BELMATT
HEALTHCARE TRAINING

The Pelvis & Hips

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Objectives

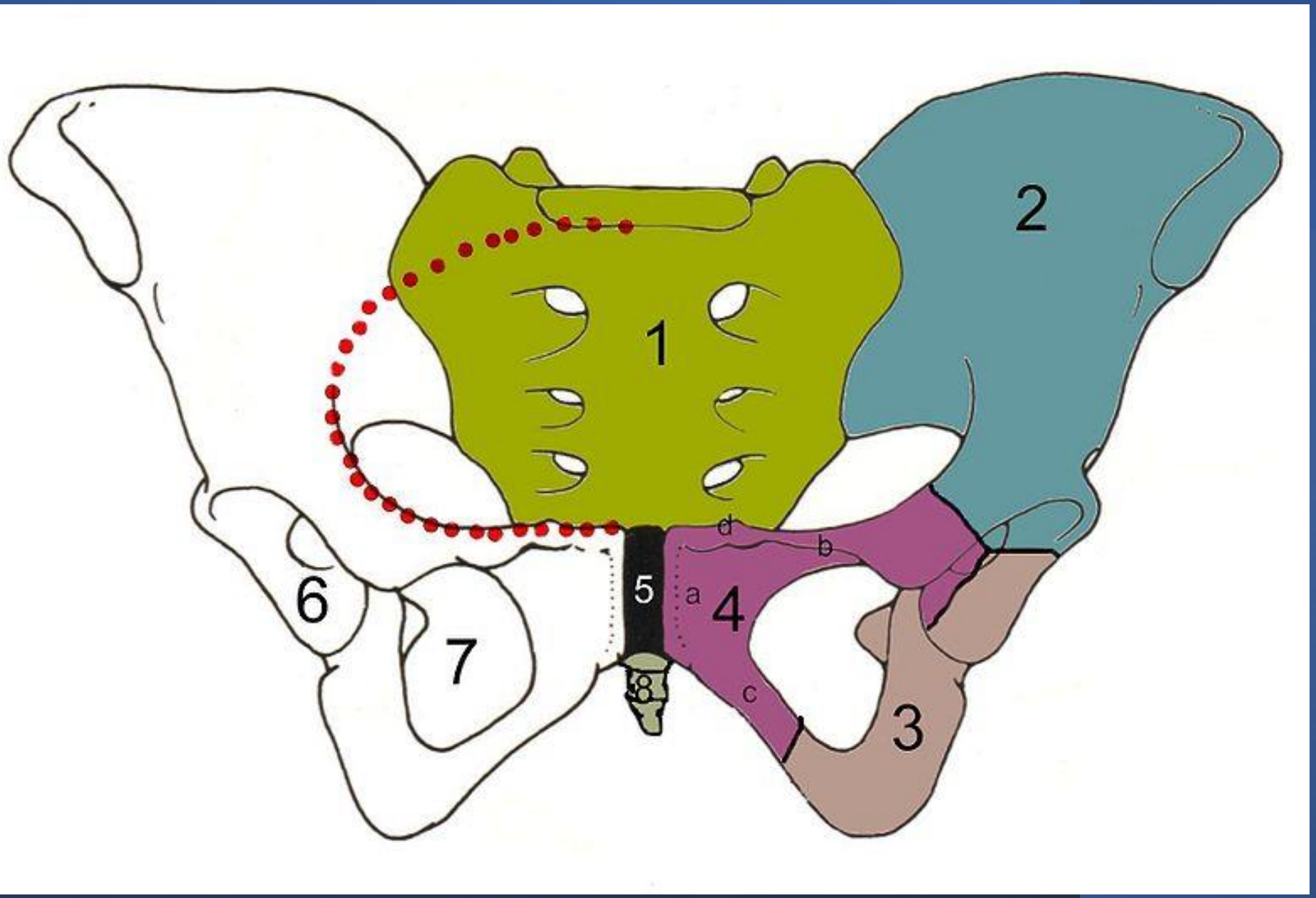
- Anatomy of pelvis and proximal femur
- Standard x ray views
- General comments on interpretation of the pelvis x ray
- # Neck of femur
- Femoral shaft fractures
- Hip prosthesis
- Hip dislocation
- Pelvis # and trauma

- UCC / ED Mx & Escalation strategies
- Referral criteria

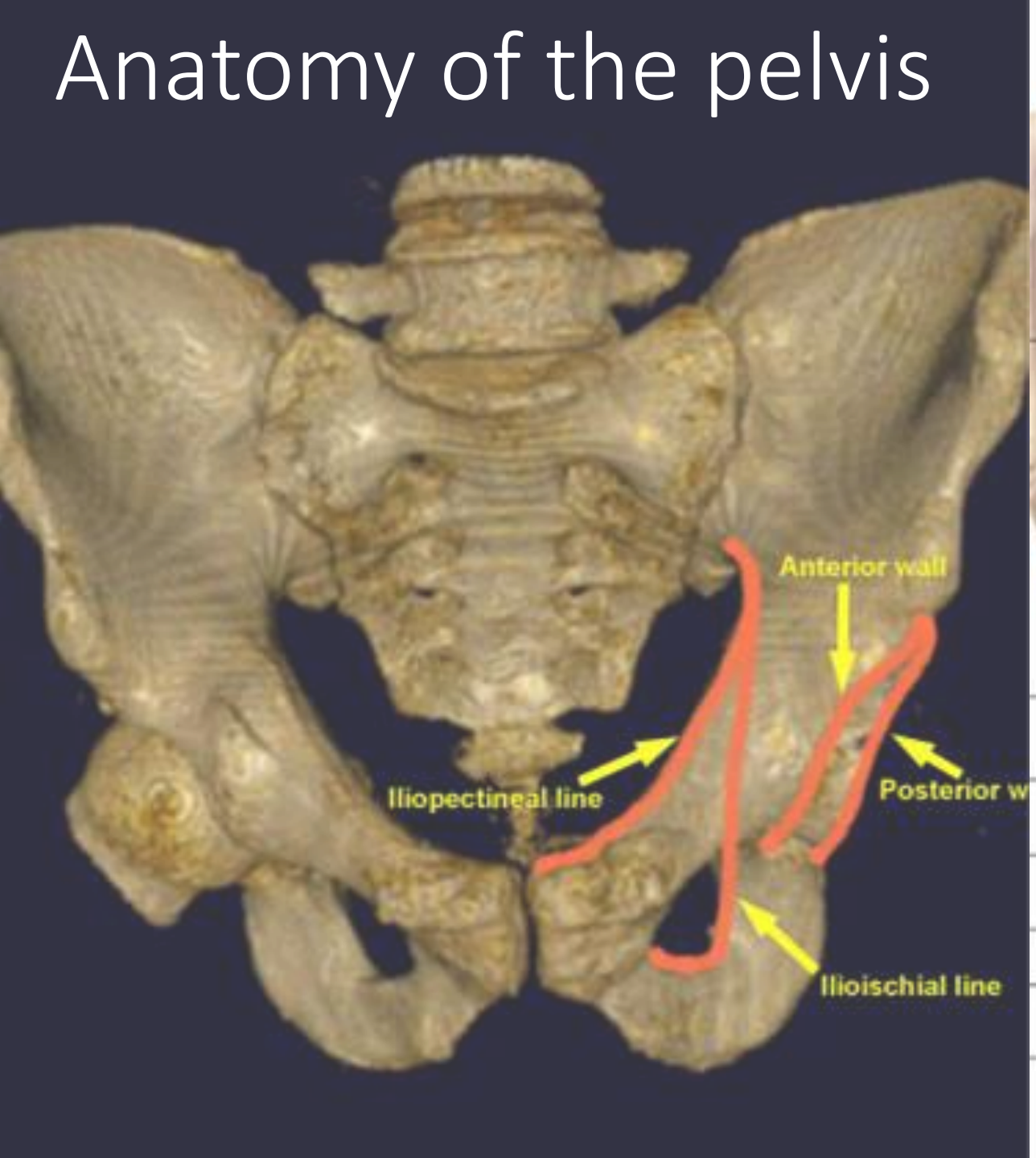
Overview

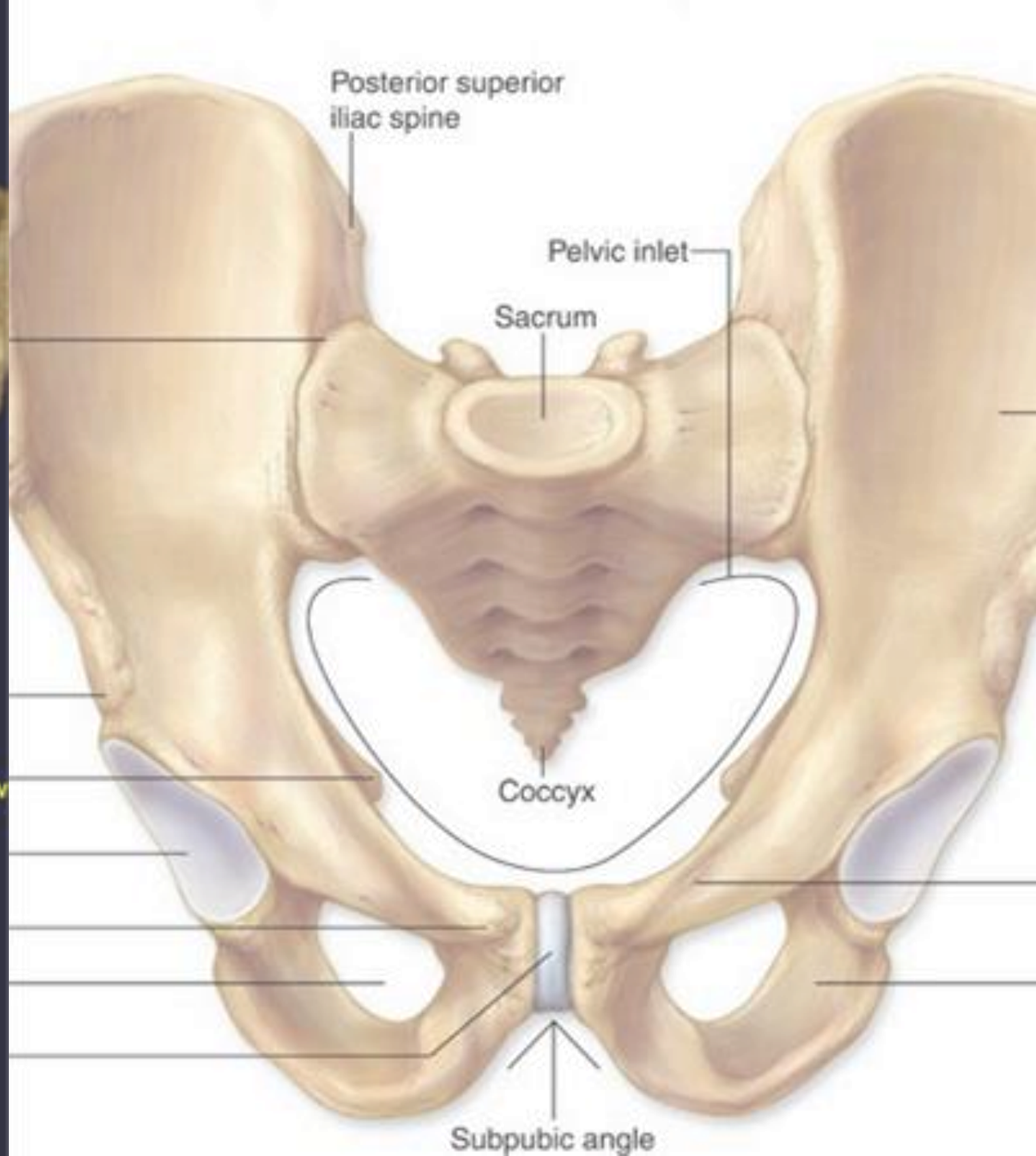
- Population group
  - Trauma patients
    - Part of a trauma series
    - Isolated exam following trauma and suspicious clinical finding
  - ? # NOFs (elderly and osteoporotic)

