

# Advanced Imaging of the Shoulder: Pre-Op and Intra-op



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# **I (and/or my co-authors) have something to disclose.**

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# Pre-operative Images

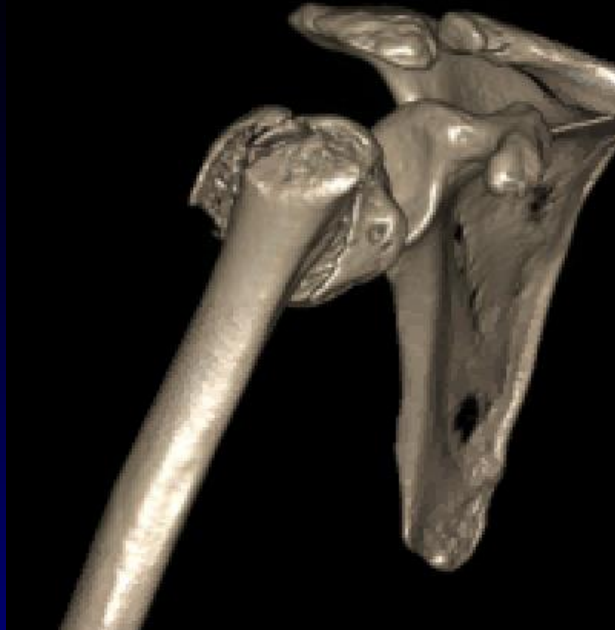
- X-ray: AP, Scapular lateral, Axillary
- CT - 2D, 3D
- CT images can give you more information:
  - Fragments size/location, how to fix
  - Bone quality
  - Predictors of failure – fix vs. replace

Do you always need a CT?



