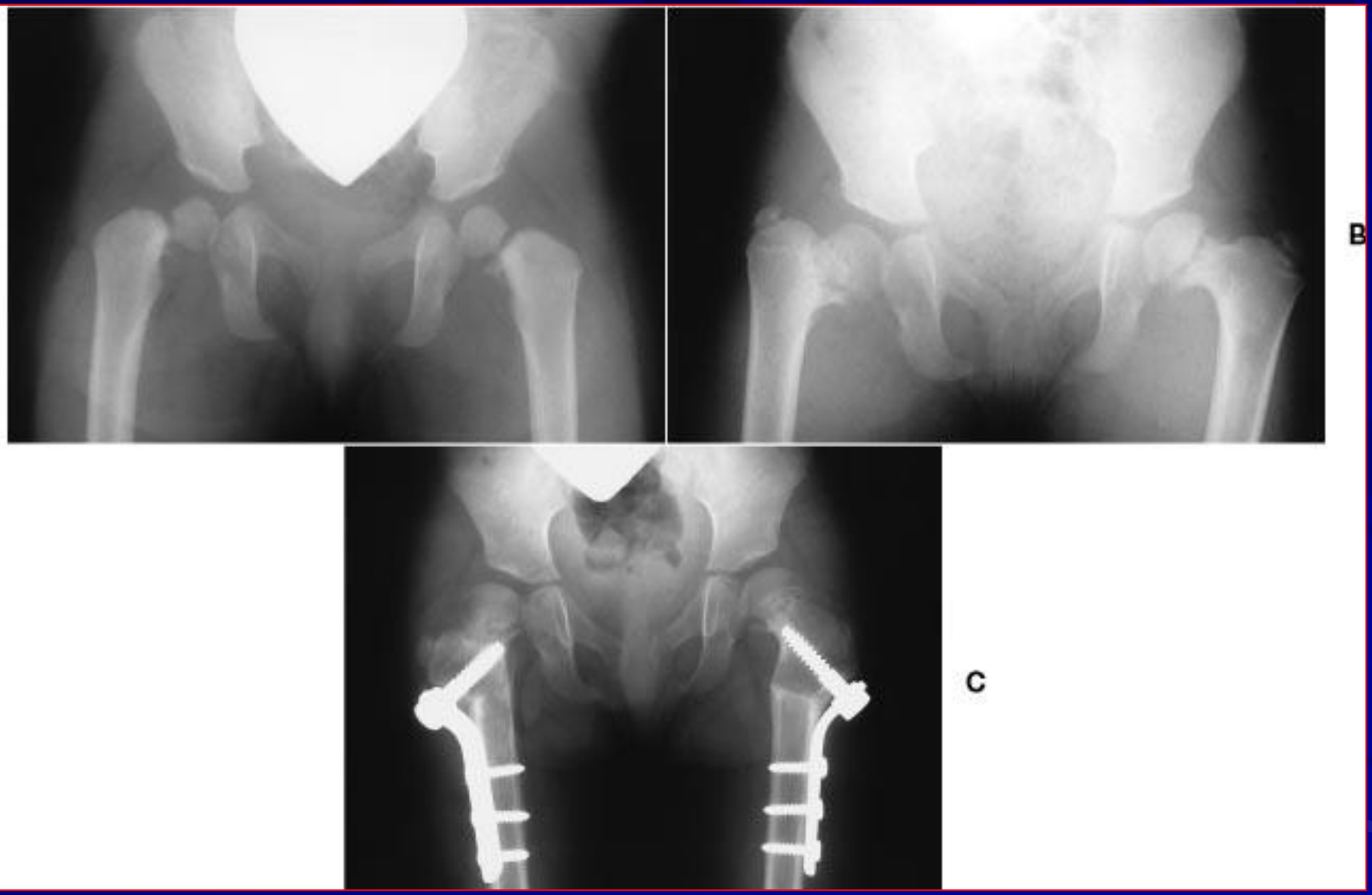
20^0-25^0

Surgery is indicated in

= H.E. angle > 45 degrees
= NS angle < 90-100 degrees
= Trendelenburg gait
= Limping




A
50°
50°
15°
H
15°
H


A
B
C

6-Idiopathic Chondrolysis of the Hip

Autoimmune response in susceptible patient !!!