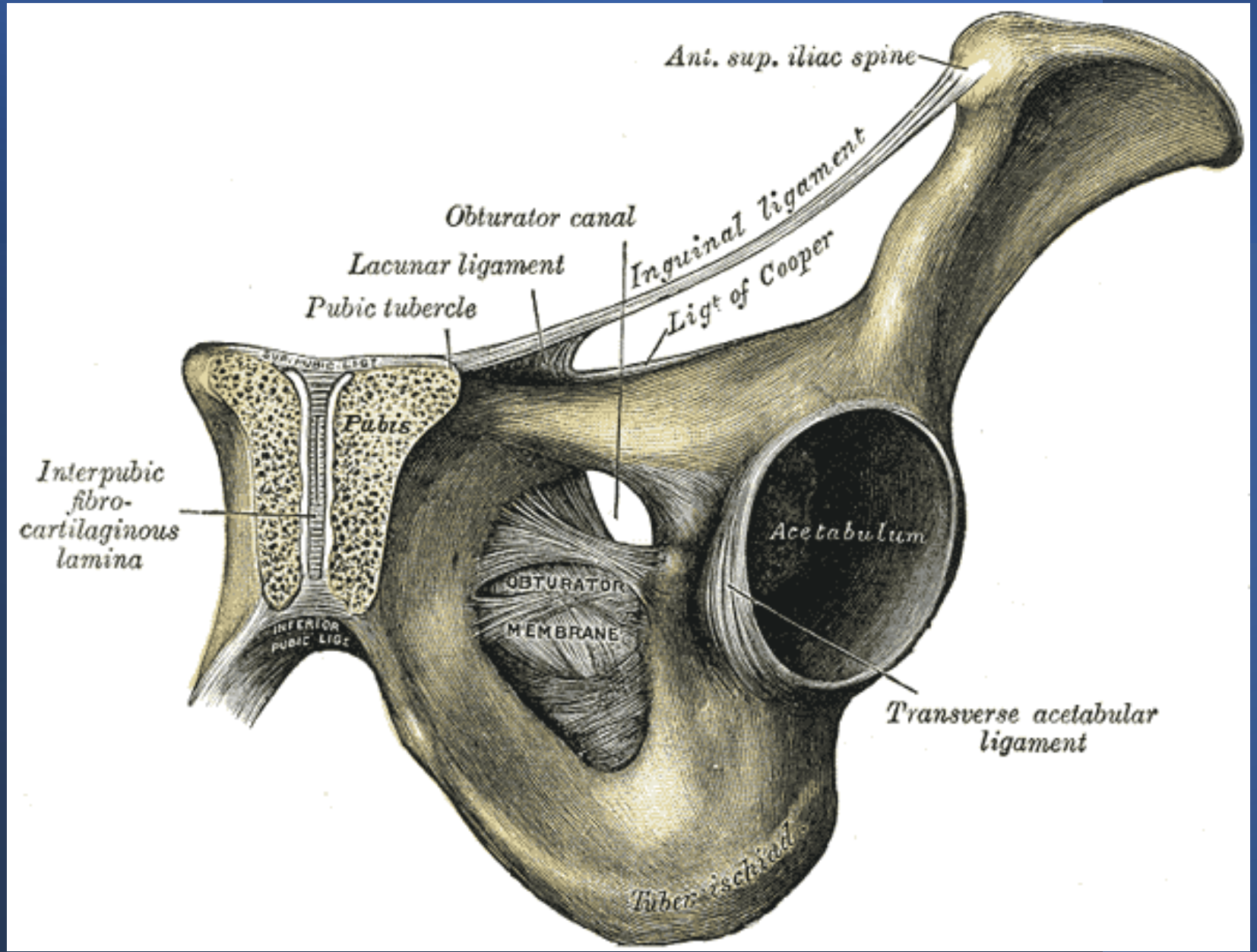
  - Pathological #
  - Rarely in response to patient symptoms
    - OA


1
2
3
4
5
6
7
8
a
b
c
d

Anatomy of the pelvis

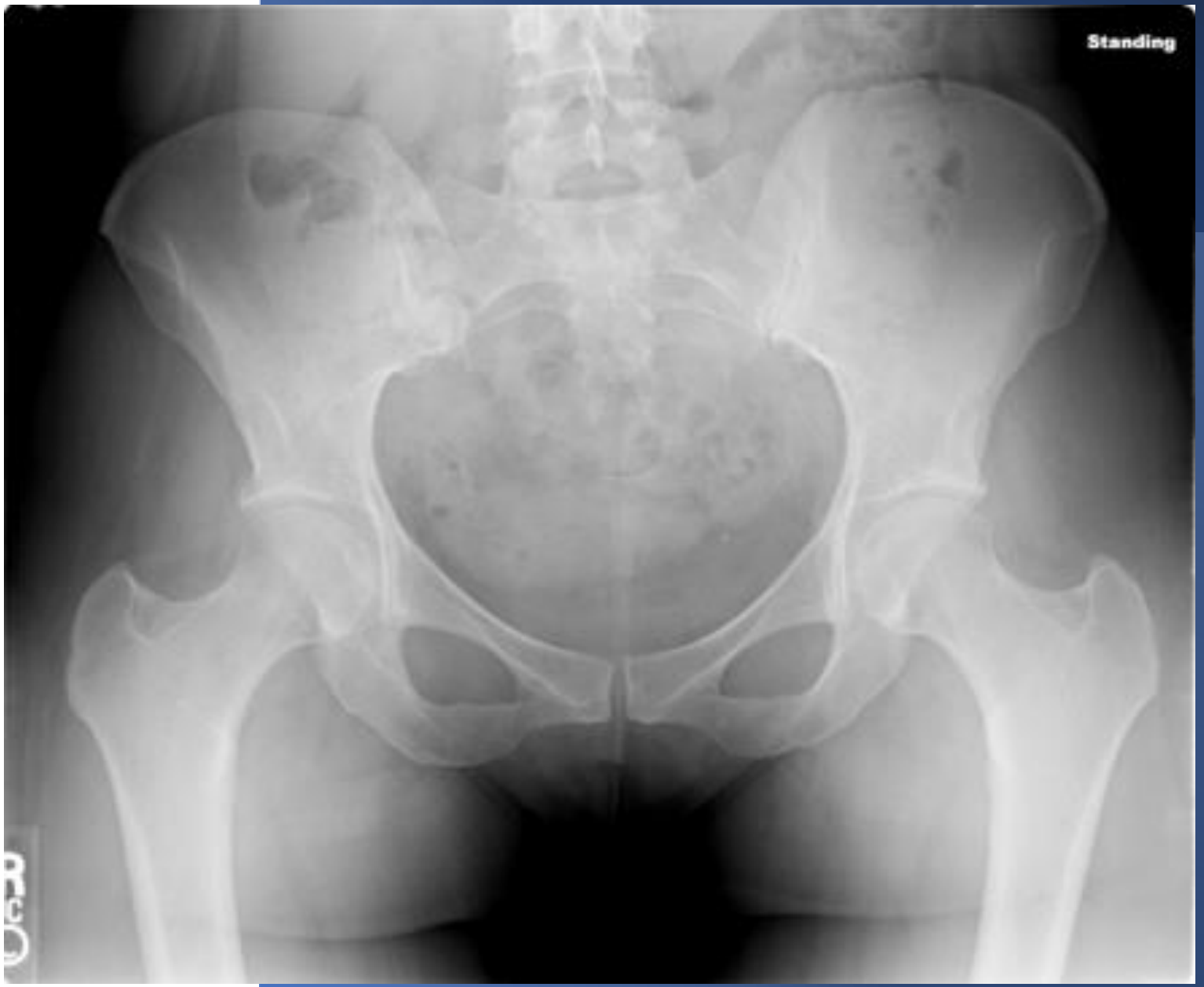





Ani. sup. iliac spine
Inguinal ligament
Ligt of Cooper
Obturator canal
Lacunar ligament
Pubic tubercle
Pubis
Interpubic fibro-cartilaginous lamina
Acetabulum
OBTURATOR MEMBRANE
Transverse acetabular ligament

