

Subtrochanteric fractures

Sunderland Fracture Forum

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Dominic Inman

Consultant orthopaedic surgeon
North Tyneside General Hospital

Summary

- Indications for surgery
- Surgical techniques
- Reduction options
- Fixation methods
- Special cases



Indications for Surgery

- All except moribund patients
 - Consider traction

- Polytrauma
 - Consider temporary external fixation

Choice of implant/ reduction technique

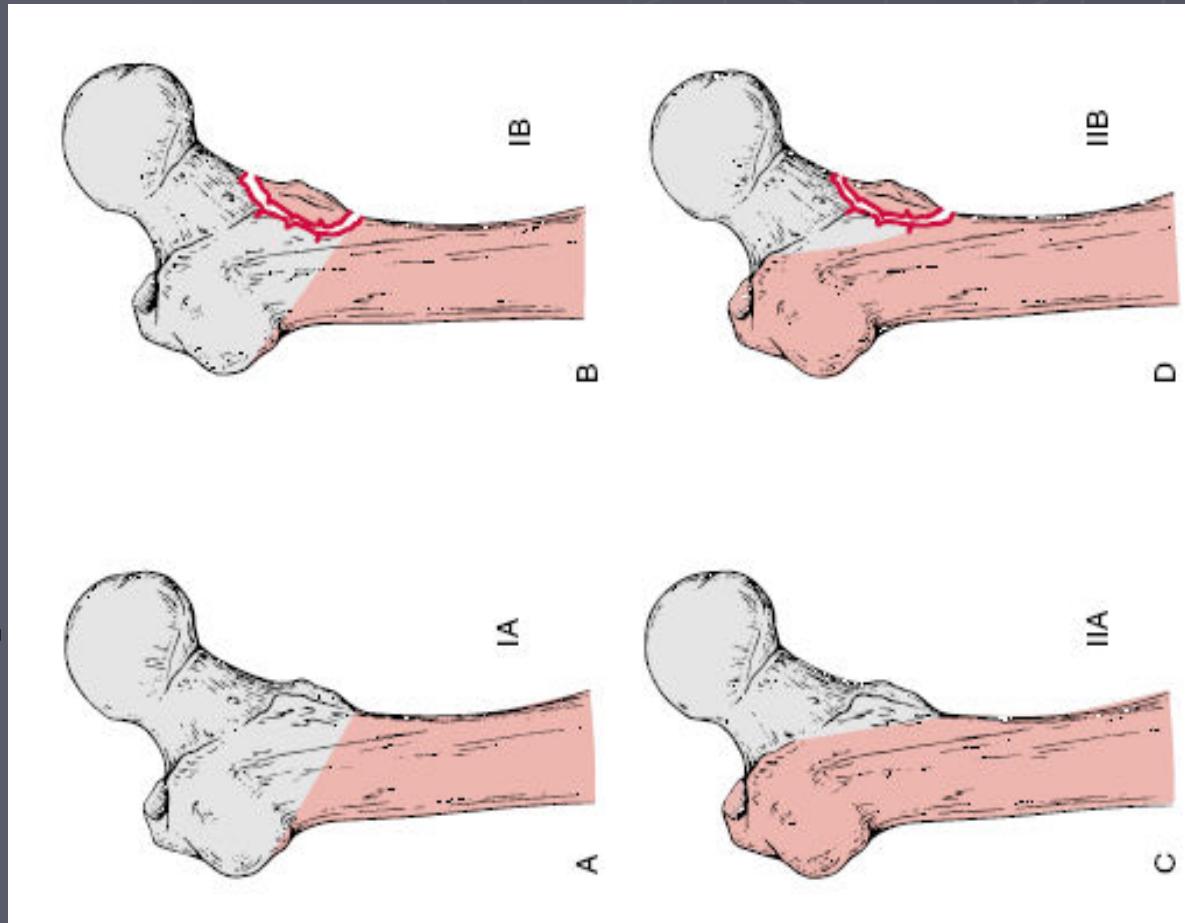
► Patient characteristics

- Age/ bone quality
- Metabolic bone disease

► Fracture characteristics

- Proximal comminution
 - Medial buttress
- ...classification useful

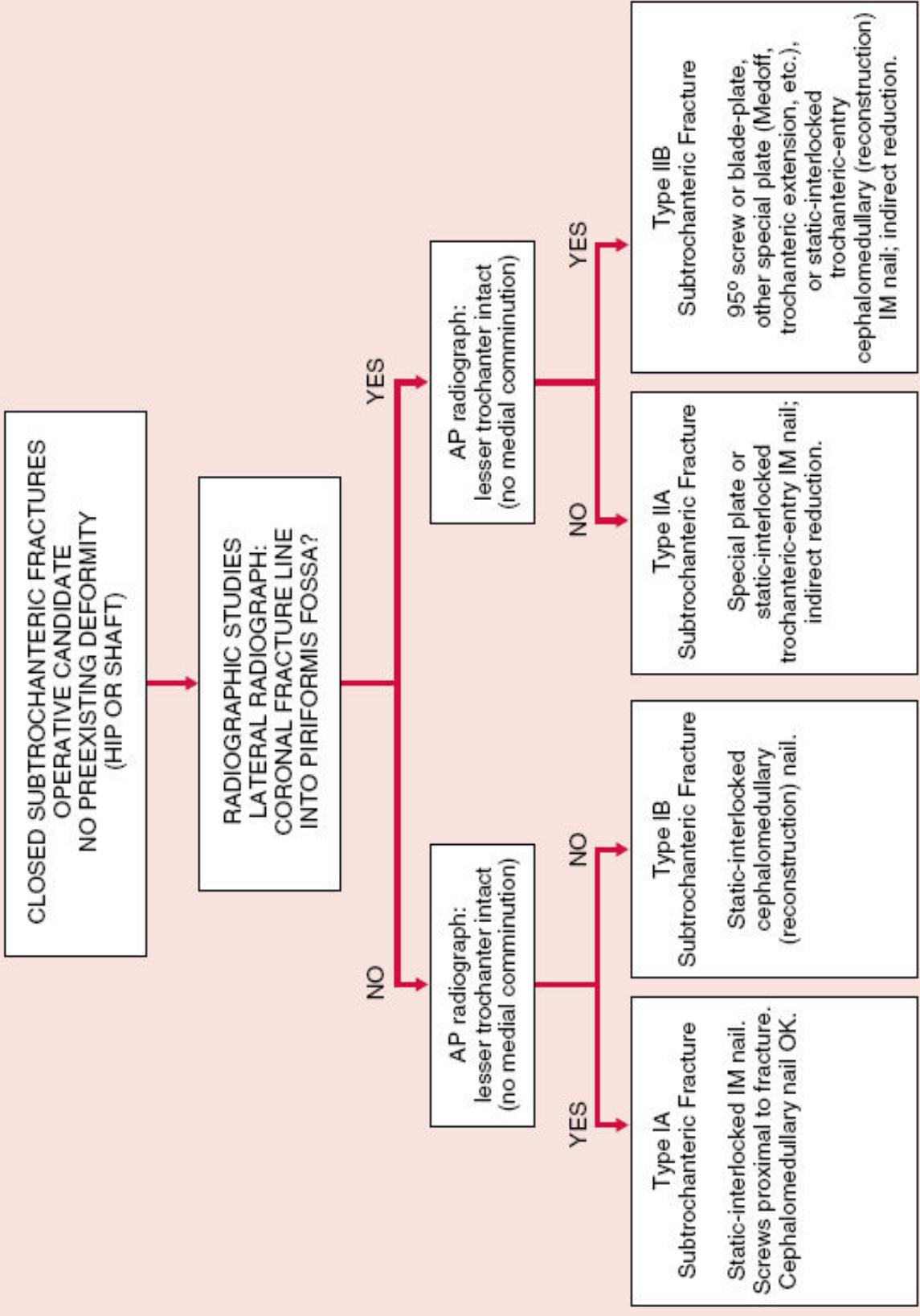
Russell Taylor Classification



► R-T IIIa fracture with extension into piriform fossa



Treatment algorithm



How I deal with them...