= Female > male 5:1
= Adolescent
= Insidious onset of pain
= Limp
= Decreased ROM in all planes

Pathology

= Thick fibrotic capsule

= Relatively dry joint

= Thin synovium

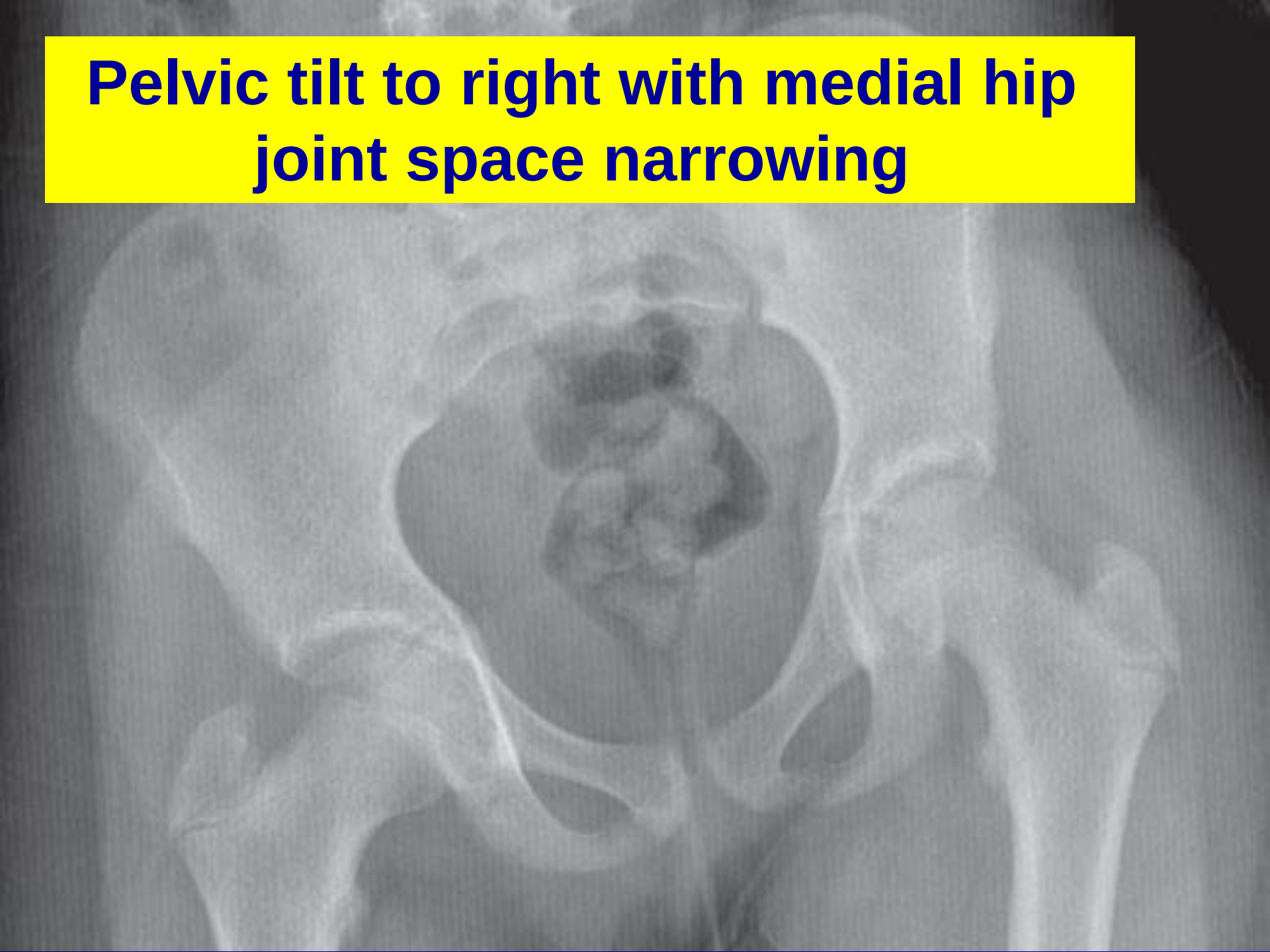