Standard pelvic views

- Antero-posterior (AP)
- Cross table lateral
- Also:
  - Frog leg
  - Oblique


Standing

Lateral Hip

ABC Approach to the AP view

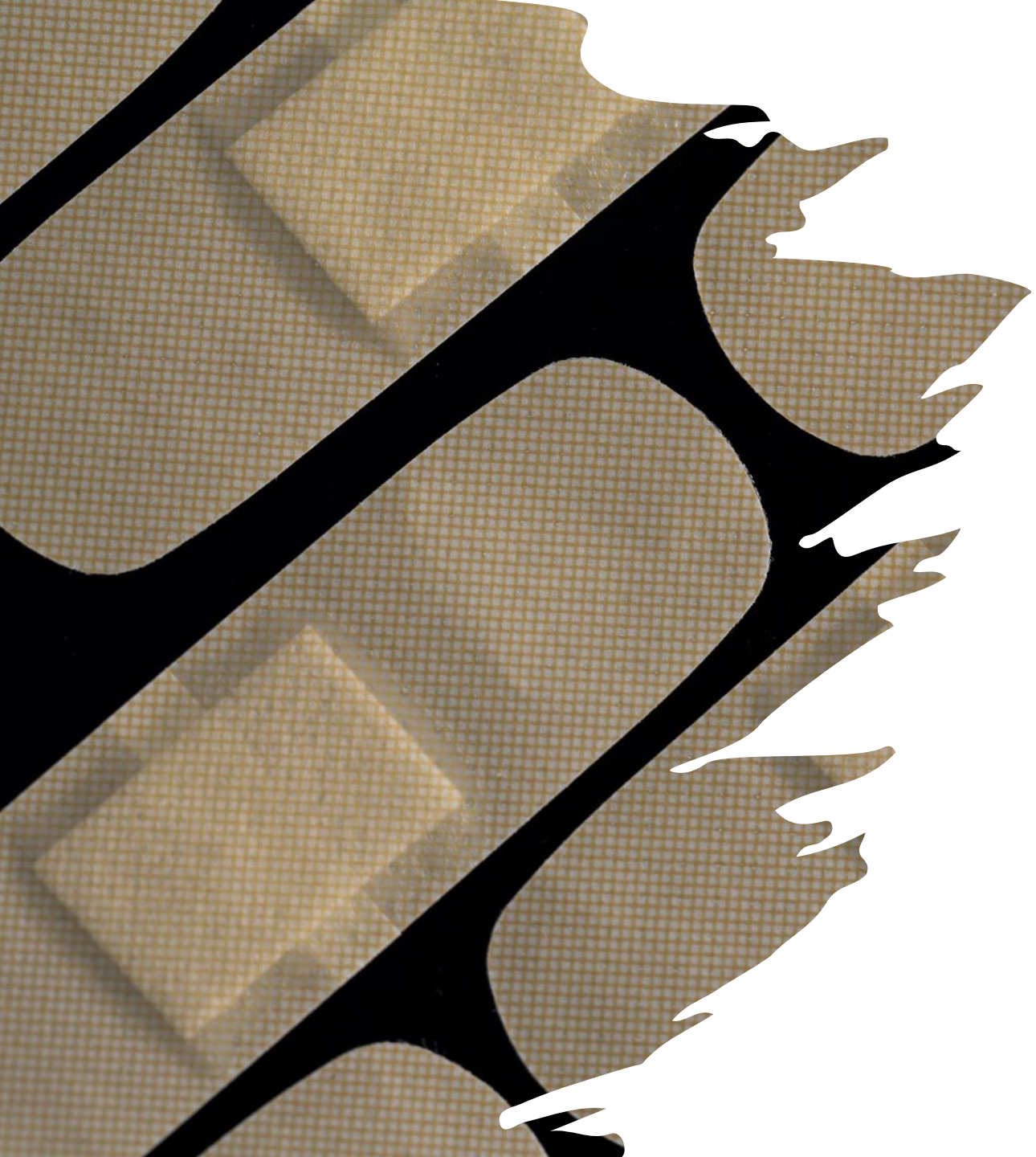
- Adequacy
- Alignment
- Bones
- Cartilage, joints and soft tissues

Specific areas to consider in the pelvis x ray

- SI joints: symmetry/widening
- Symphysis pubis: widening

- L5 transverse processes: avulsion injuries

- Iliac wings for fracture lines

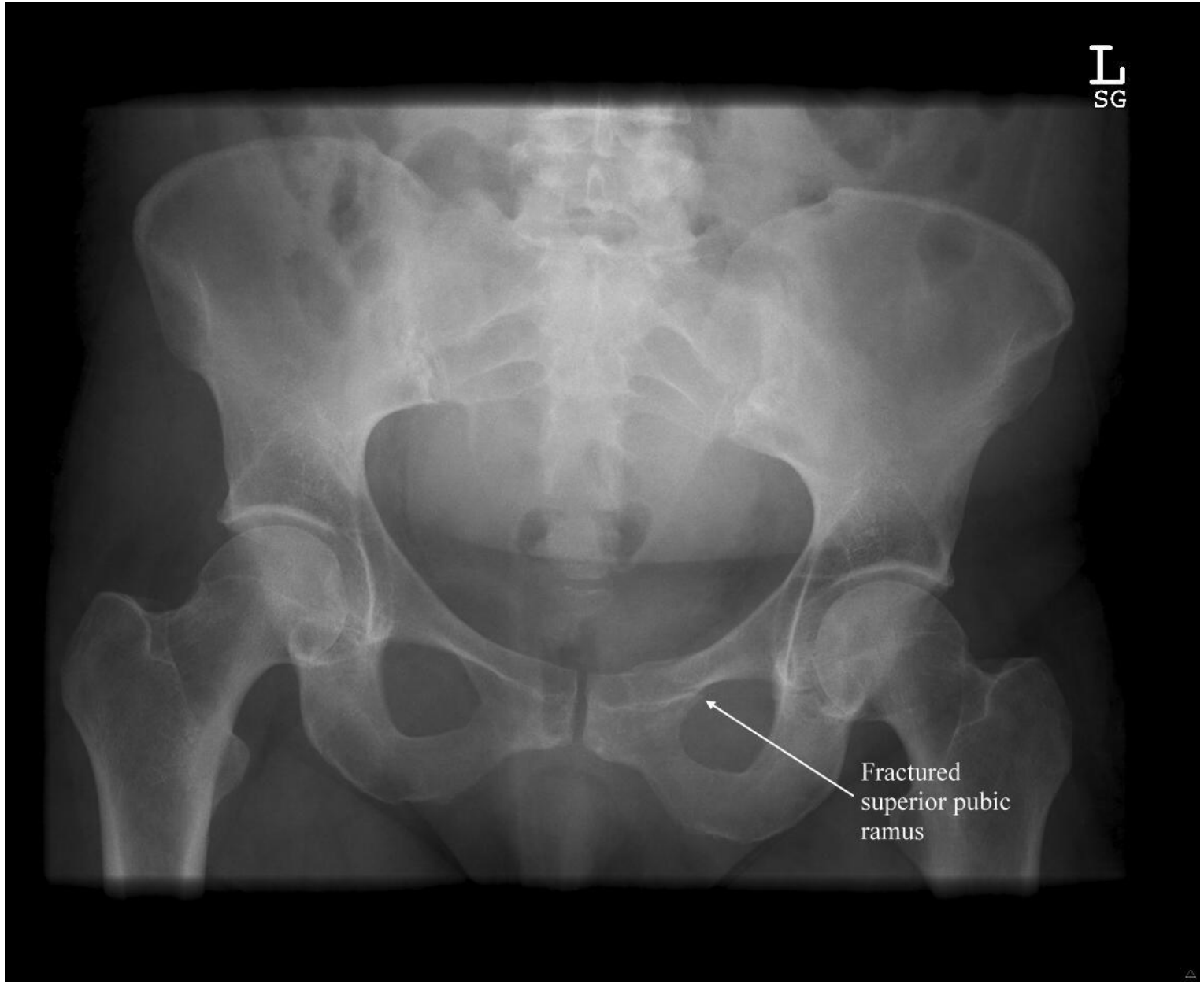


Pelvic Fractures

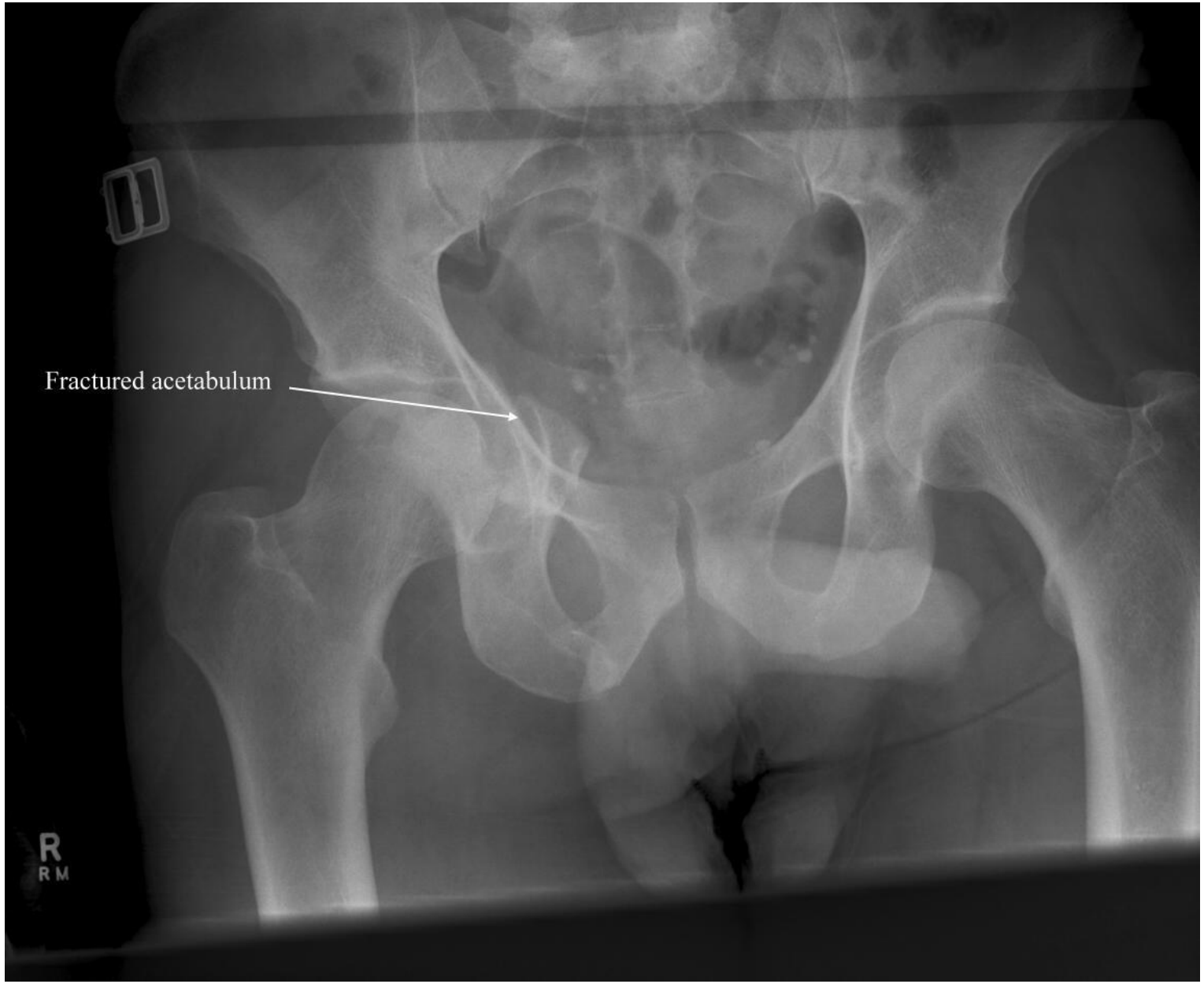
- **Many complicated classification systems**

- **TYPE A**
- **Stable**
- pubic rami fractures
- acetabular fractures
- Avulsion fractures (muscle attachments)