- Assess patient
- Other injuries
- Co-morbidities
 - Diabetes
 - Smoking
 - Cancer
 - Obesity
- Consent
 - Patient
 - family

Pre-Operative planning

► Equipment

- Correct nails (length and diameter)
- Selection of plates; which screws, drills etc
- Rep available (if unfamiliar with kit)
 - “RTFM” (as should scrub staff)
- Adequate imaging
- Plan B (...if it all goes wrong)

Step 1: Reduce

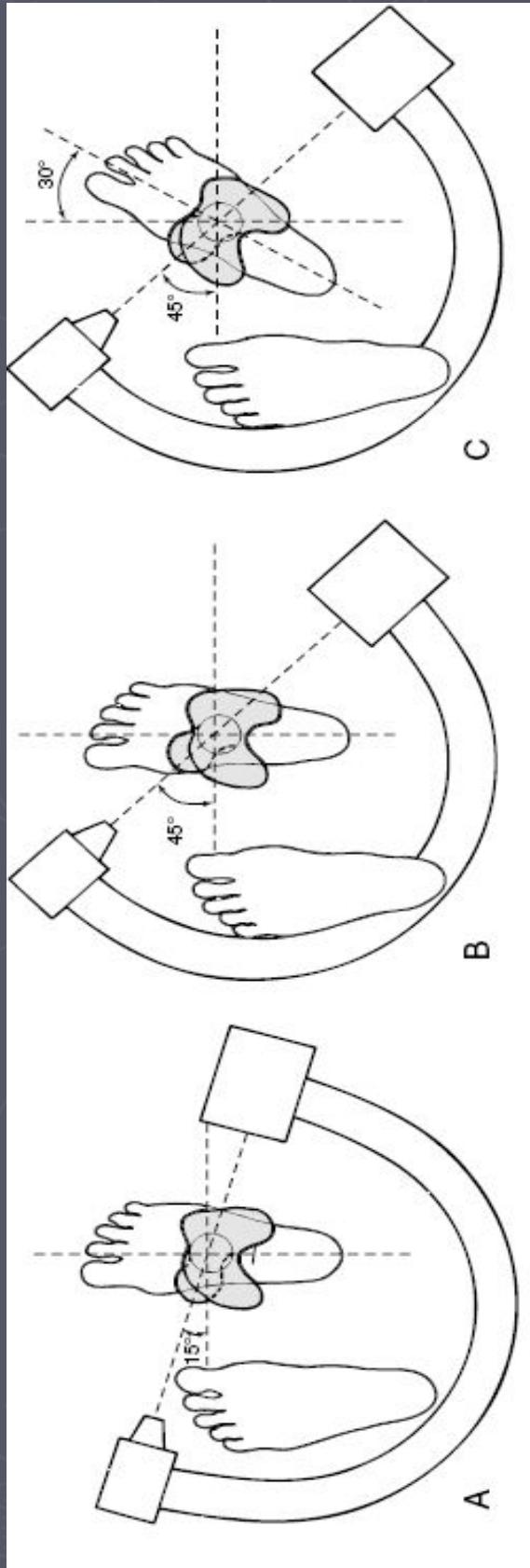
- ▶ Position on traction table
- ▶ Ensure adequate views on I.I.
- ▶ Not the same as an intertrochanteric fracture
- ▶ Restore
 - length,
 - alignment &
 - rotation, rotation, rotation
- ▶ Relative stability