= Thin cartilage

Plain radiography

N joint space 3.5-5 mm

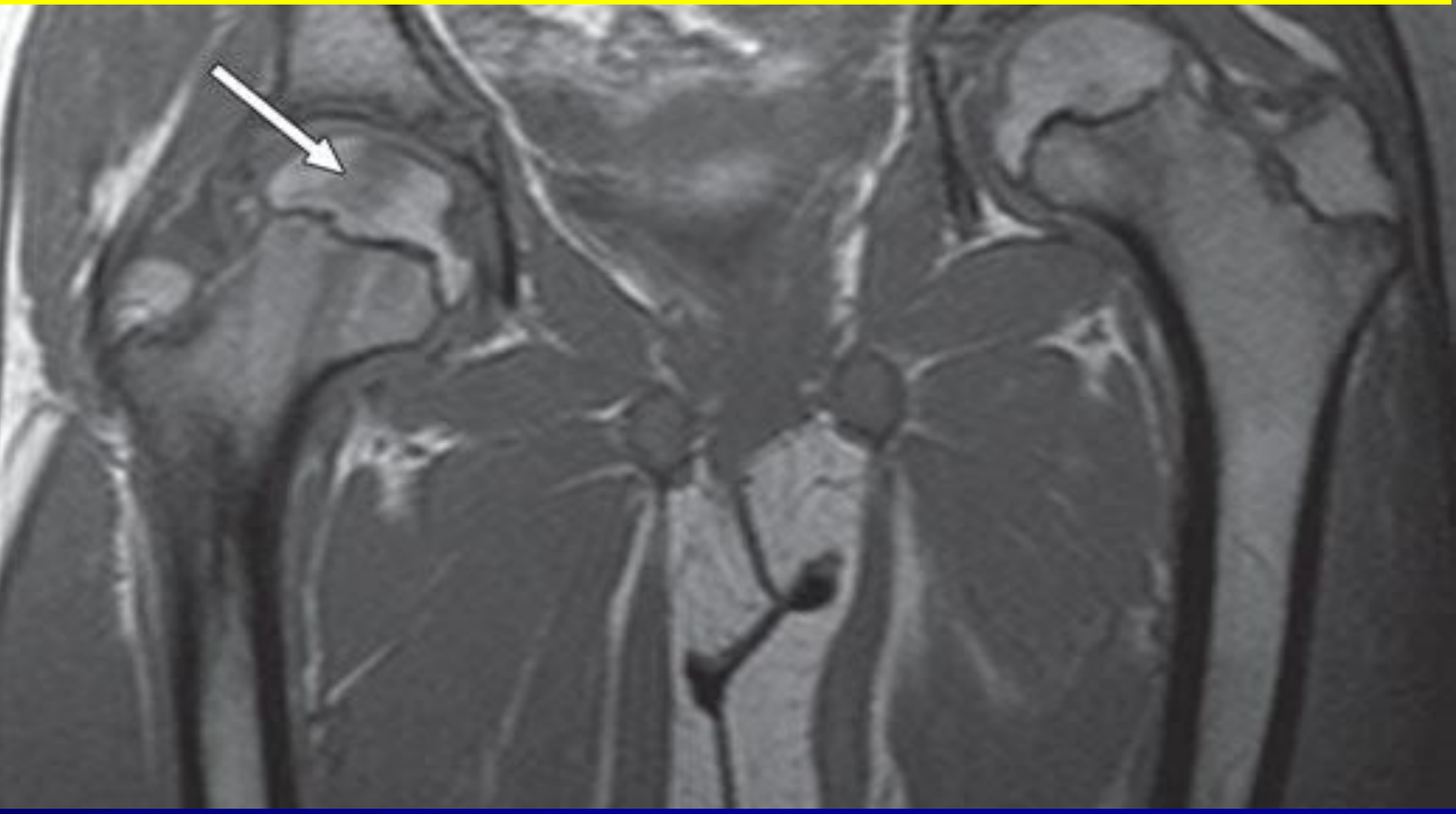
= < 3 mm joint space

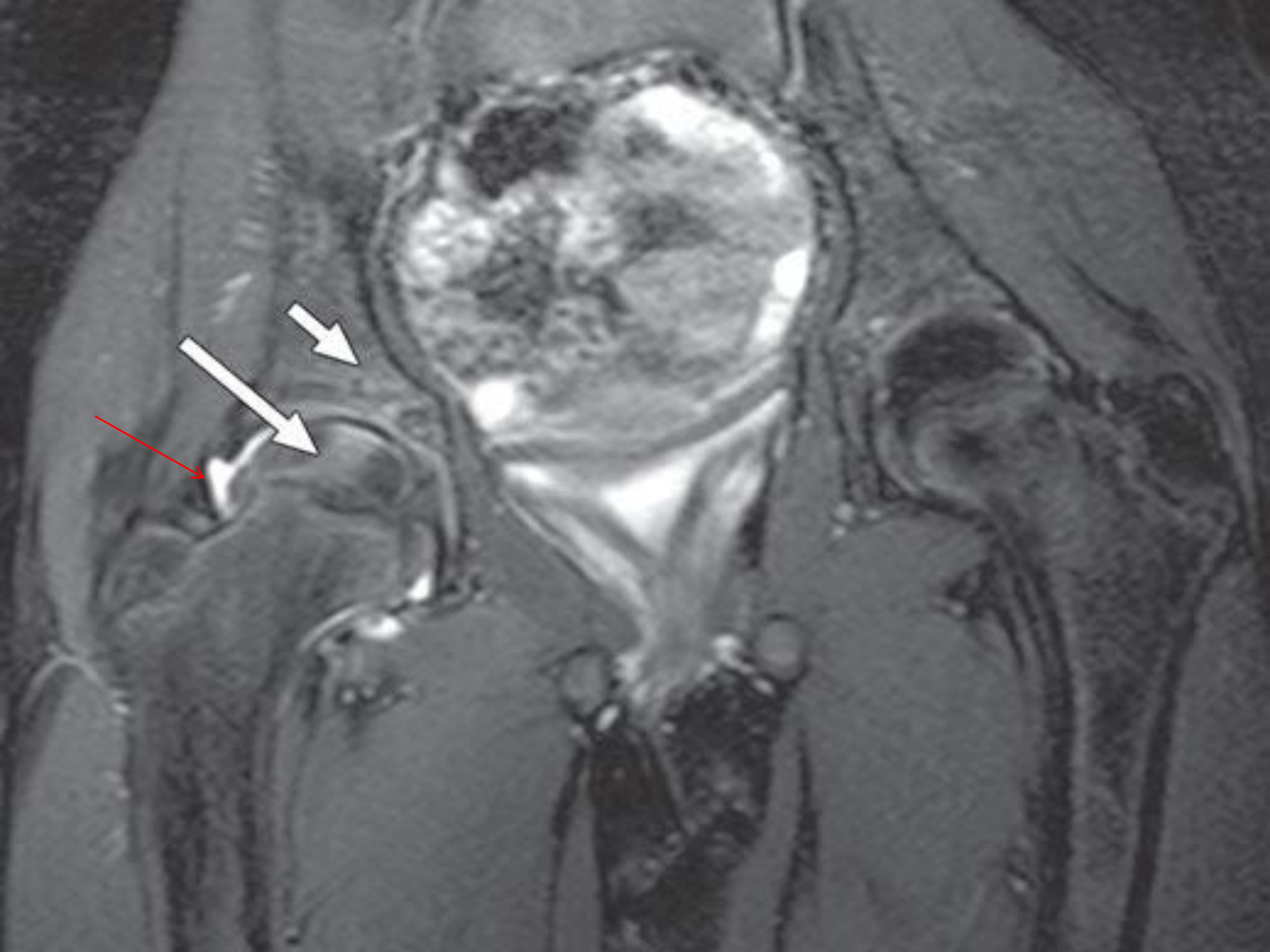
= Osteopenia


Pelvic tilt to right with medial hip joint space narrowing

Early MRI findings

Focus of abnormal signal intensity in middle one third of proximal femoral epiphysis.






mild synovial hypertrophy

Natural History

= Acute phase: 6-16 months
(inflammatory)

= Chronic phase:

painful fibrous ankylosis

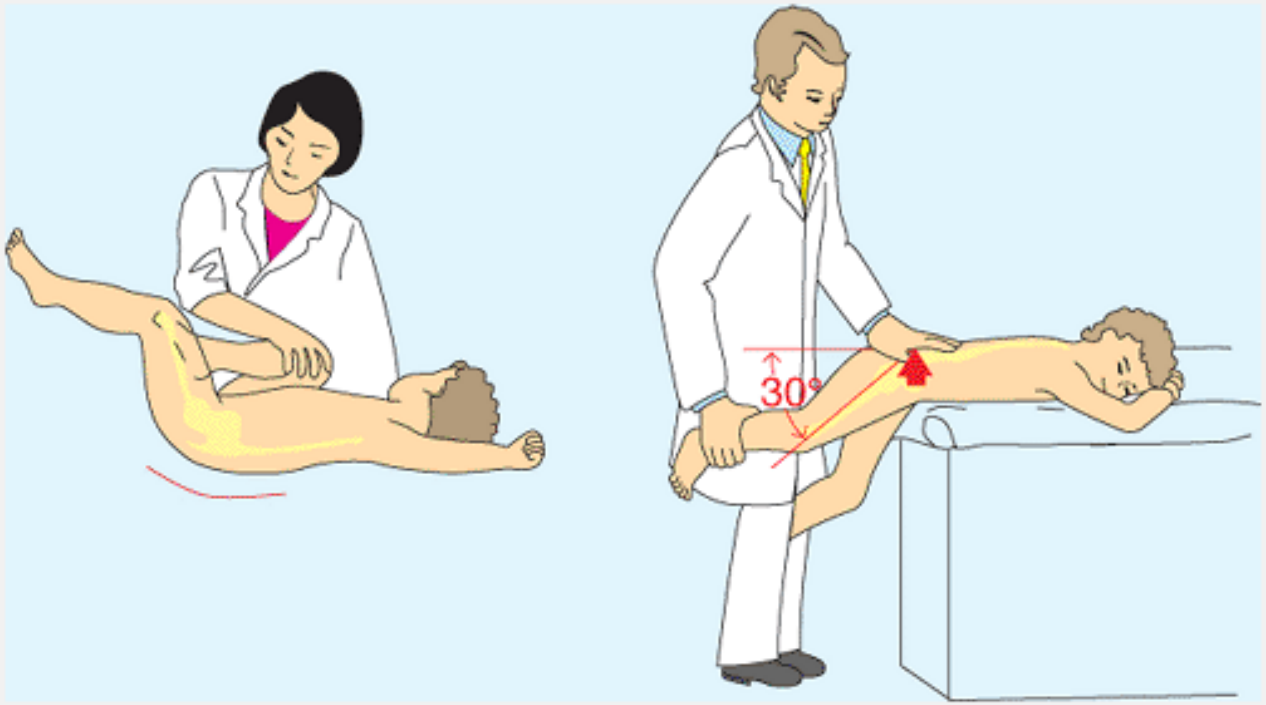
painless ankylosis

improvement

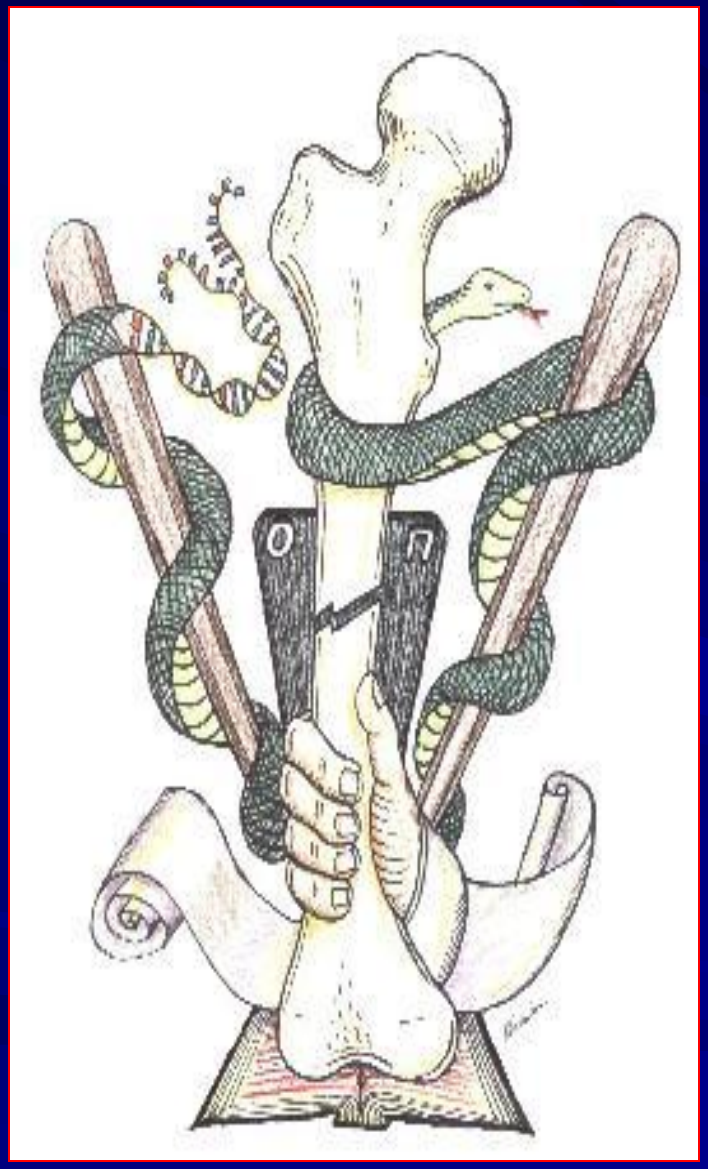
50-60 % have favourable long term outcome