Isolated superior pubic ramus fracture



Acetabular Fracture

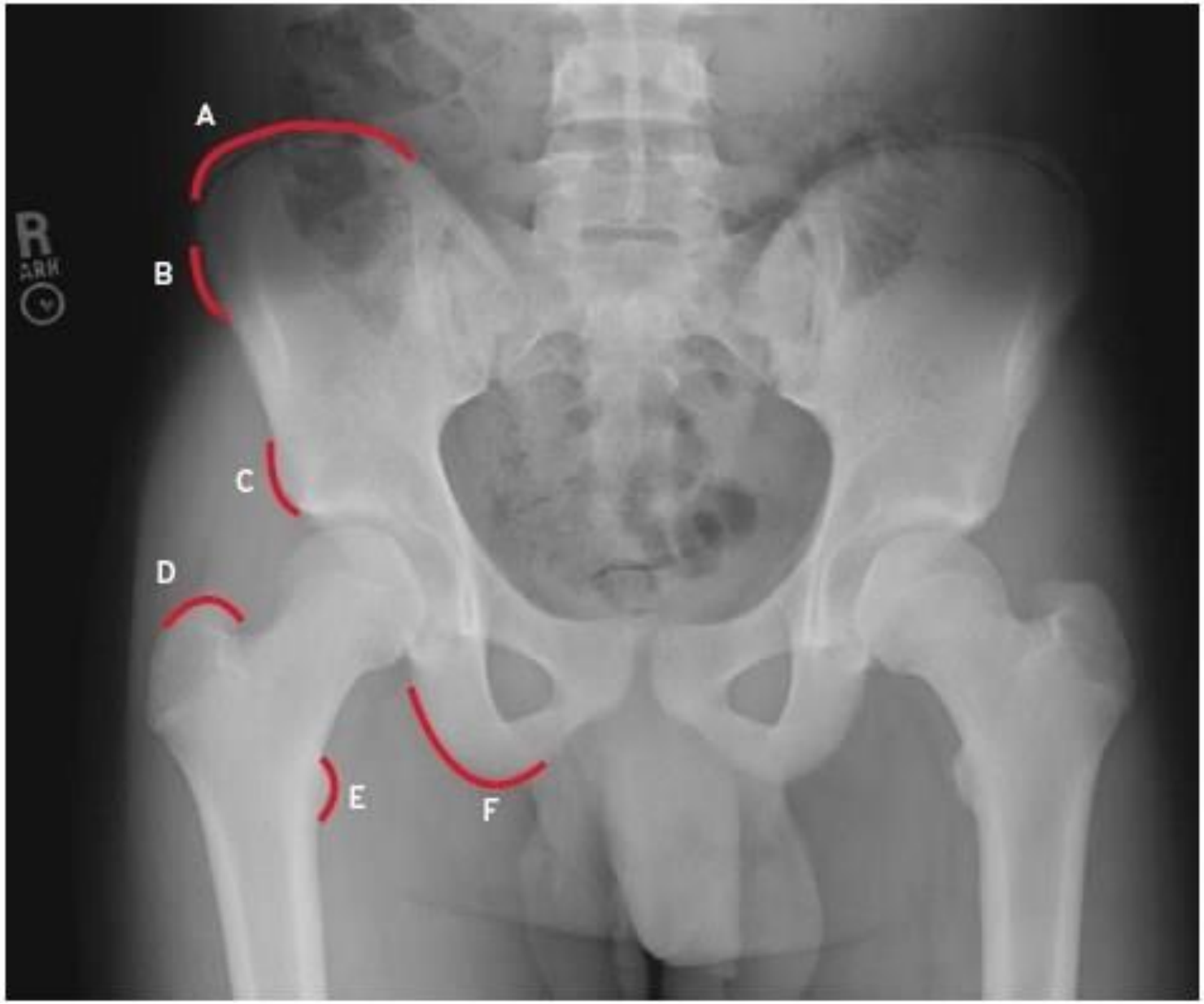


Avulsion fracture of Anterior inferior iliac spine

FIGURE 1. Fracture of the anterior inferior iliac spine in a 13-year-old boy

Isolated ischial tuberosity fracture

Common locations for avulsion fractures



Vertically stable, rotationally unstable

AP compression (open book)

- Separation of the pubic symphysis and widening of one or both iliac joints (B1)

Lateral compression (ramus + SI injury)

- Ipsilateral compression causing pubic bones to fracture and override (B2)
- Contralateral compression resulting in pubic rami fractures on one side and compression sacroiliac injury on the other side (B3)


L

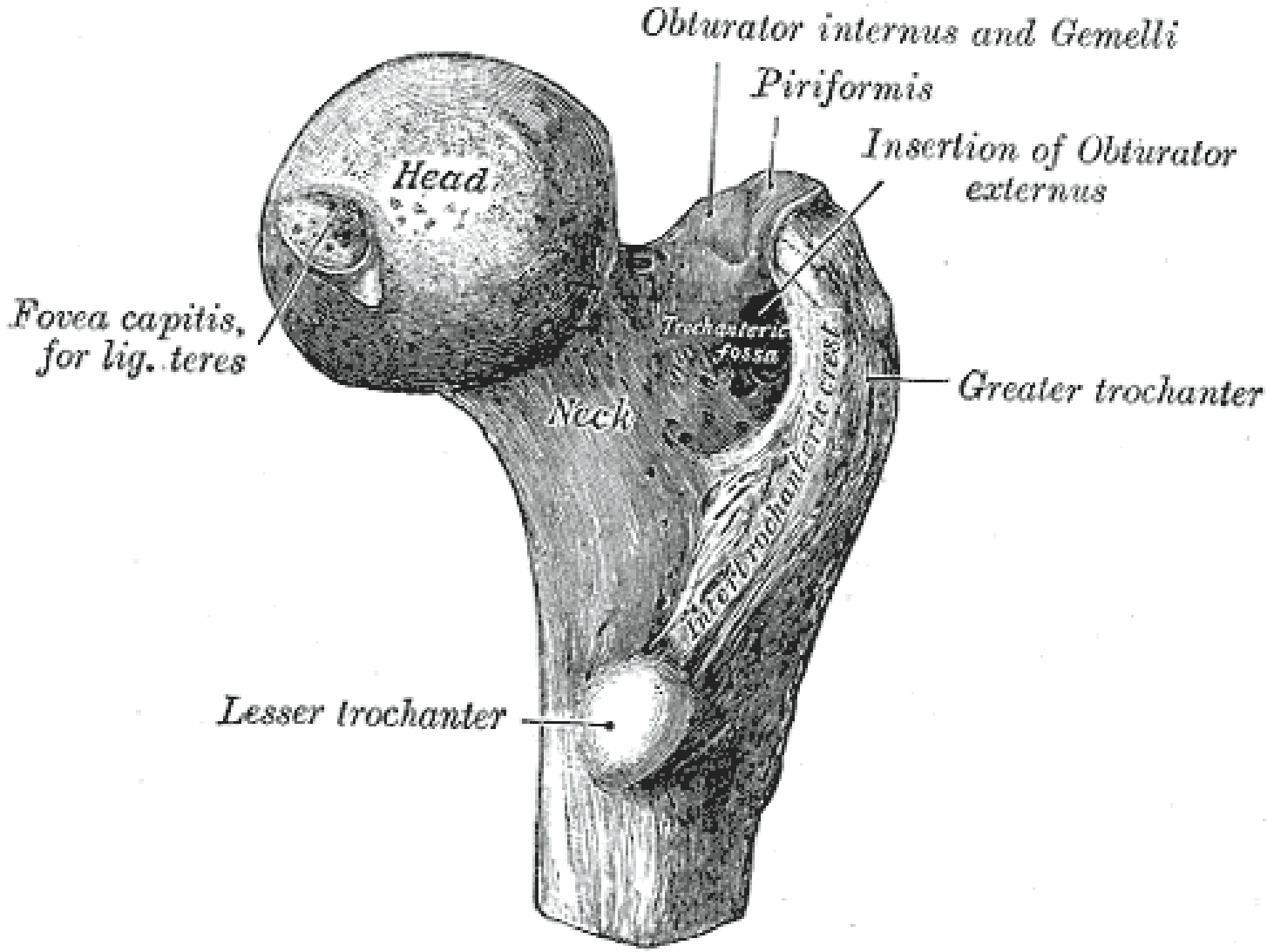
Pelvic ring disruption at ≥ 2 levels

Unstable

Pelvic ring disruption

- Rami
- SI dissociation
- L5 Transverse process fracture

Anatomy of proximal femur



Femoral neck fractures

- Who?

  Old, osteoporotic female

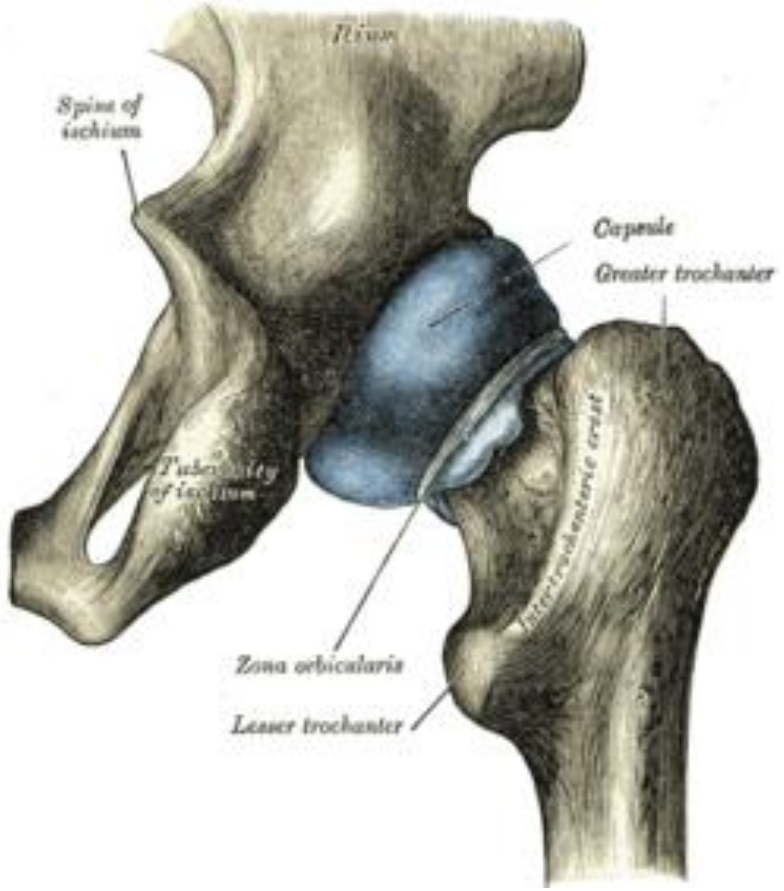
- How?