Check rotation

► Assess femoral anteversion

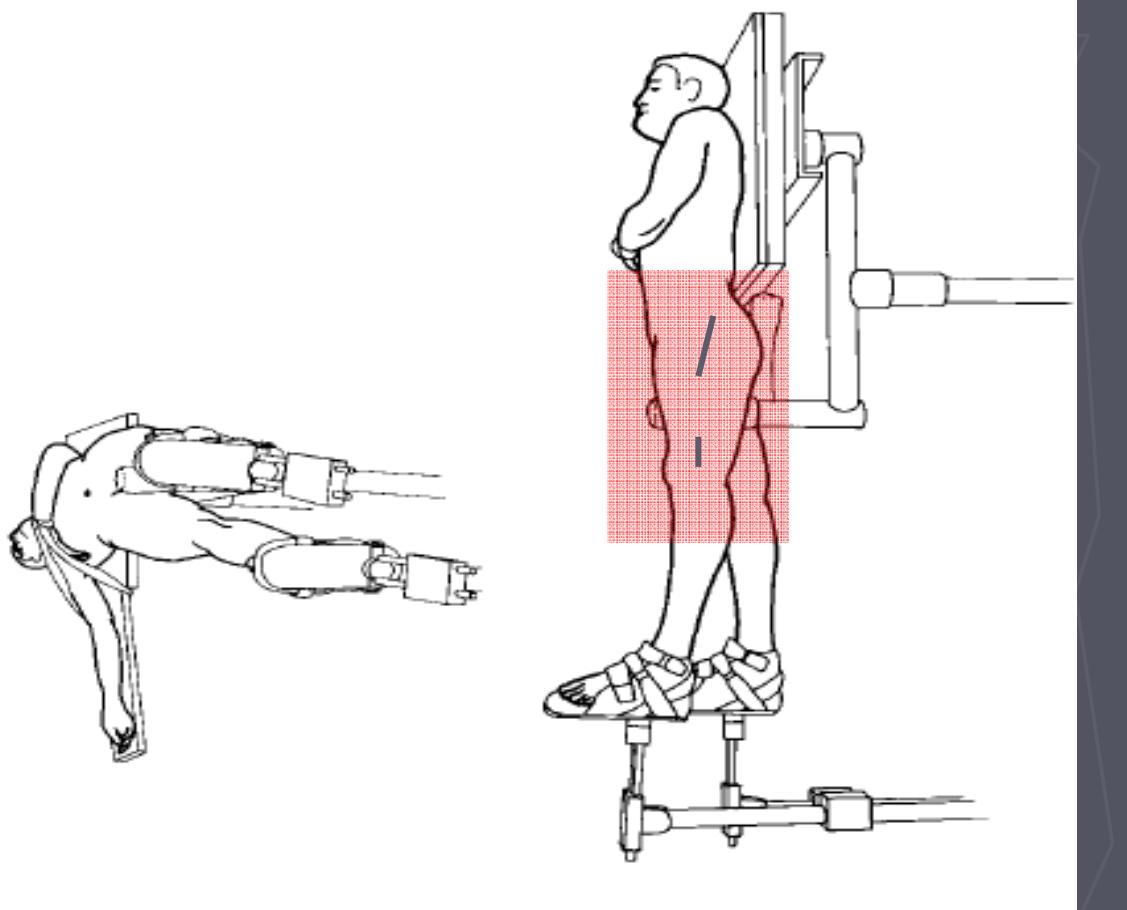
Normal

with subtroch # Ext rotate foot to correct

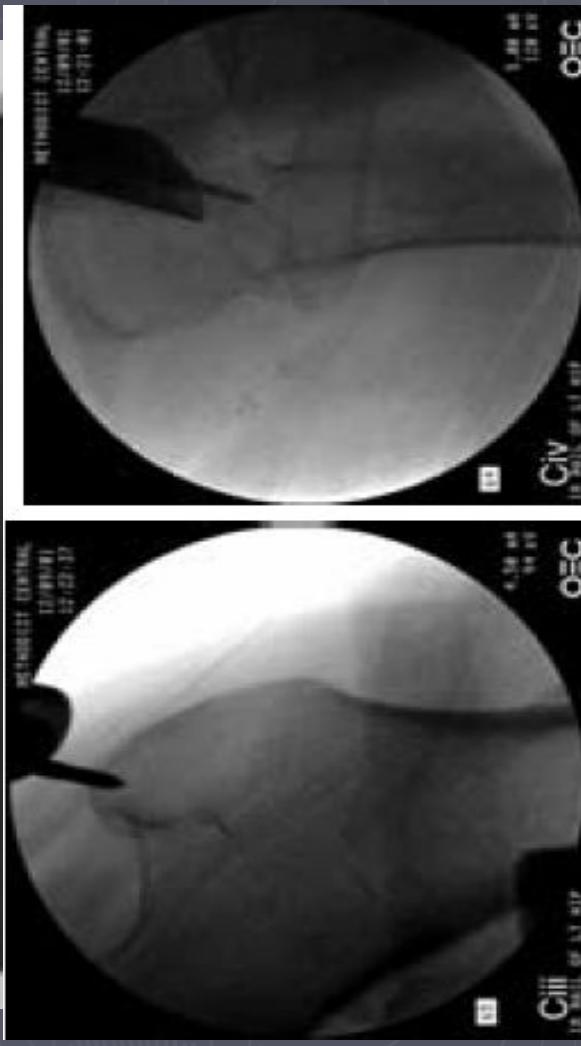


Surgical prep

- ▶ Prep with 2% chlorhexidine and drape allowing exposure from lower ribcage to below tibial tuberosity

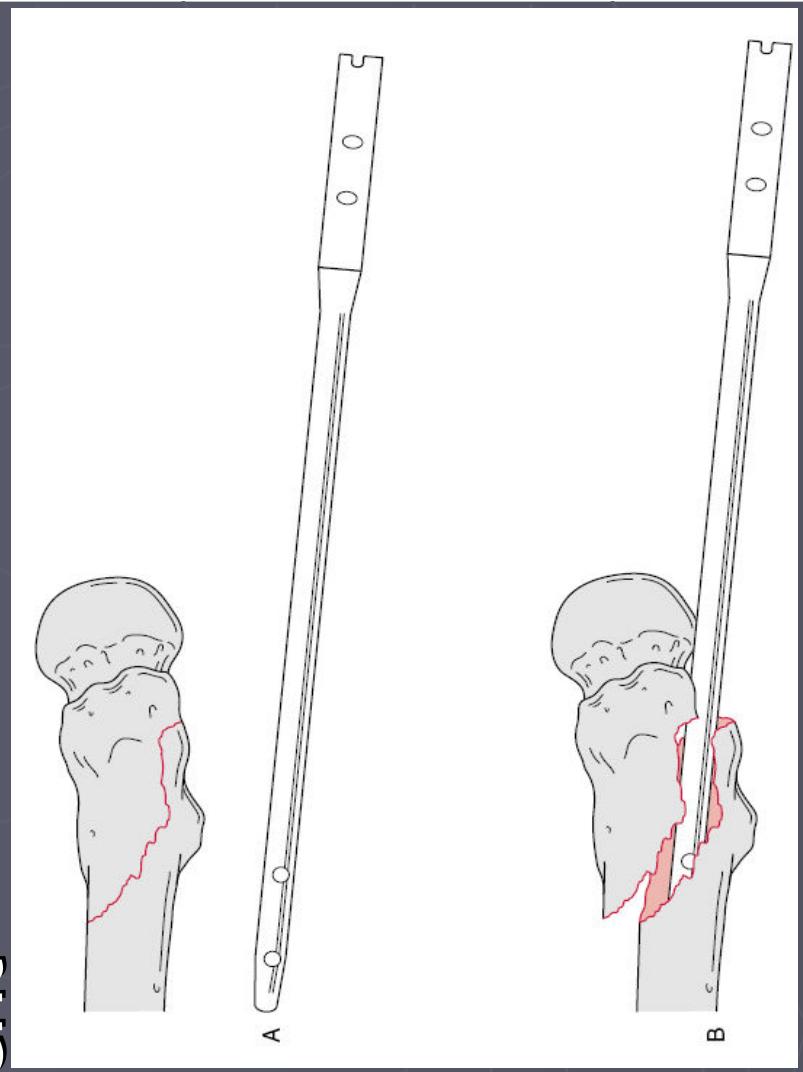


Correctly position entry point



Beware entry point comminution

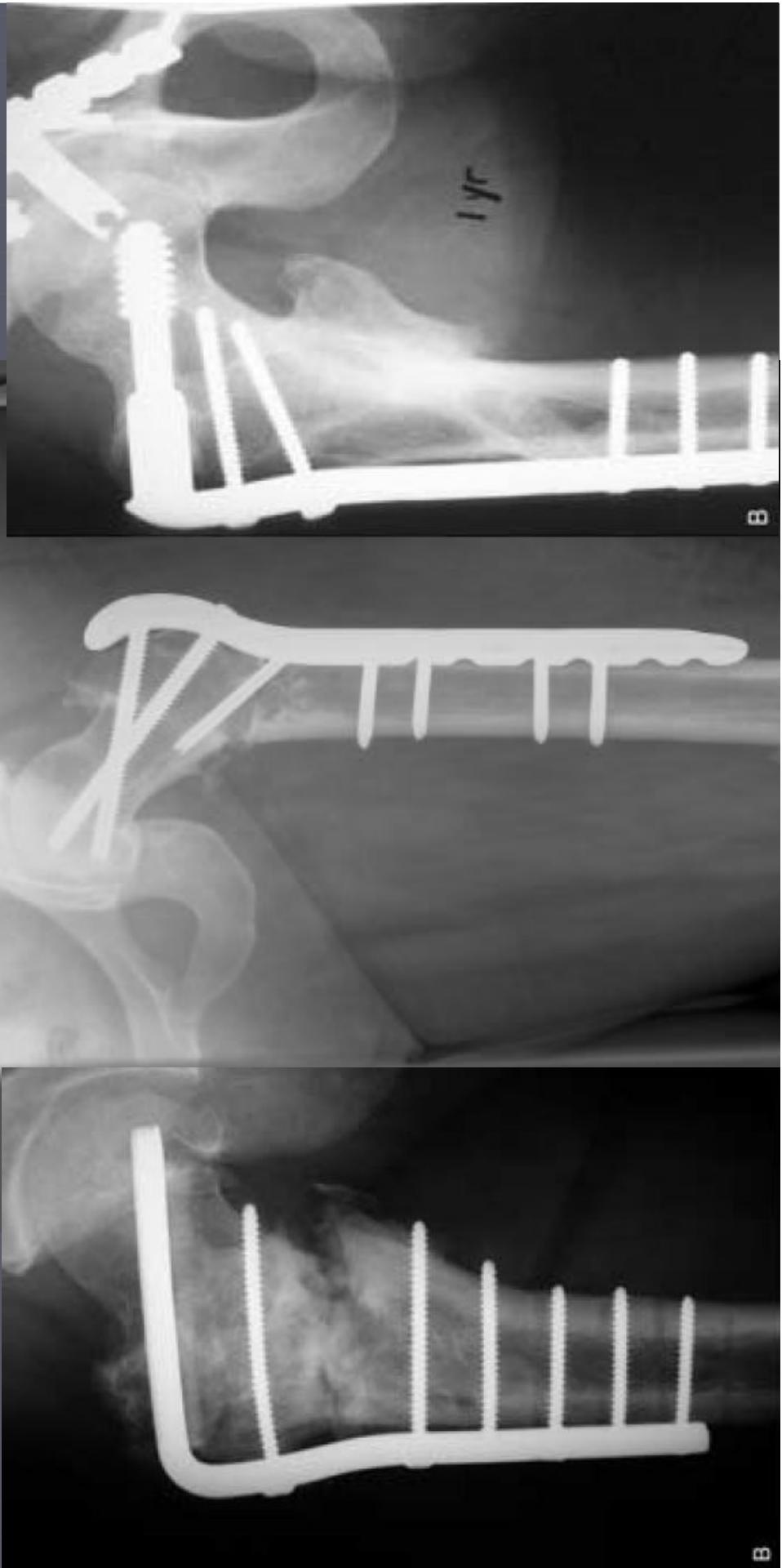
- use open reduction with Hey Groves bone clamp prior to reaming/ passing nail to prevent displacement