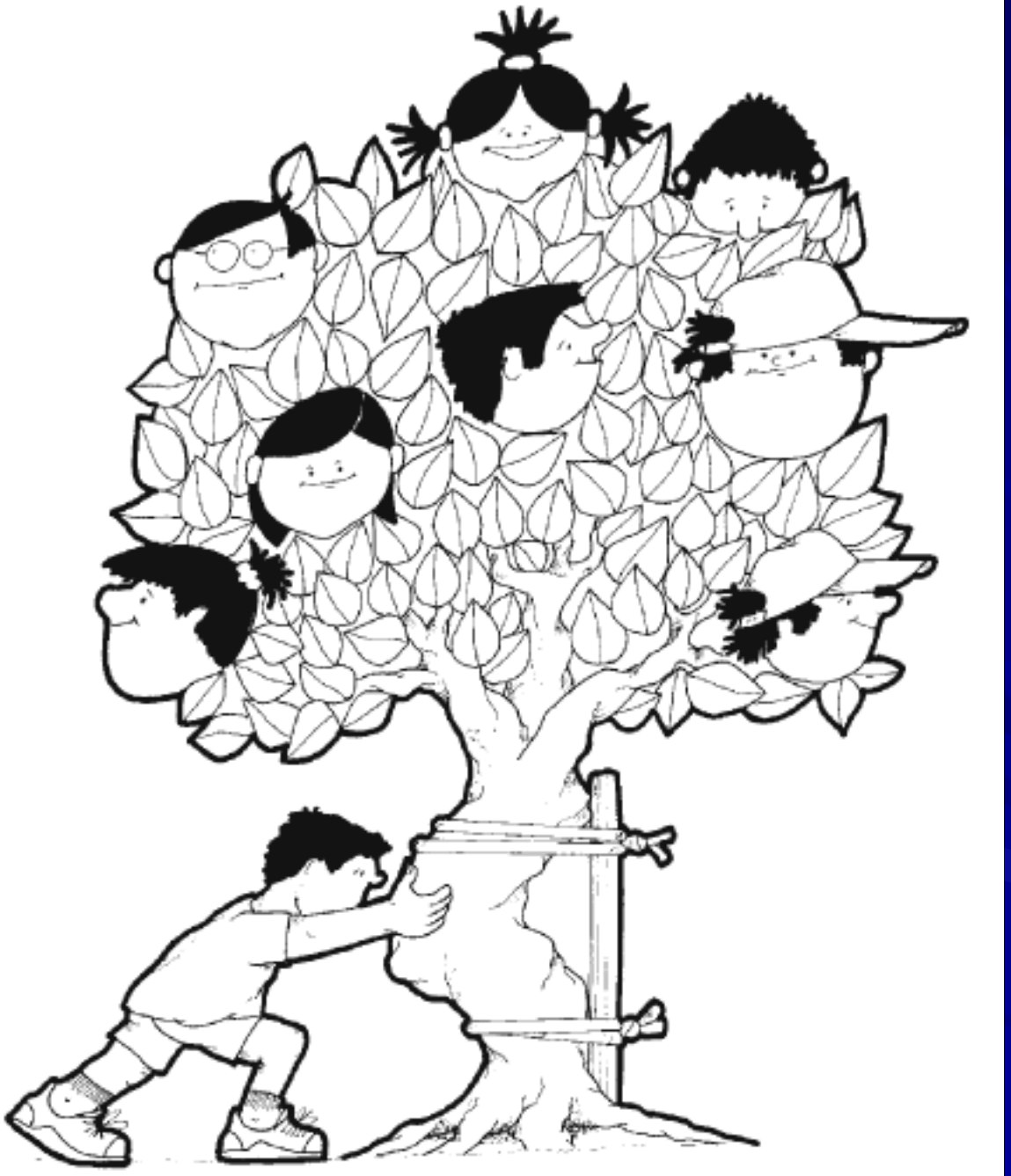
Treatment

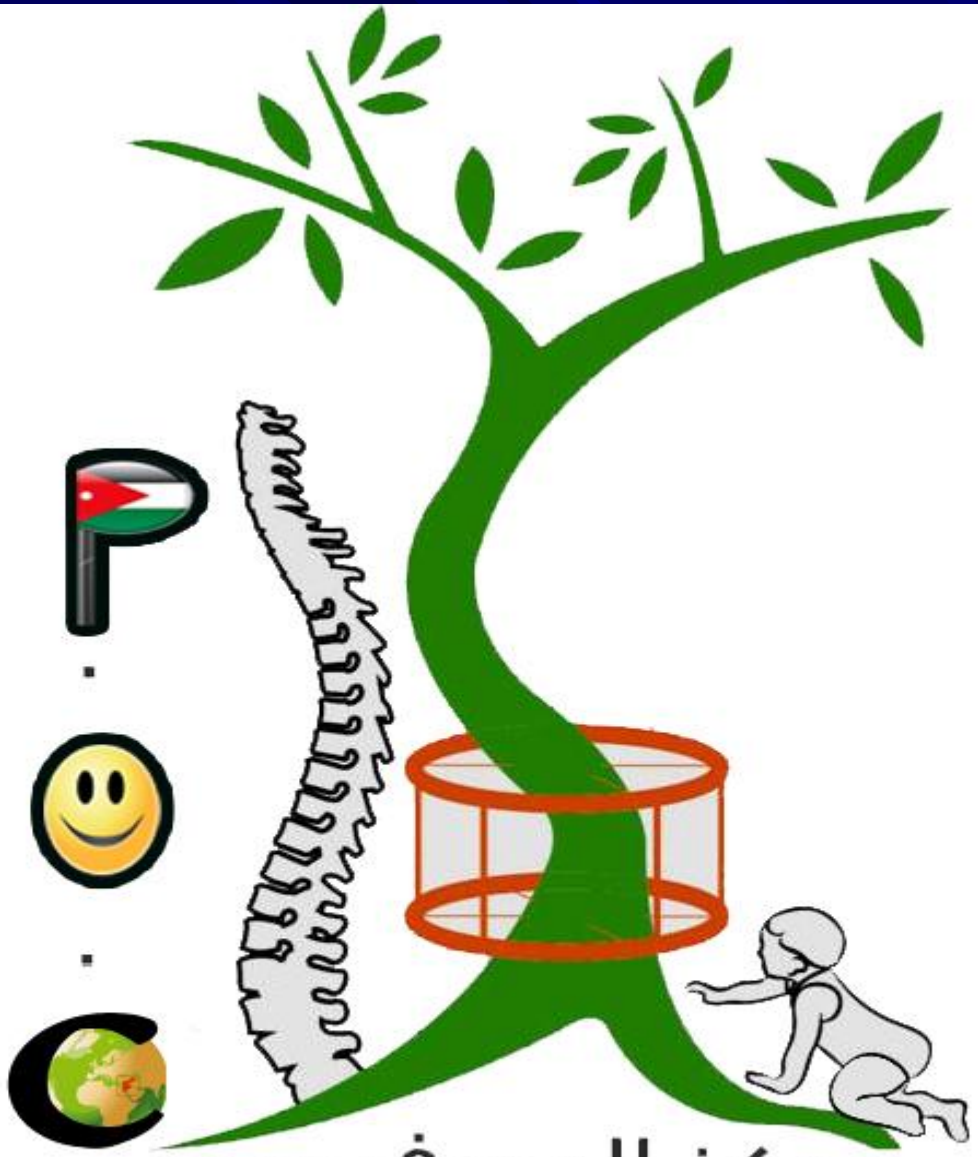
= Physiotherapy
= NSAIDS,
= Protected weight bearing
= Bisphosphonates
= Etanercept (TNF)



C Hip flexion contracture assessment The Thomas test (left) is performed with the contralateral hip flexed. Extend to measure the degree of contracture. The prone extension test (right) is performed with the child prone. Gradually extend the hip until the hand on the pelvis begins to rise. The horizontal-thigh angle indicates the degree of contracture.



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