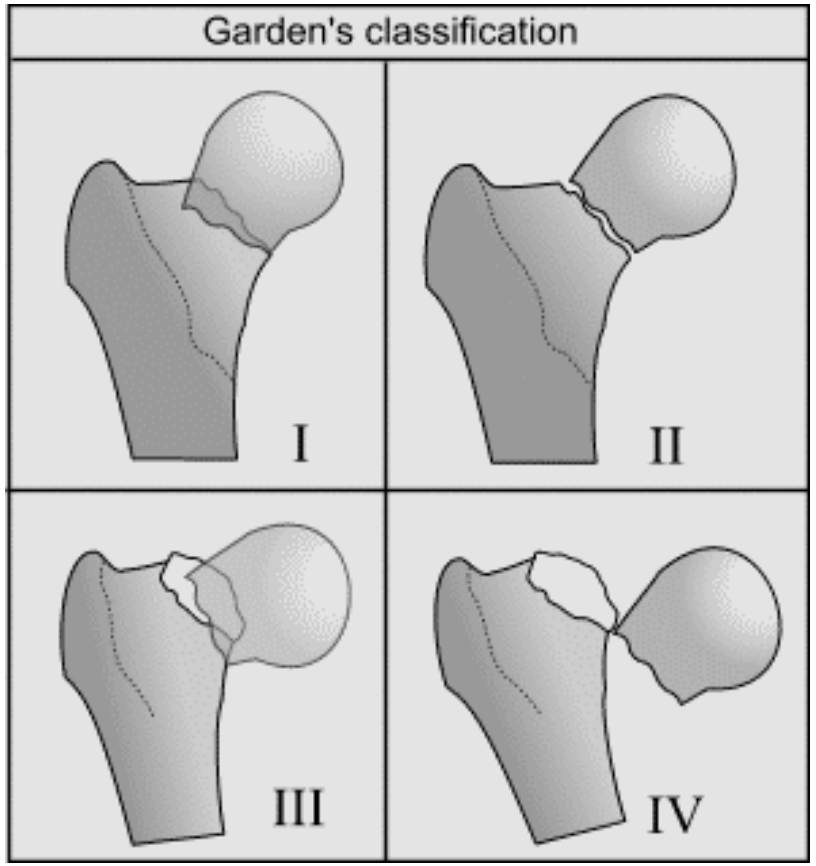
  Mechanical fall

Intracapsular

- Garden classification
- Subtle finding
- Must identify minimally displaced fractures (hardest to see)

Garden Classification





Garden 1

Garden 2

Garden 3

Garden 4

Troch-anter

31-A1
pertrochanteric simple

select

31-A2
pertrochanteric multifragmentary

select

31-A3
intertrochanteric

select

Neck

31-B1
subcapital, with slight displacement

select

31-B2
transcervical

select

31-B3
subcapital, displaced, non impacted

select

Head

31-C1
split (Pipkin)

select

31-C2
with depression

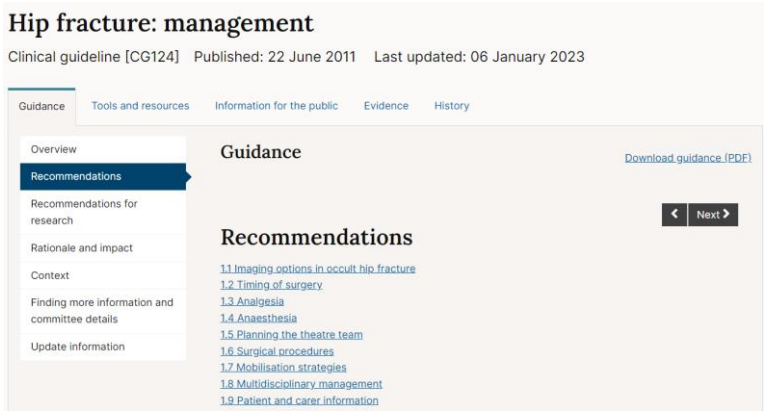
select

31-C3
with neck fracture

select

Caveats with hip fractures – NICE guidance

- The invisible fracture
- CT/MR depending on hospital protocol if pain+ with no fracture visible
- Concomitant acetabular fracture
- [Overview | Hip fracture: management | Guidance | NICE]



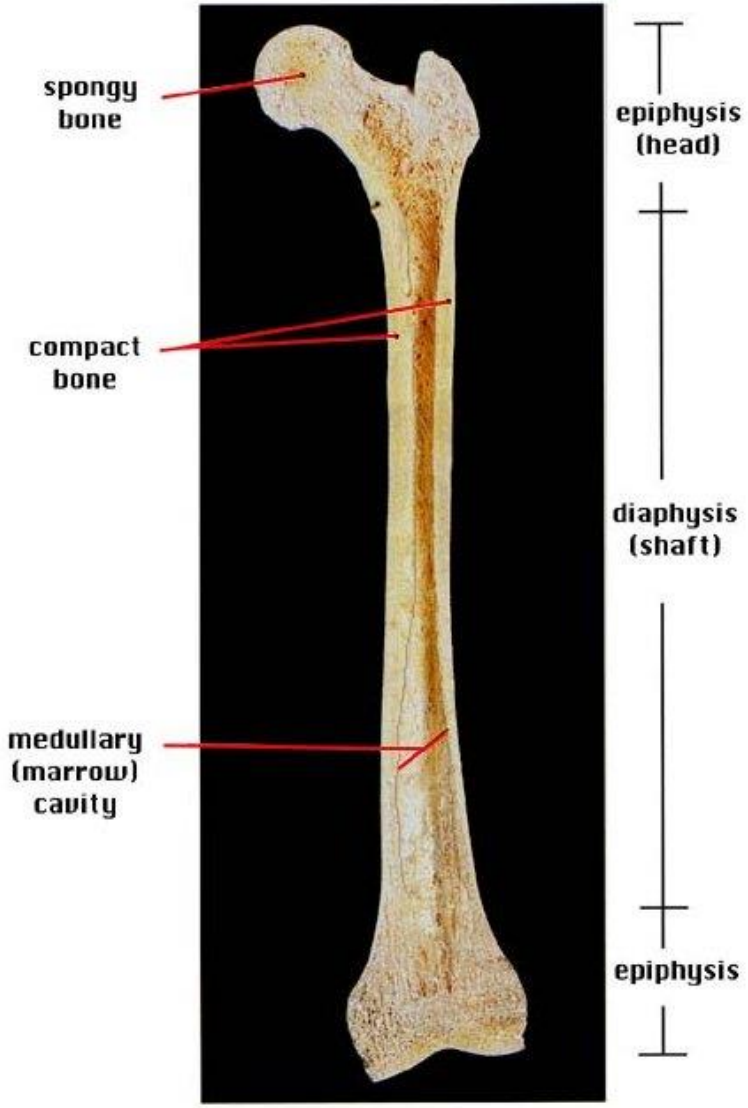
The femoral shaft fracture

- Assessing the full length femur view:

- Adequacy
- Alignment
- Bone
- Cartilage, joints, soft tissue

Femur (shaft/diaphysis)

- Largest, strongest bone, lots of surrounding muscle
- High force injury
- Blood loss ~ 1000ml



Femur – clinical signs

- PAIN!
- Unable to bear weight
- Local swelling and deformity
- Possible distal deformity
- Check NV status

Femur – systematic approach

- Adequacy: AP & lateral of *whole* femur

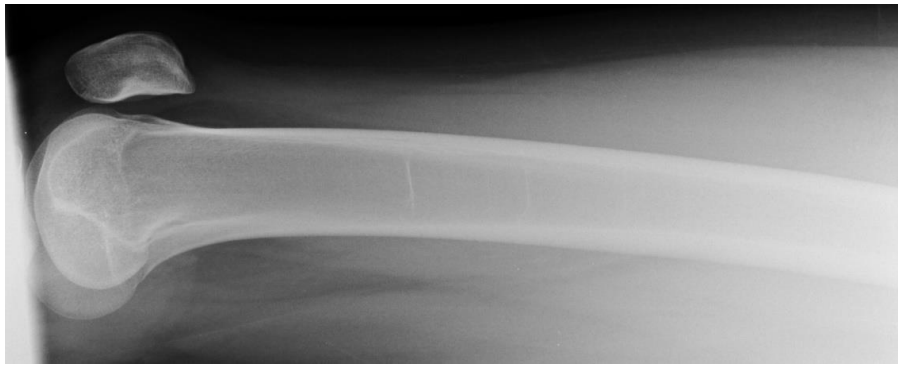
Femur – systematic approach

- Adequacy: AP & lateral of *whole* femur

Femur – systematic approach

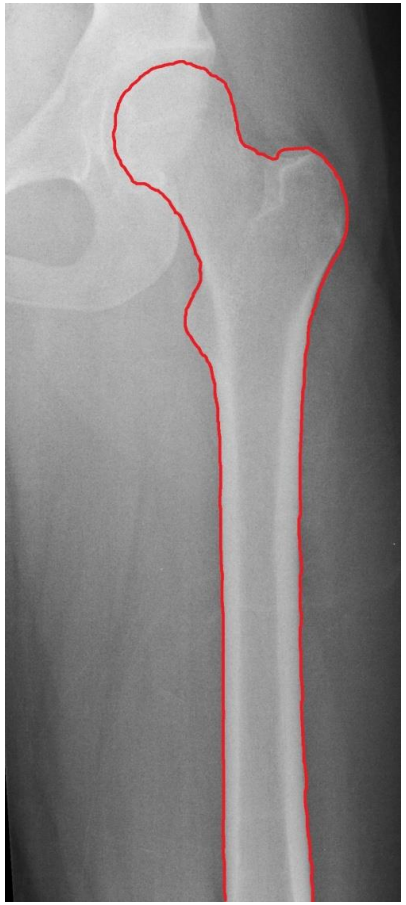
- Adequacy: AP & lateral of *whole* femur