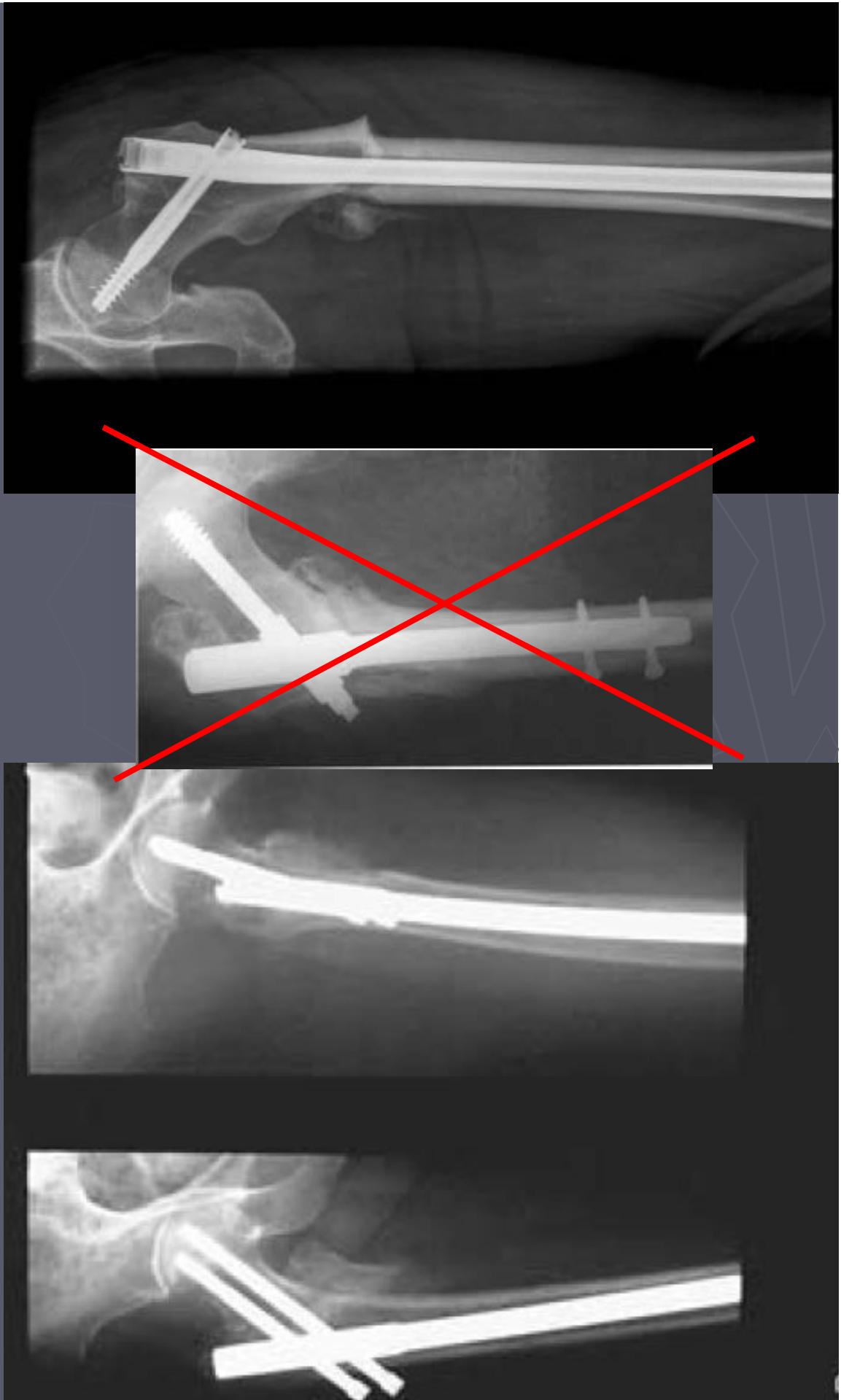
Open VS Closed reduction

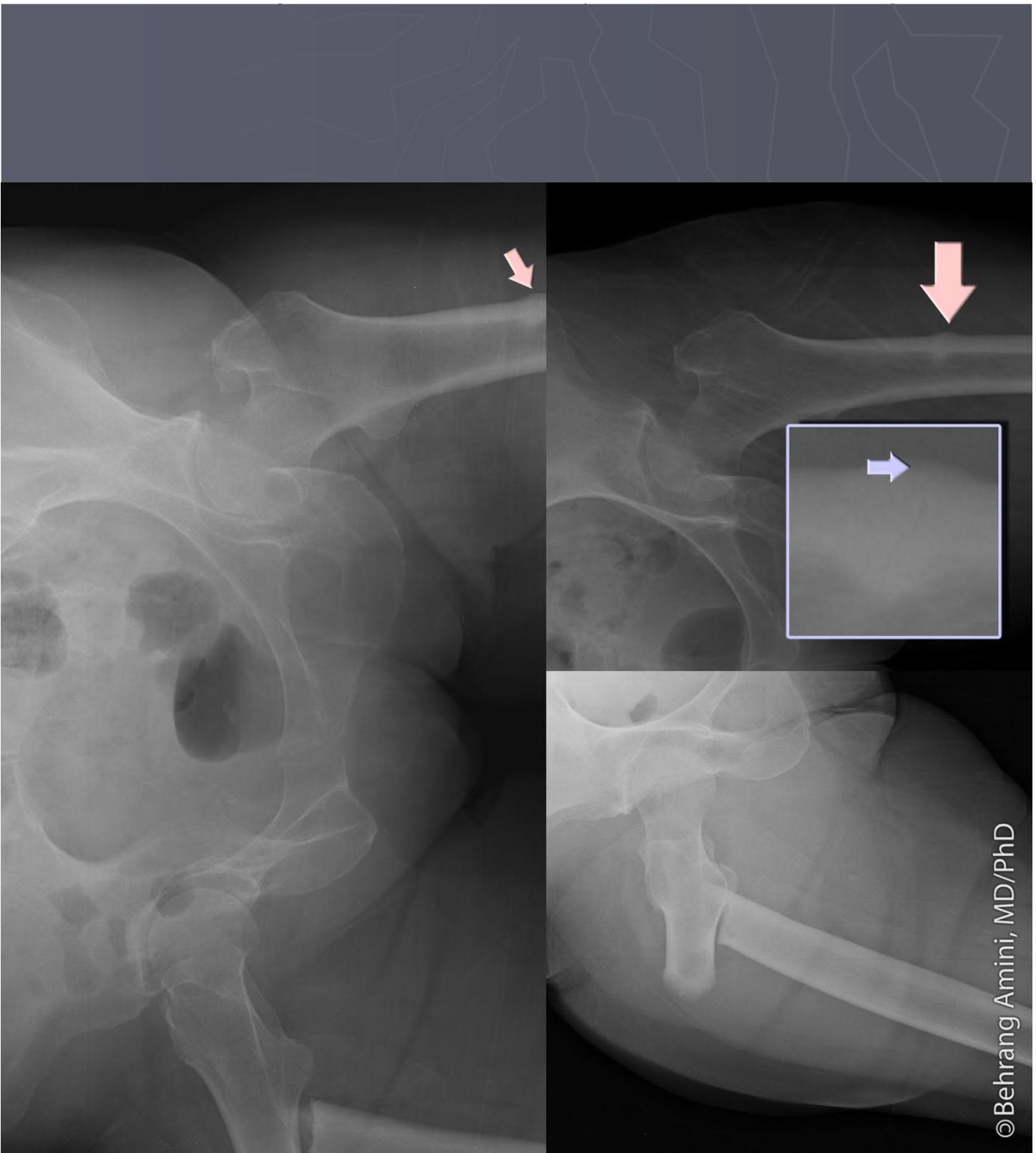
- Main goal is accurate reduction
- Avoid varus
- Entry point of nail key to success
- Attempt closed reduction to preserve vascularity
- Low threshold for open reduction using Hey Groves bone holding forceps/ circlage wire
- Minimal medial stripping to avoid devascularisation
- Compress fracture if simple
- Do not fix distracted
- **Beware malrotation**