# 28 Year old Female







# 53yr female, Healthy





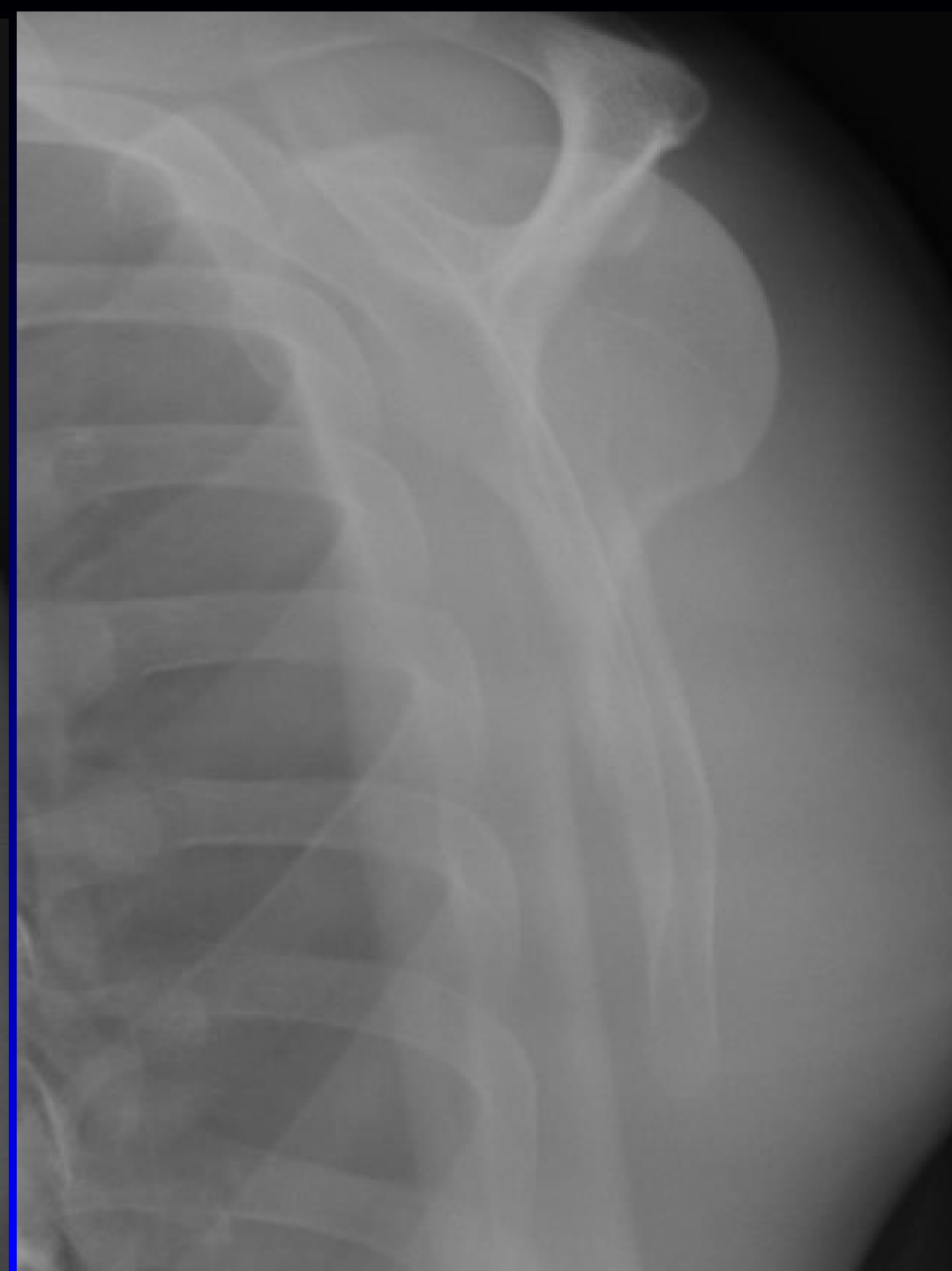








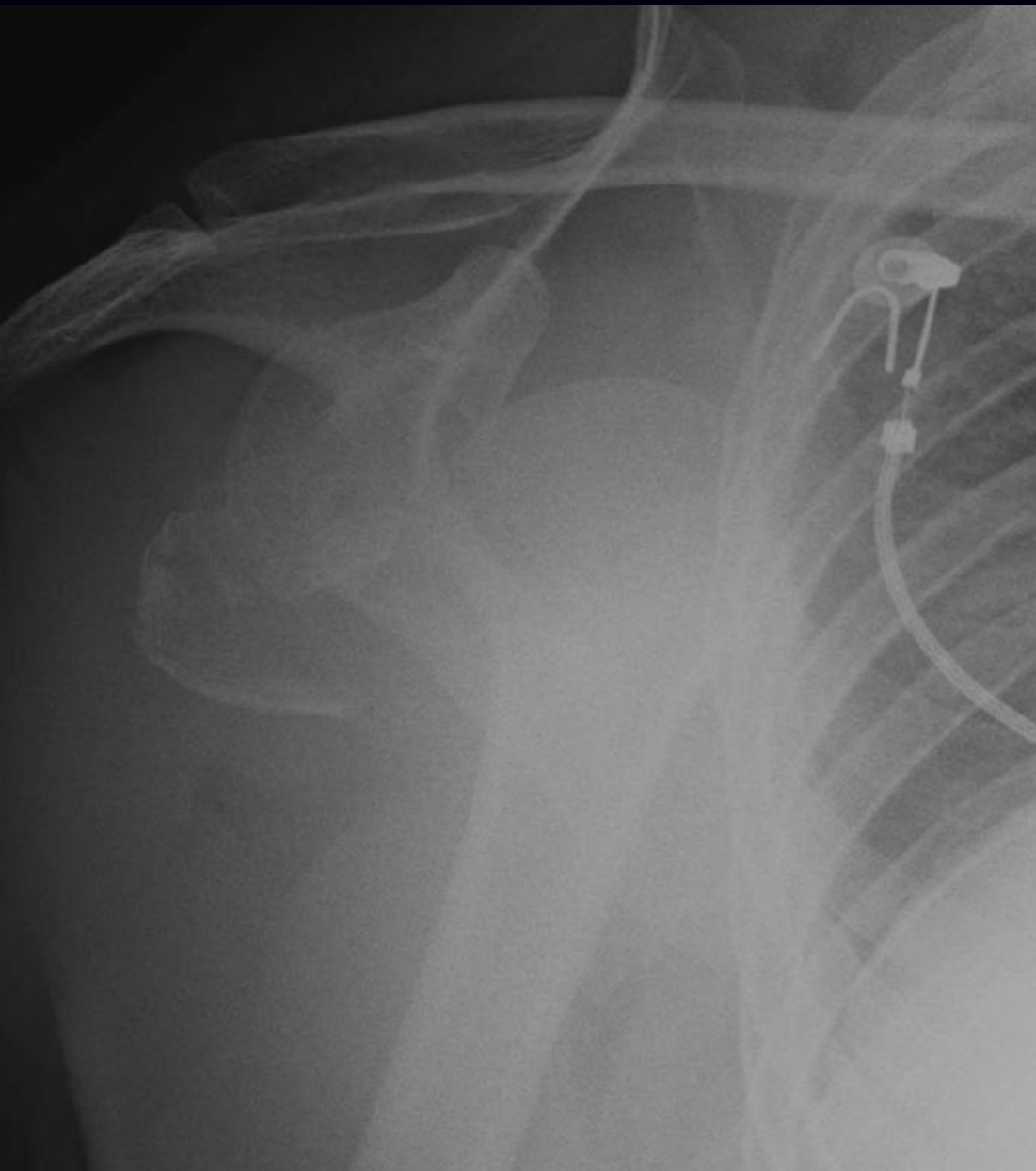














# Intra-operative Images

- Standard C-arm
- 3D C-arm

# Intraoperative 3D imaging in plate osteosynthesis of proximal humerus