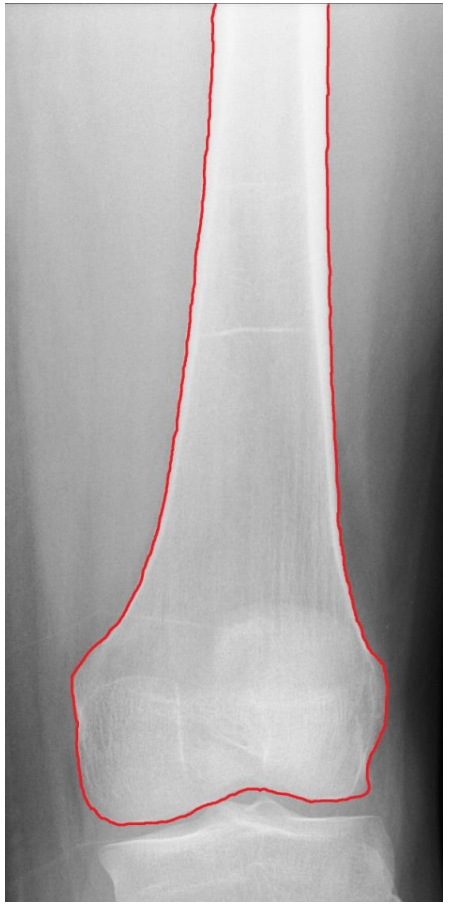


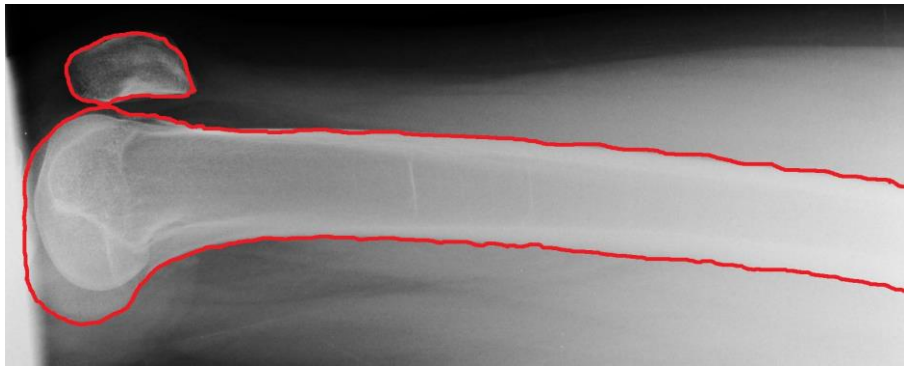


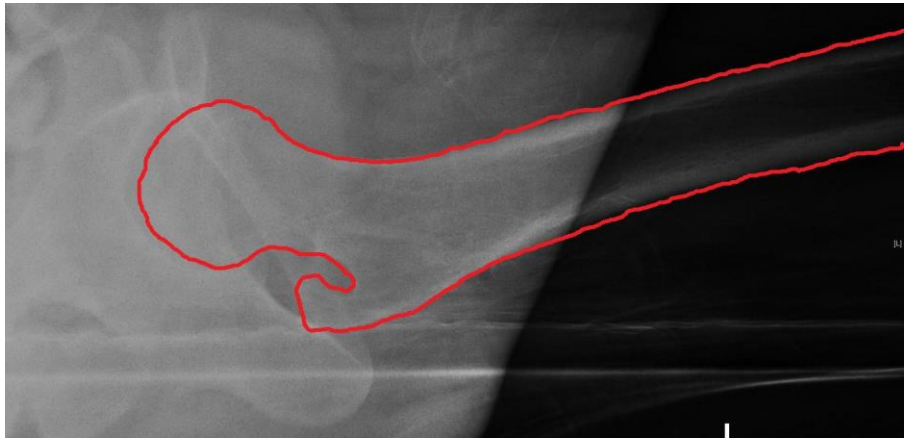

Femur – systematic approach

- Bones: Trace the cortices



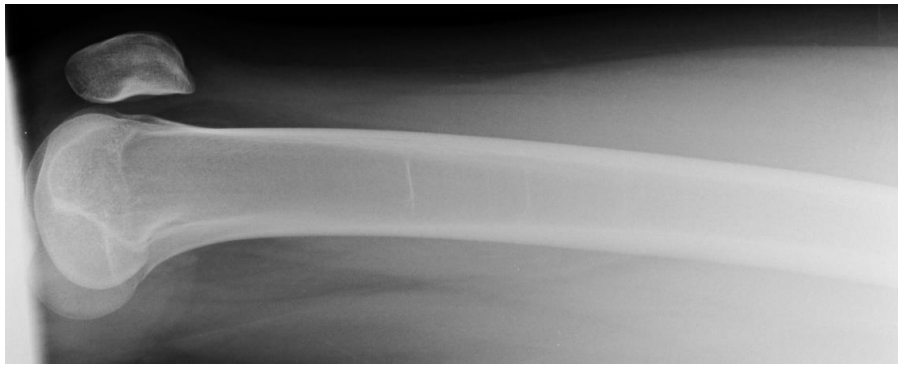






Femur – systematic approach

- Cartilage & *soft tissues*



Femoral shaft fractures

- **Description**
- Proximal/middle/distal third
- Look for evidence pathology
- Full length femur views: AP/Lateral (inc knee)

Femur - 11 y.o. ♂: fall off trampoline

Proximal femoral shaft fracture

Mid shaft fracture

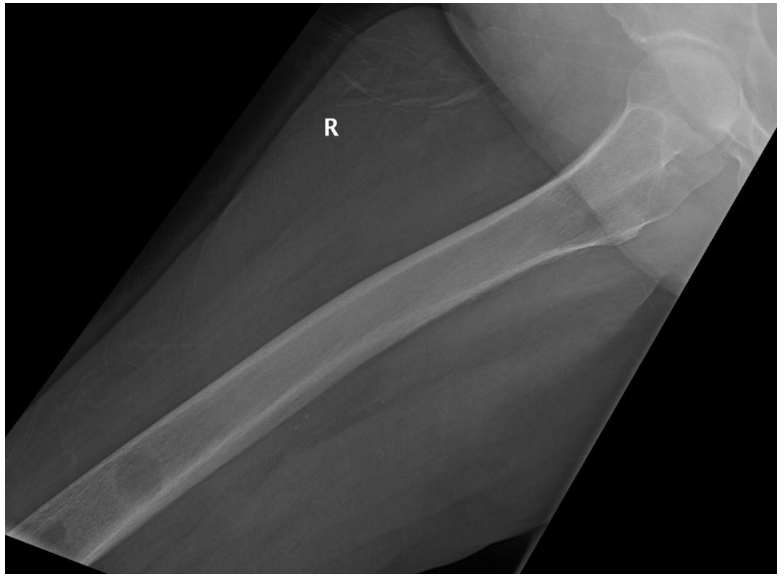
Distal femoral shaft fracture

Femoral Shaft fractures

- Mx

- ABCDE / ATLS
  - Splintage
  - Analgesia
  - Traction (ward staff)