Fixation methods - Plates



Fixation methods - Nails





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MHRA 2011

Definition of Atypical femoral fracture (American Society for Bone and Mineral research)

Major features

- Located anywhere along the femur from just distal to the lesser trochanter to just proximal to the supracondylar flare
 - Associated with no trauma or minimal trauma, as in a fall from a standing height or less
 - Transverse or short oblique configuration
 - Complete fractures extend through both cortices and may be associated with a medial spike; incomplete fractures involve only the lateral cortex

Minor features

- Noncomminuted
 - Localised periosteal reaction of the lateral cortex
 - Generalised increase in cortical thickness of the diaphysis
 - Prodromal symptoms such as dull or aching pain in the groin or thigh
 - Bilateral fractures and symptoms
 - Delayed healing
 - Comorbid conditions (eg, vitamin D deficiency, rheumatoid arthritis, hypophosphatasia)
 - Use of pharmaceutical agents (eg, bisphosphonates, glucocorticoids, proton pump inhibitors)
- Need all major features present to be classed as atypical femoral fracture

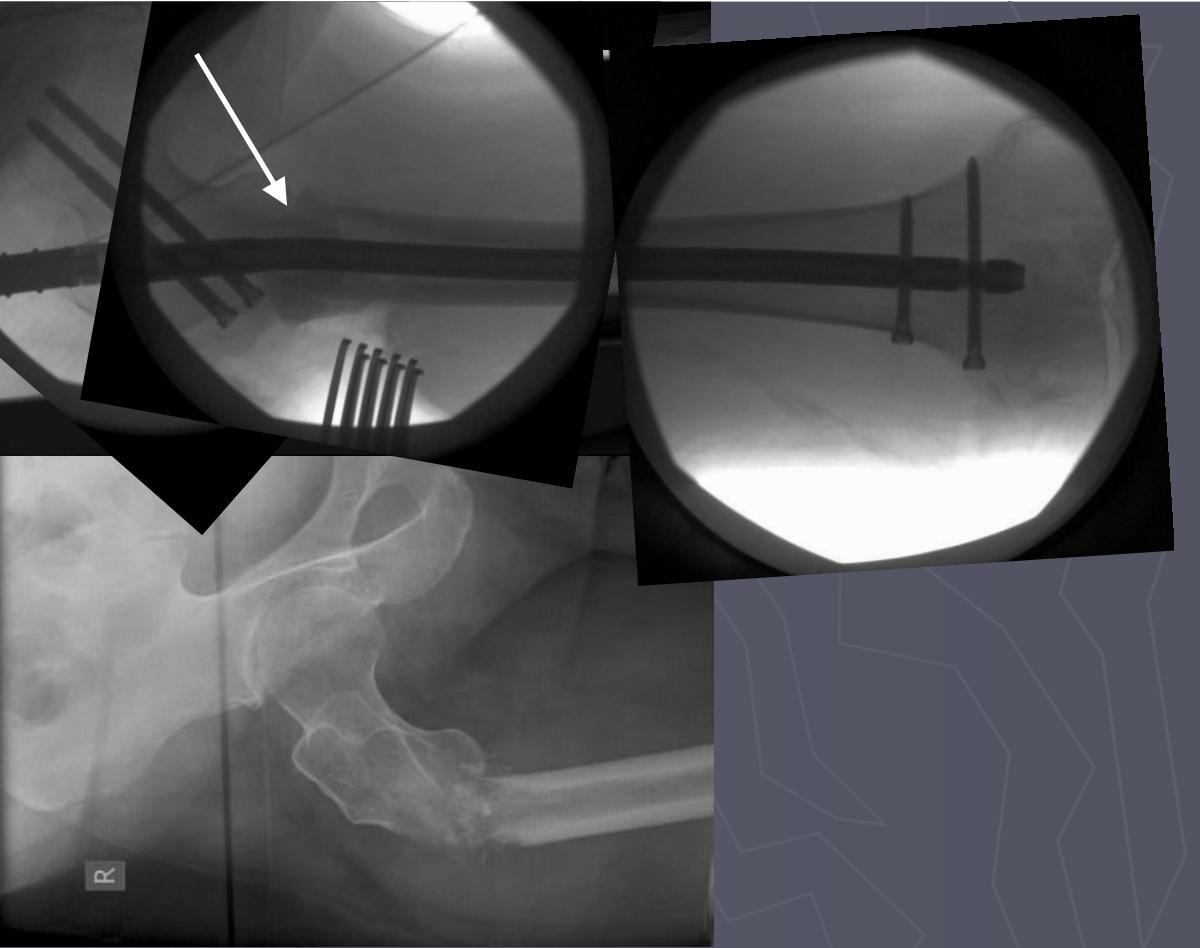
MHRA 2011 Advice for healthcare professionals

- Atypical femoral fractures are often bilateral; therefore the contralateral femur should be examined in bisphosphonate-treated patients who have sustained a femoral shaft fracture
- Discontinuation of bisphosphonate therapy in patients suspected to have an atypical femur fracture should be considered while they are evaluated, and should be based on an assessment of the benefits and risks of treatment for the individual
- During bisphosphonate treatment, patients should be advised to report any thigh, hip, or groin pain. Any patient who presents with such symptoms should be evaluated for an incomplete femur fracture
- The optimum duration of bisphosphonate treatment for osteoporosis has not been established. The need for continued treatment should be re-evaluated periodically based on the benefits and potential risks of bisphosphonate therapy for individual patients, particularly after 5 or more years of use

Atypical femoral fractures

- ? Due to suppressed bone turnover
- Bisphosphonate Use and the Risk of Subtrochanteric or Femoral Shaft Fractures in Older Women Park-Wyllie et al., *JAMA*. 2011;305(8):783
 - Population based, case-control study
 - Treatment for >5 yrs lead to an increased risk
 - Absolute risk small (71/52595 (0.13%))

Pathological fractures



- common site for metastasis
- Pain prior to fall
- Thorough work-up
- Full length femur x-rays
- Discuss with regional bone tumour unit
 - primary tumours
 - Solitary renal Ca mets
- Fix the whole bone
- Consider curettage & cement augmentation

Non-Unions/ Salvage

- Ongoing pain at 6 months
- Consider exchange nailing
 - Re-ream
 - Larger diameter nail
- Plate fixation and autologous bone graft
 - Ensure good apposition/compression
 - Minimise medial stripping
- Arthroplasty