fracture

Böhringer et al, Trauma Surg, 2023

- 14 patients with proximal humerus fracture
- Isocentric mobile 3D C-arm image intensifier
  - 1 had screw that was exchange
  - 1 had poor reduction that was revised



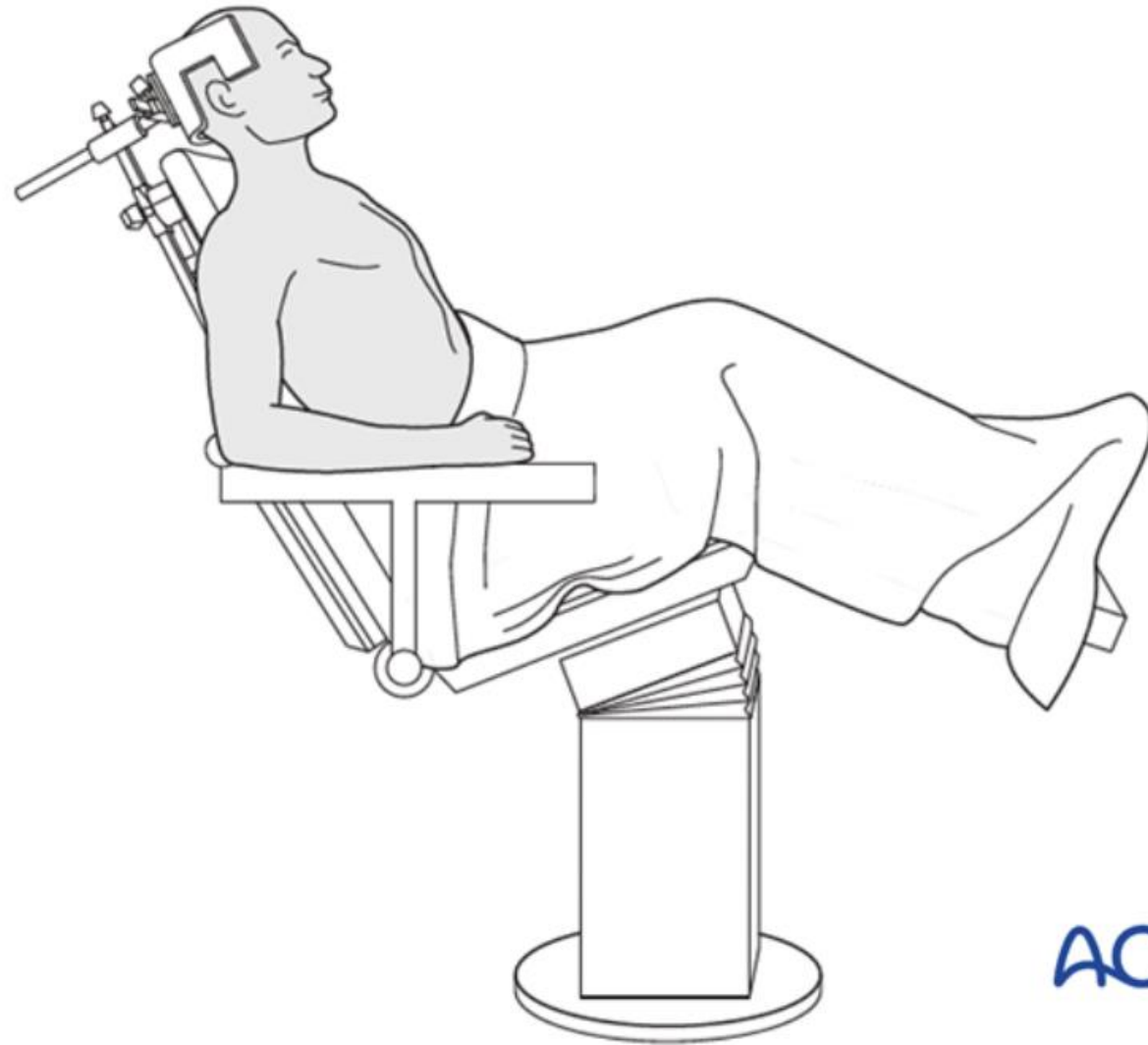
# Do you need a 3D C-arm?