Chronic hip & thigh pain



Prostheses

- Types of prosthesis
  - Bipolar hemiarthroplasty
  - Total hip replacement

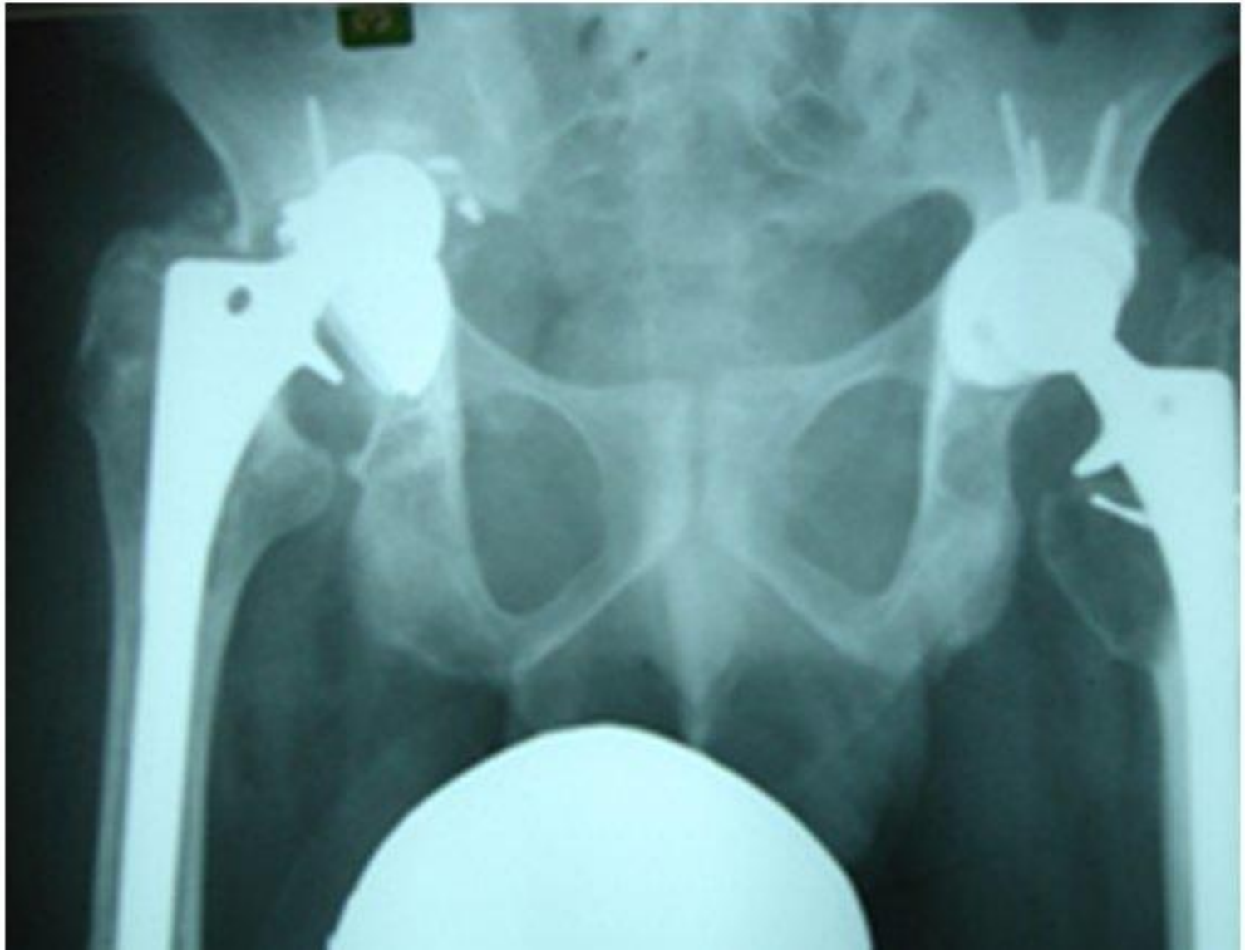
Hemiarthroplasty

Total hip replacement

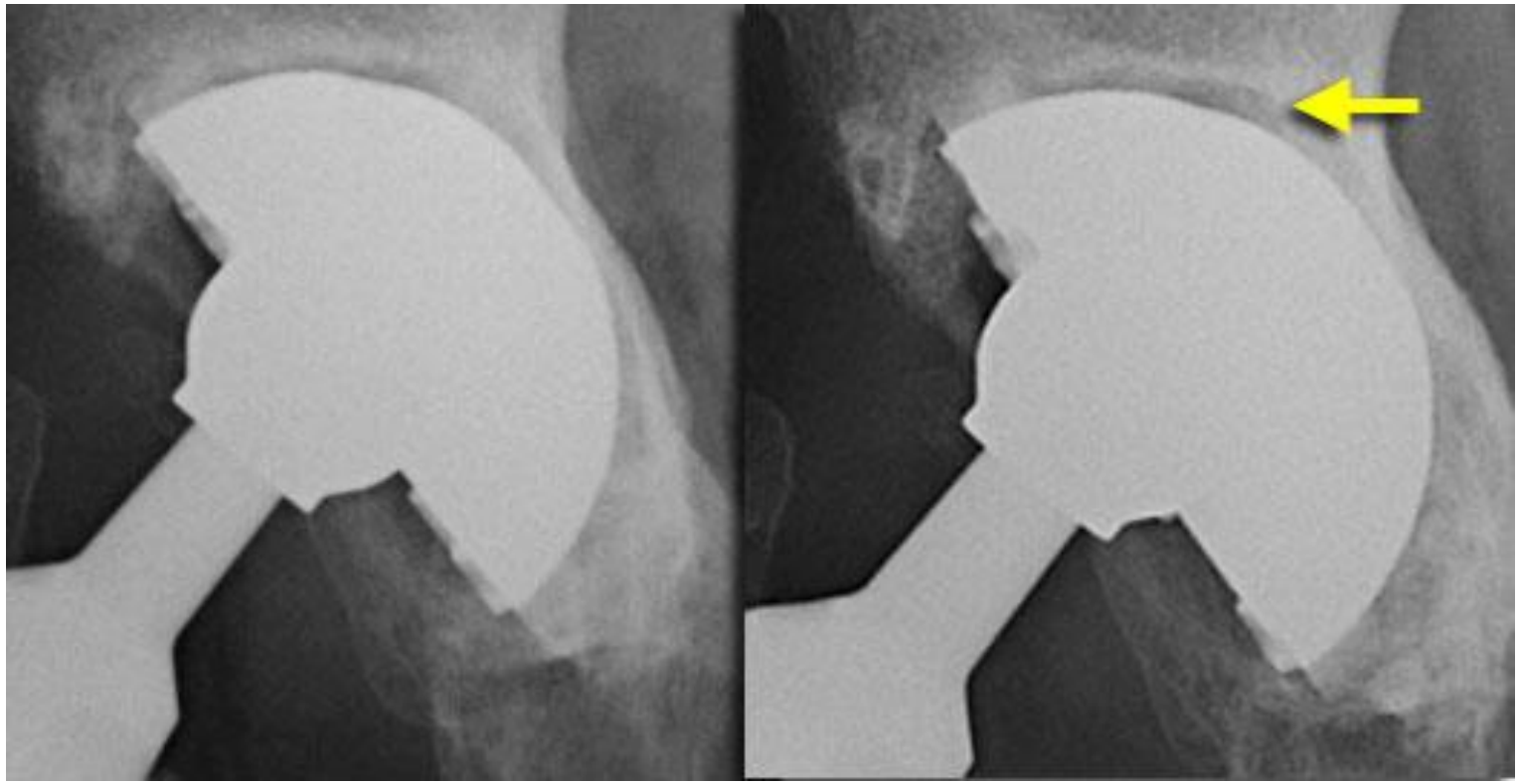
Prosthetic injuries

- Loosening
- Infection
- Fracture (missed fracture below prosthesis)
- Dislocation