Case 1

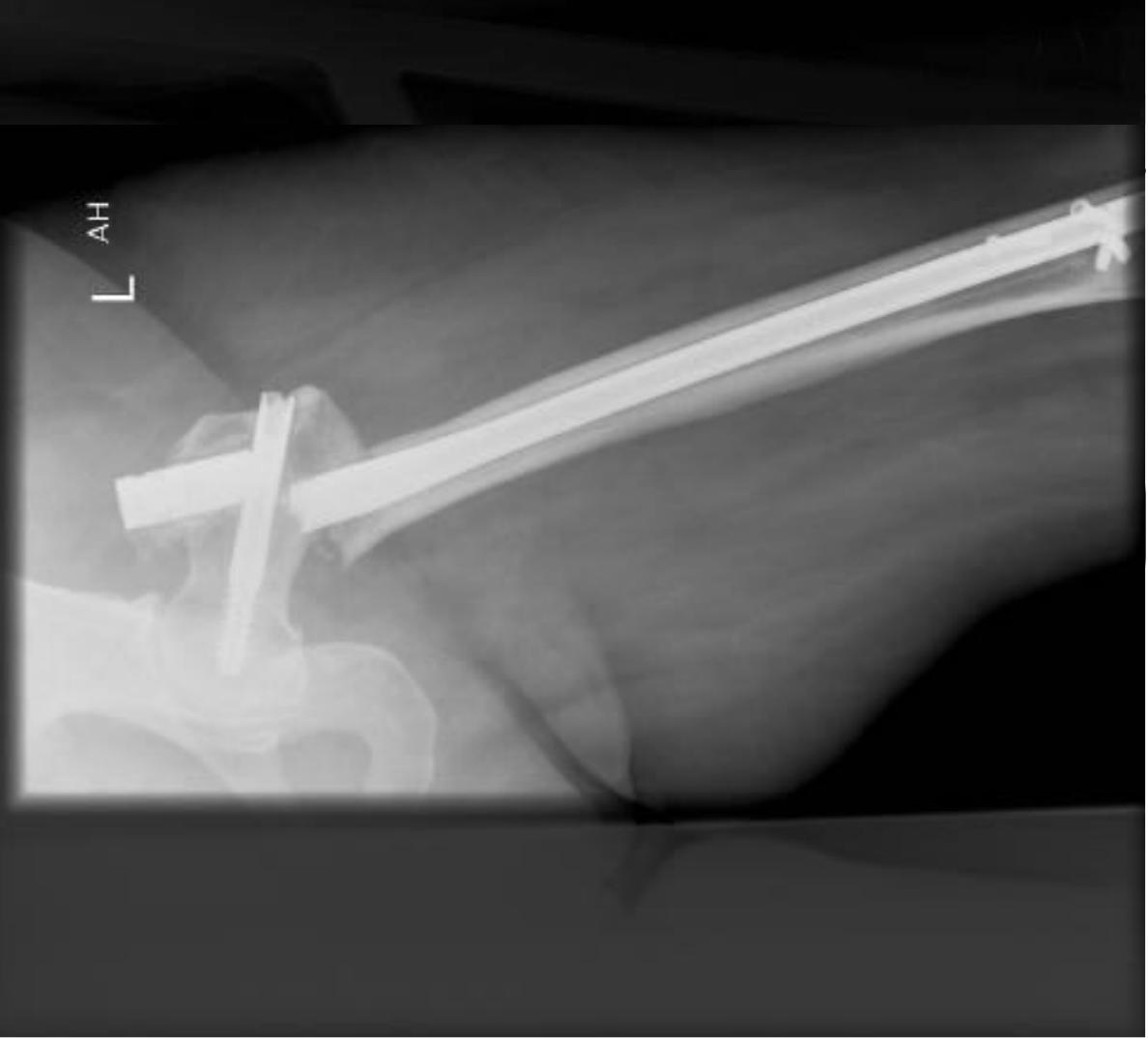
- AD
- 64 year old lady
- Fall in house 'leg gave way'
- Subtrochanteric fracture fixed with Gamma nail

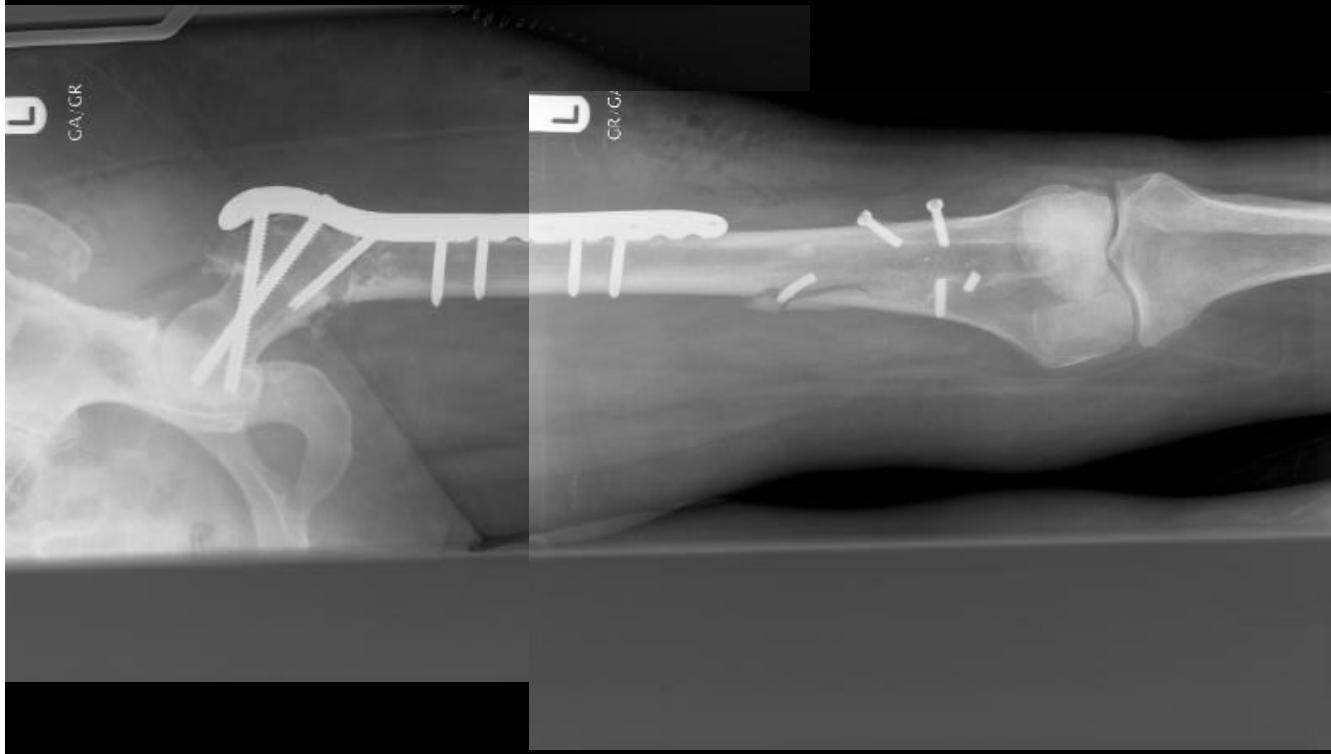


► 2 years post fracture...

► No pain

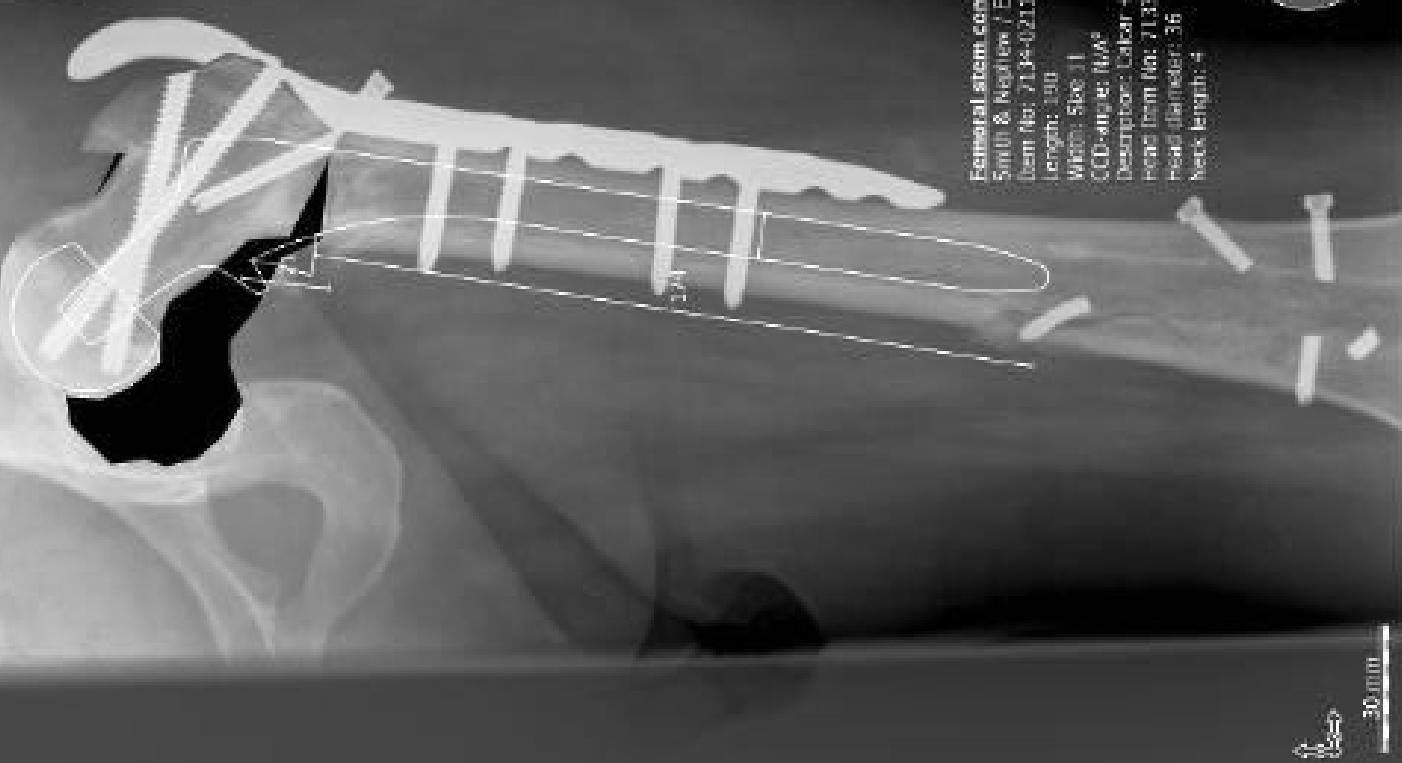
► Leg gave way

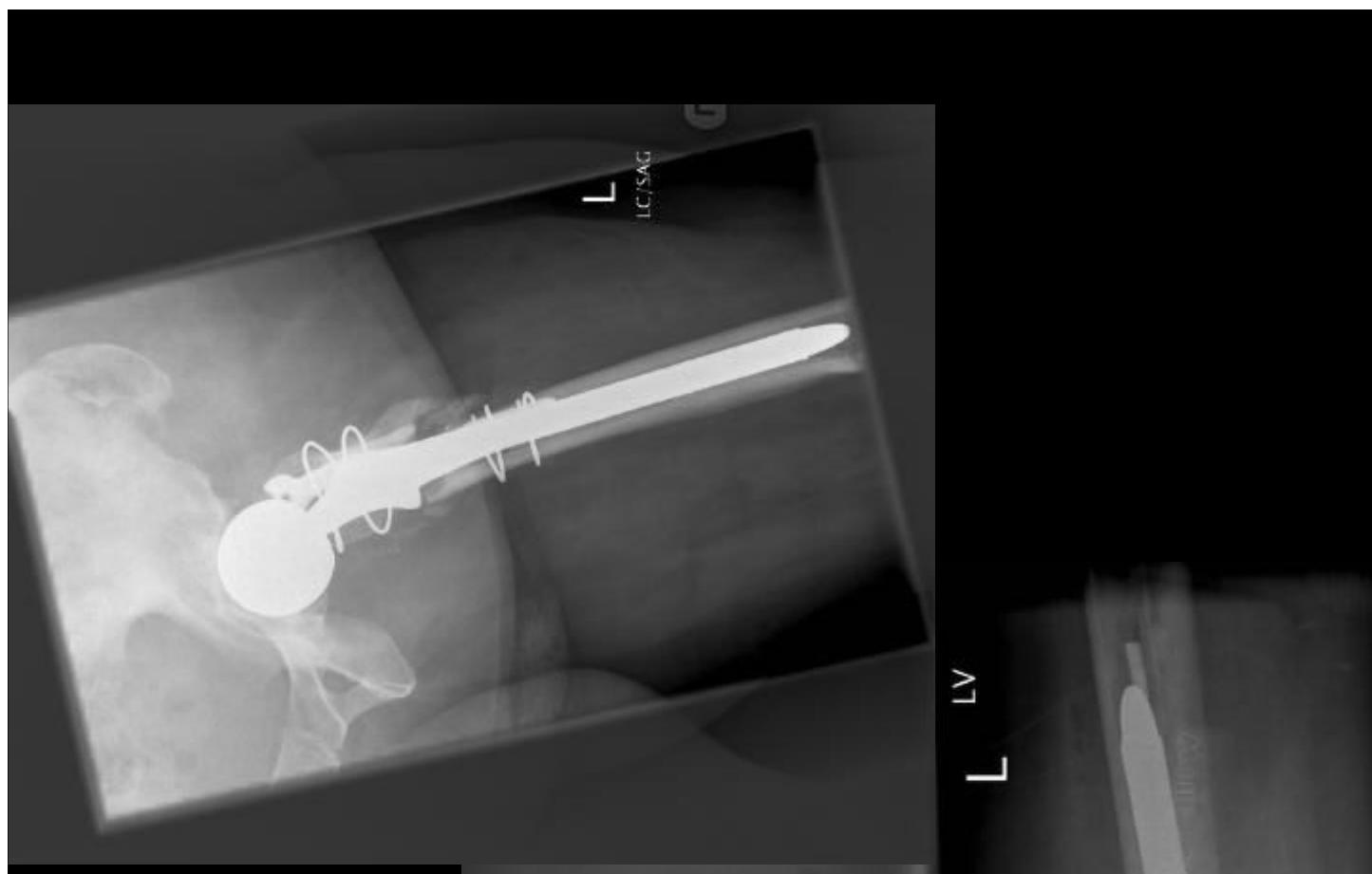






Autodesk





Case 2

- 87 year old gentleman
- Fall in house
- Previous right femoral fracture 1 year ago
- On bisphosphonates







3 months post op



Two X-ray images of a knee joint are shown side-by-side. The left image, labeled '1 MTHS', shows a fracture of the femoral condyle with internal fixation. The right image, labeled '7 months post op...', shows the same knee 7 months after surgery, with the fracture healed and the internal fixator removed. A small 'L' marker is visible in the top left corner of the top image.

7 months post op...
Pain-free
...watch this space

Case 3

- 71 y.o. man
- Known metastatic renal cell Ca with bone, liver and lung mets
- Leg gave way while walking
- Spinal decompression for spinal mets 6/52 ago