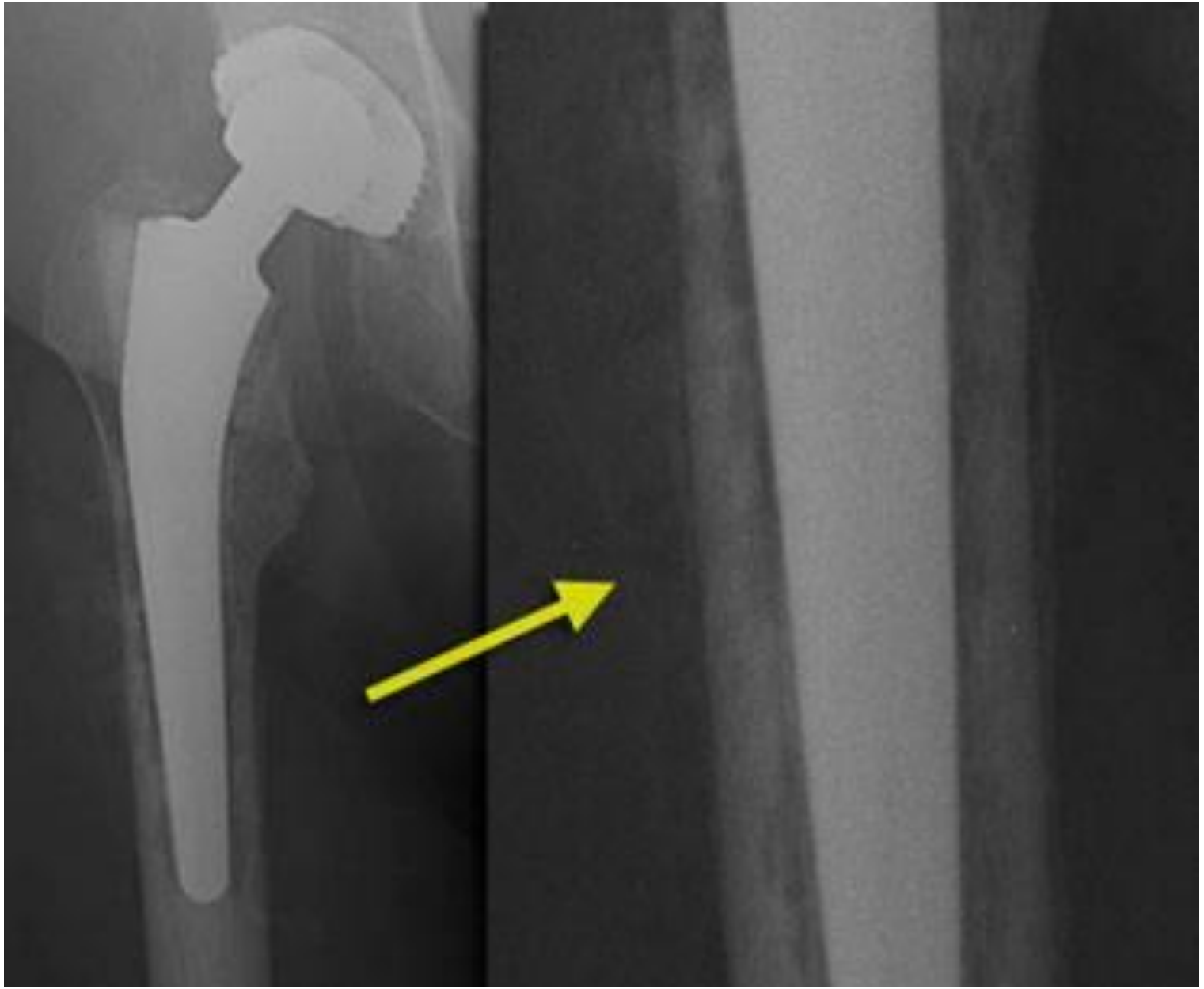
Loosening



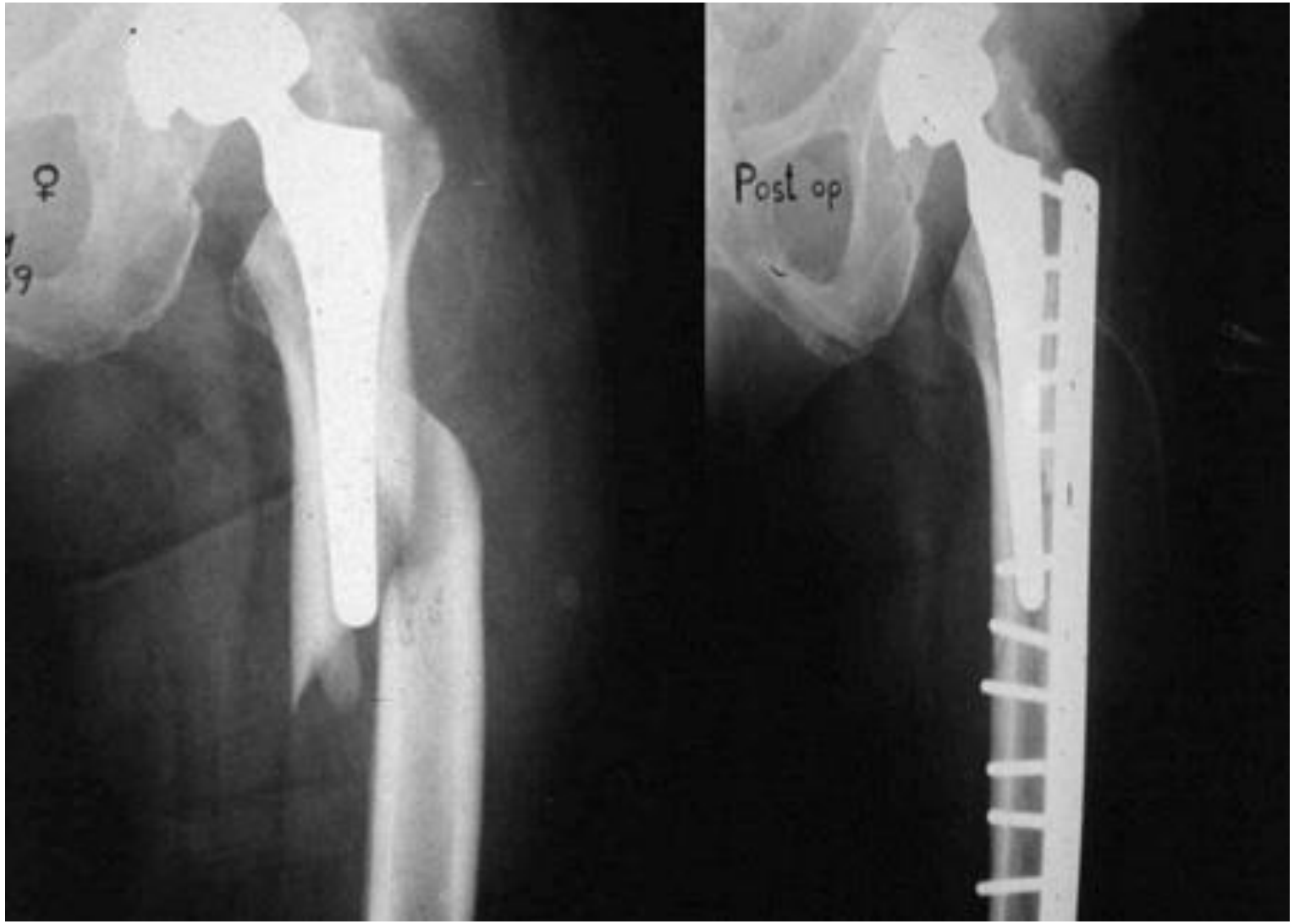
Loosening



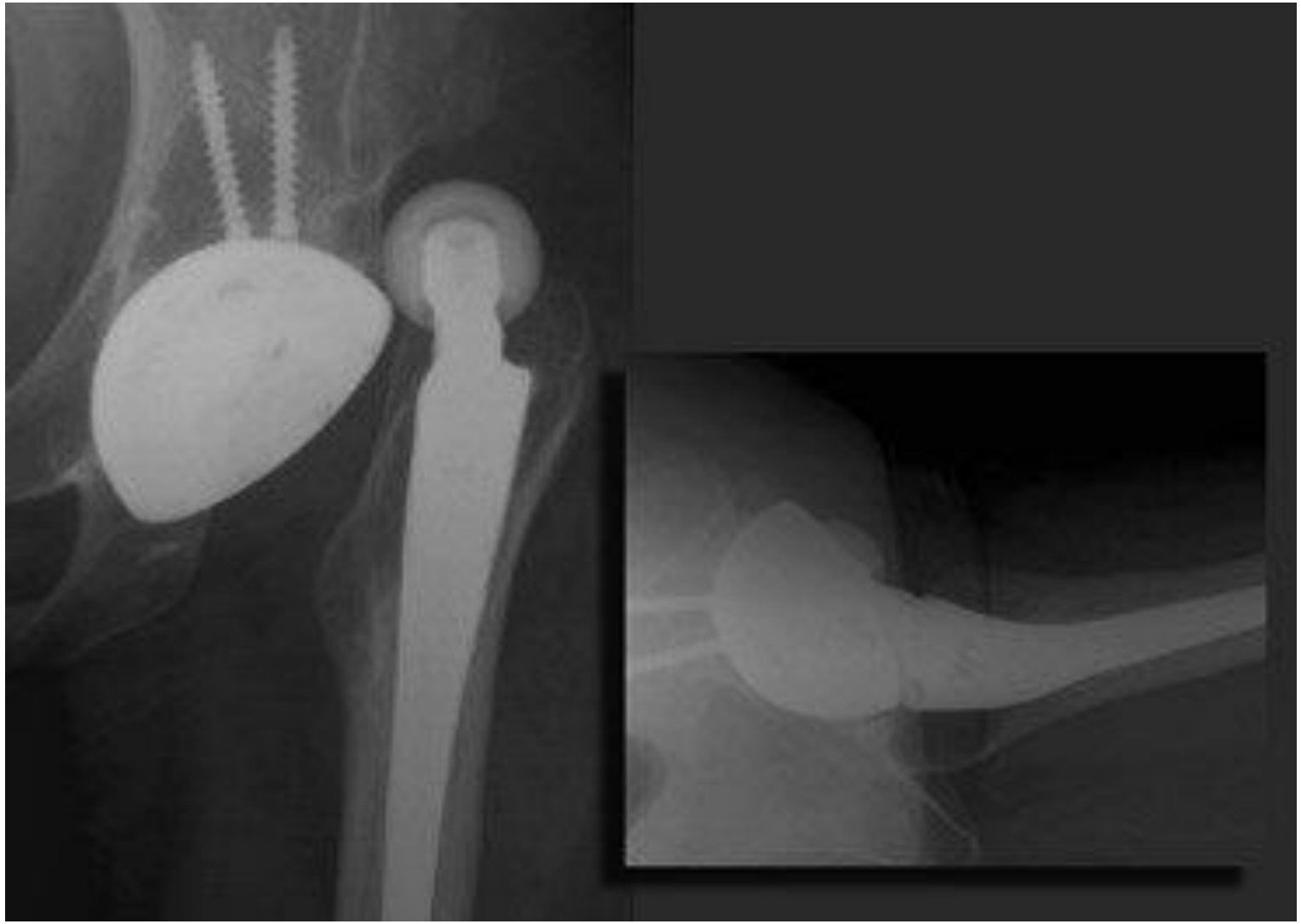
Infection



Peri-prosthetic fracture



Dislocation

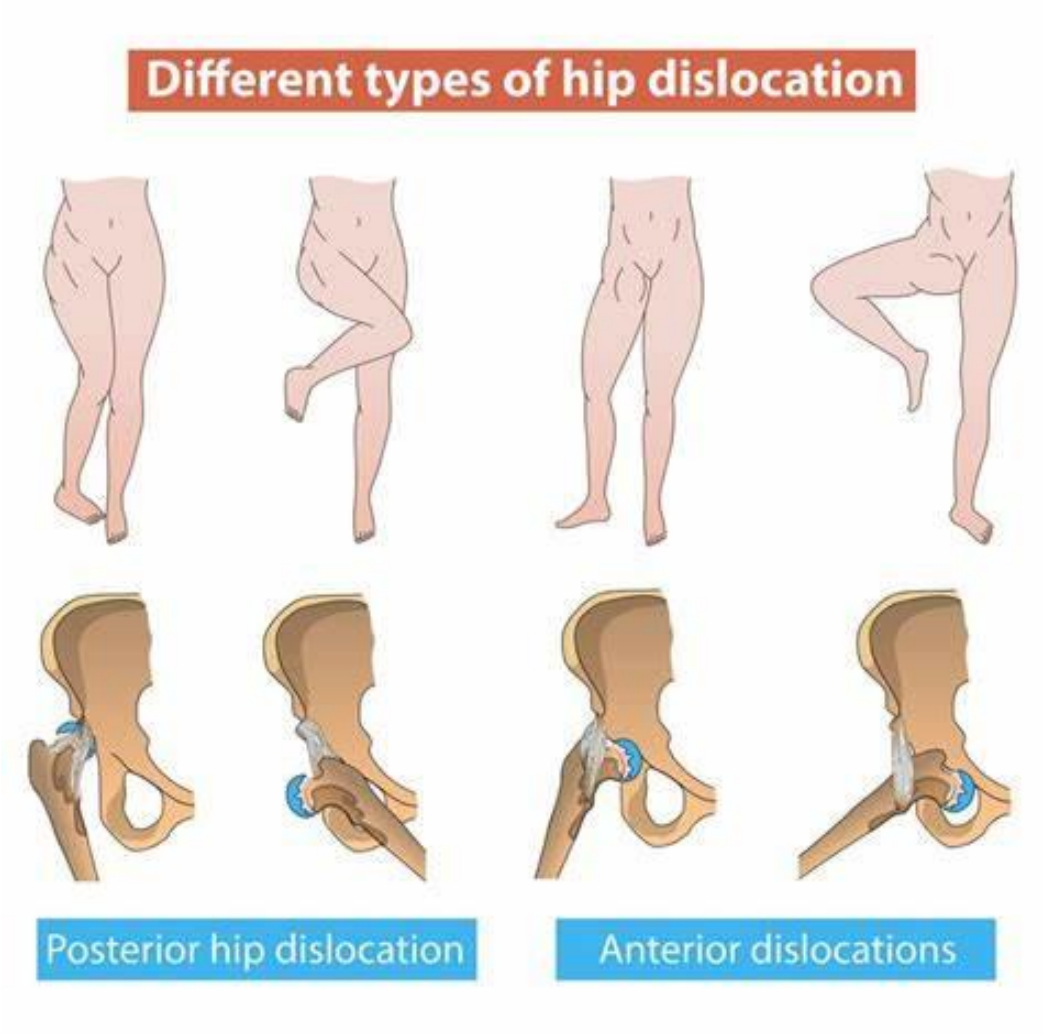


Hip Dislocation

- Who?
- Adult. RTC. Front seat.

- Clinical Features
- Pain++
- Internally rotated, adducted

- Radiology
- Always get lateral
- Compare size of femoral head: if anterior is bigger on affected side



Hip Dislocation - Posterior

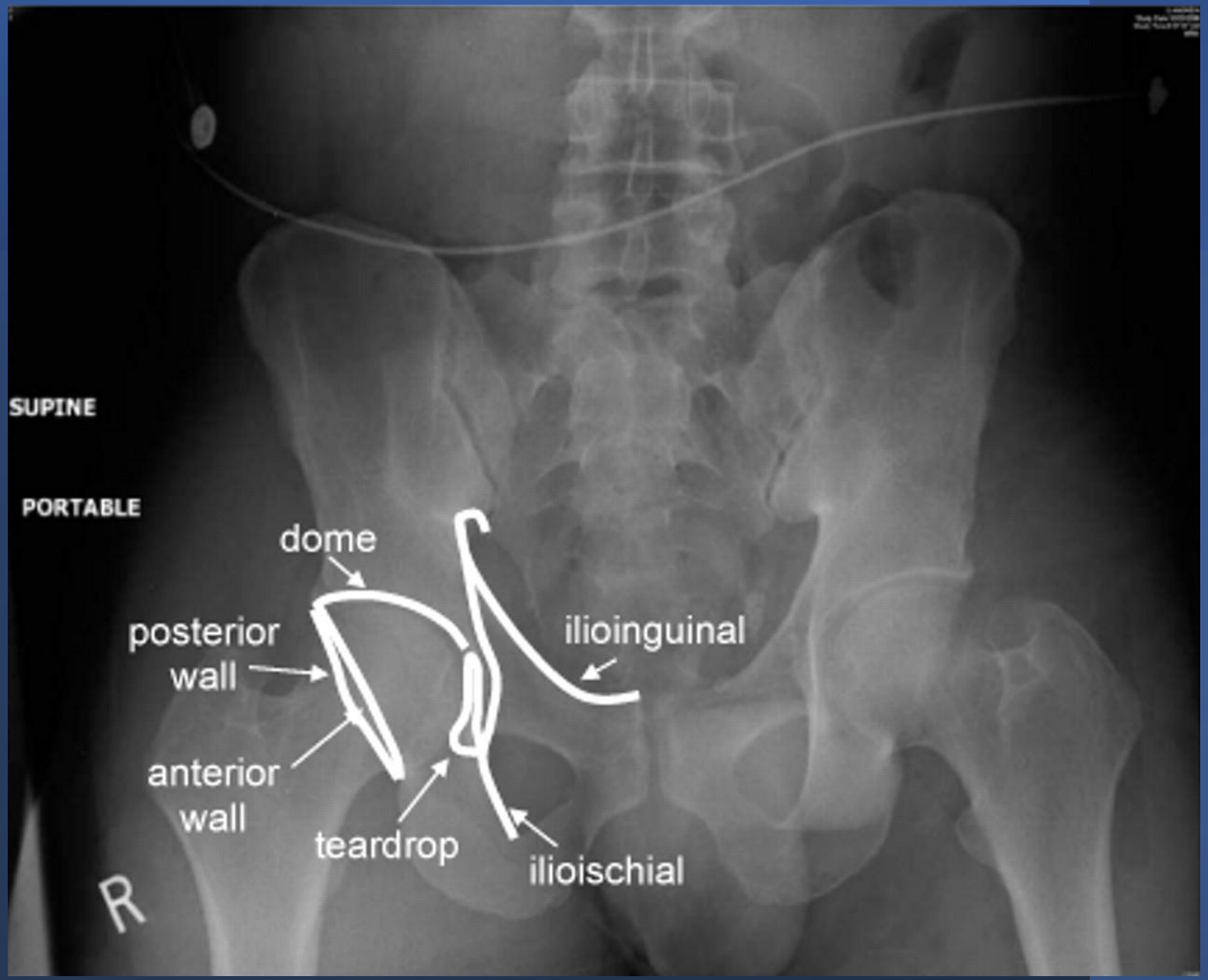
- Mx

  ABCDE

  Assess soft tissues, neurovascular status

  Reduce

  Maintain reduction


SUPINE
PORTABLE
dome
posterior wall
ilioinguinal
anterior wall
teardrop
ilioischial
R


Any
Questions?

Summary

- Pelvic fractures check for subtle anomalies check the patient be aware of soft tissue damage.
- Relate mechanism to possible fracture pattern
- Obvious # resuscitate and seek expert help
- If clinically suspicious treat as femoral # and re image according to local policy
- If you do see an abnormality in this region think of the potential soft tissues affected.