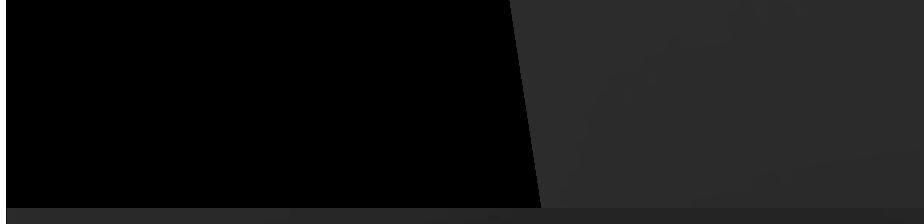
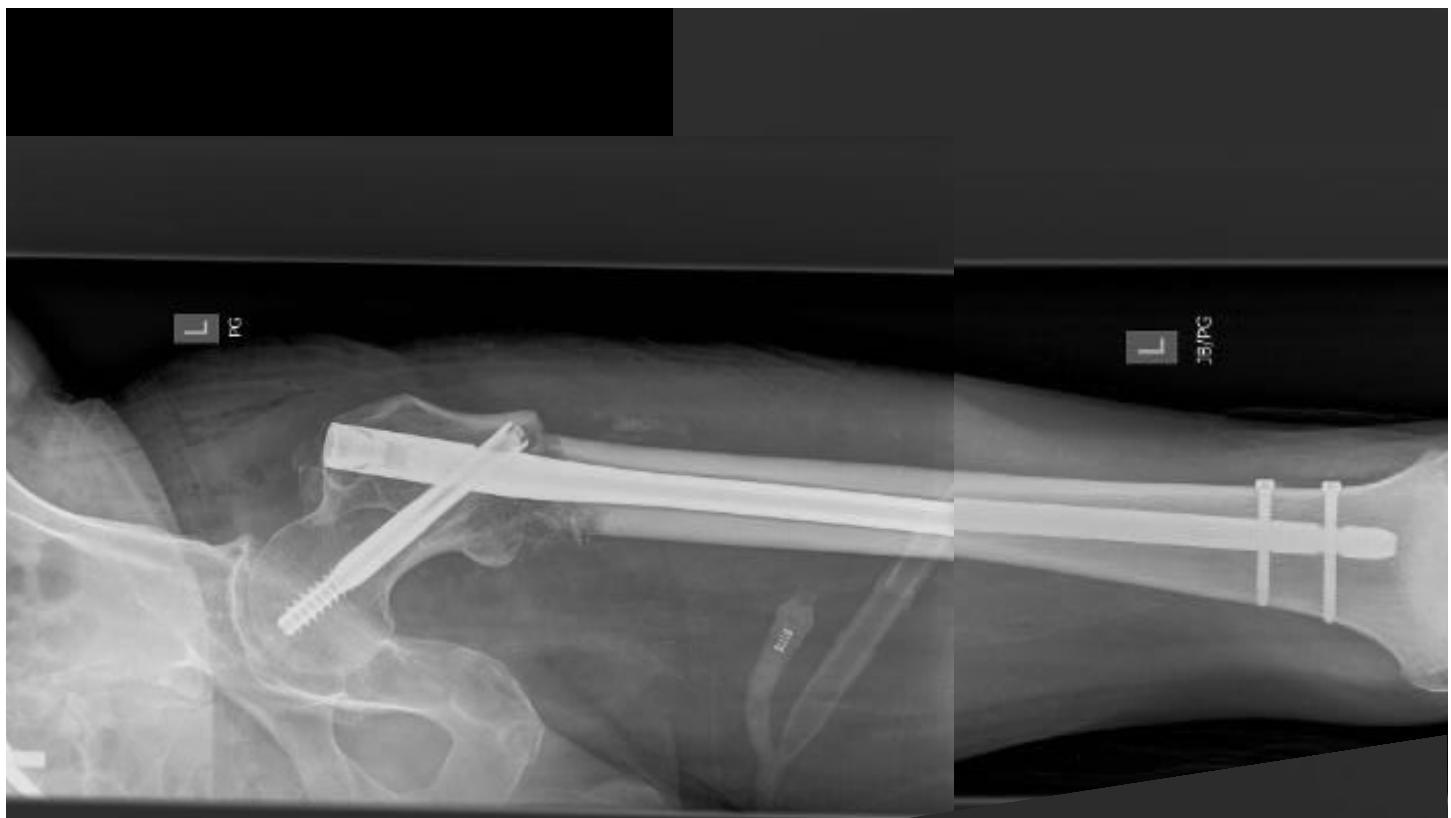
Horizontal beam shoot through



Trolley

HB

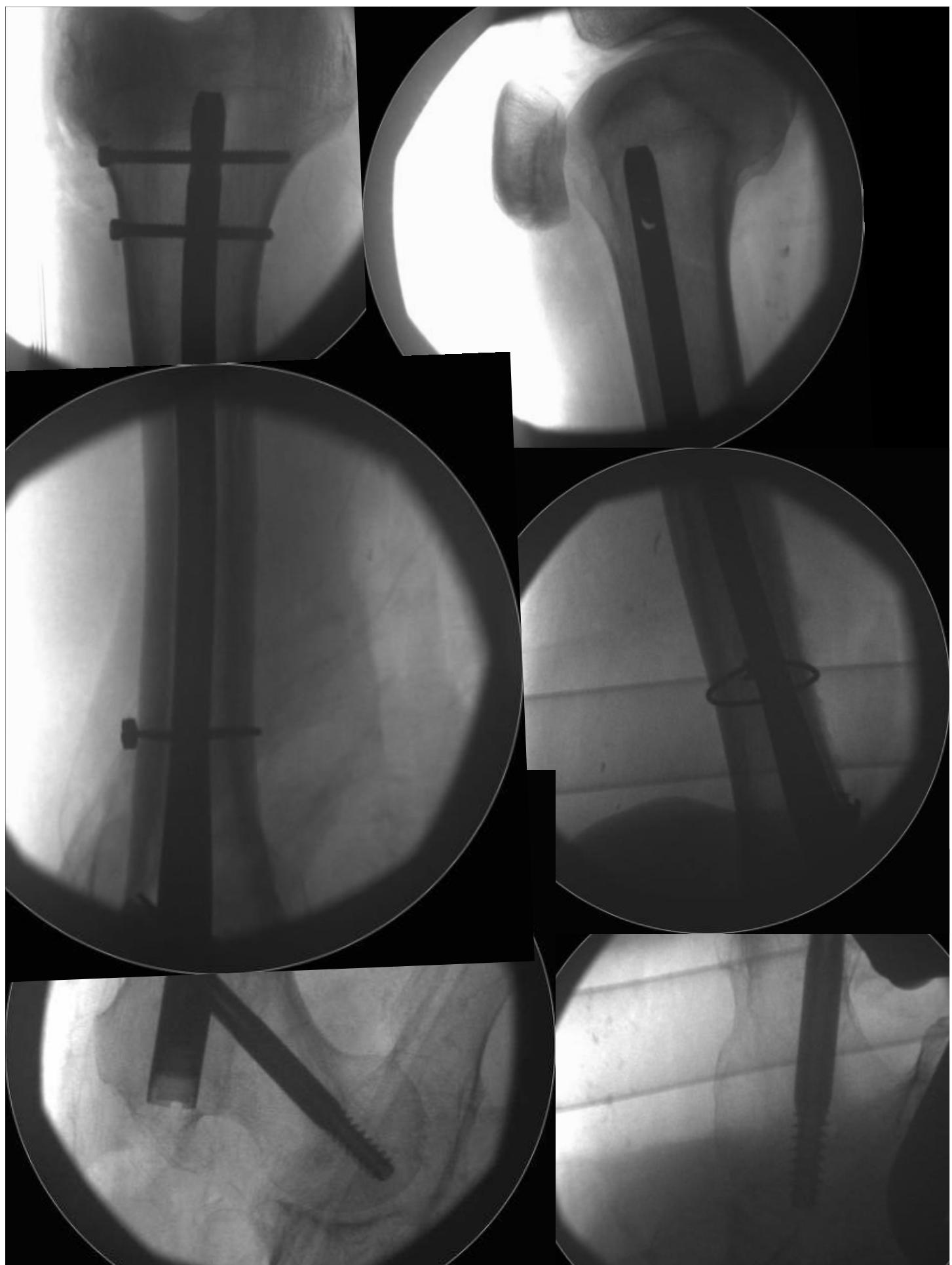
Lateral and rest of femur



Case 4

- 74 y.o. man
- Episode of chest pain and collapse resulting in fracture
- Known liver Ca with adrenal mets
- NSTEMI 6 weeks previously
- On Clopidogrel and aspirin





Key points to remember

- Medial comminution
- Proximal extension
- Assess rotation
- Avoid varus malreduction
- Entry point key to success
- Open if necessary
- Minimise medial soft tissue stripping
- Consider autogenous bone graft