- Not readily available
- Expensive
- Still need to use it like a regular C-arm throughout the case
- Need to know how to use a C-arm to get good images



# How do you get good C-arm images?

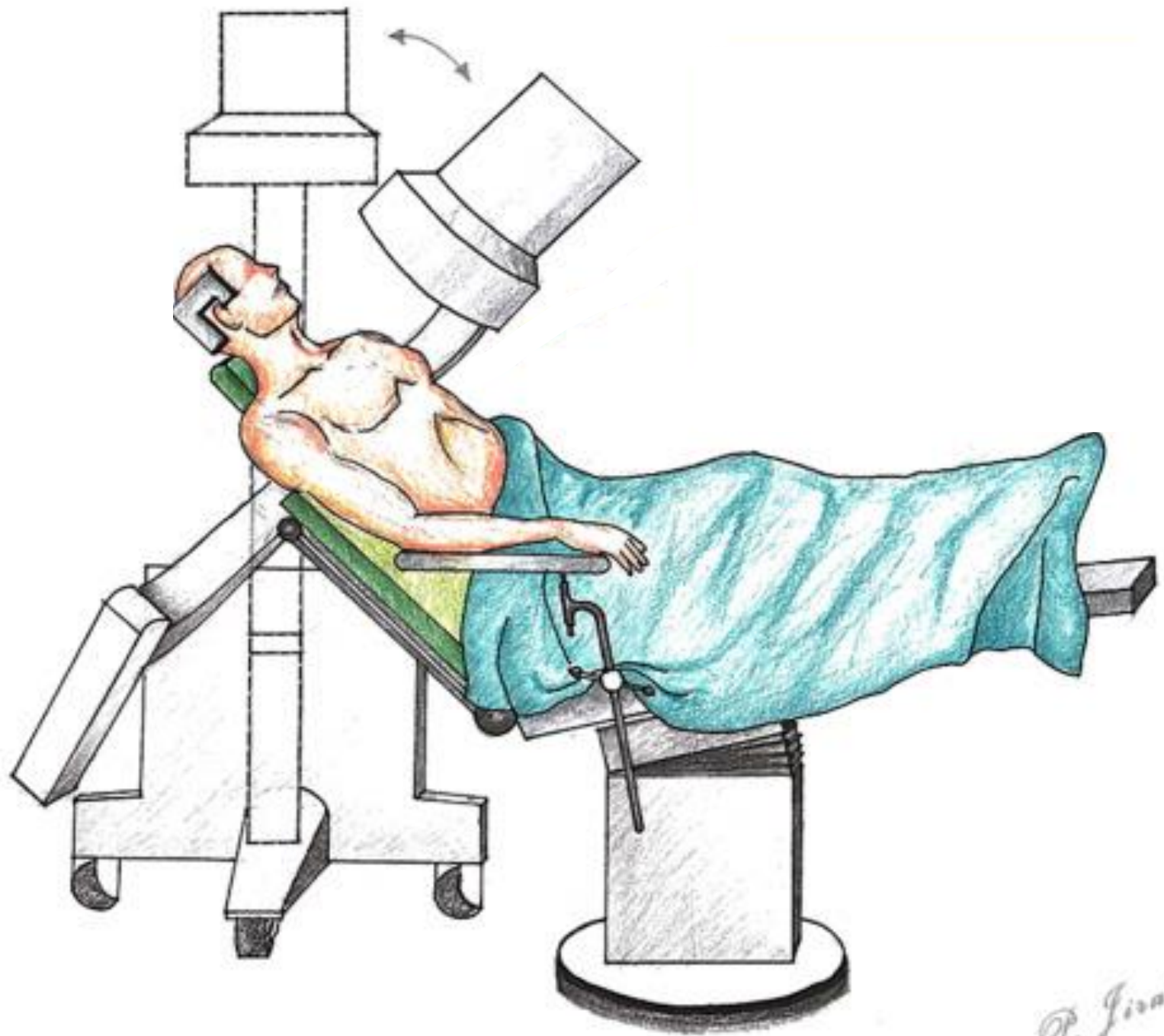
- Patient positioning - optimize approach and images
- C-arm position - get good quality images
- Need to see good AP and lateral views
  - Assess reduction
  - Ensure no intra-articular screws

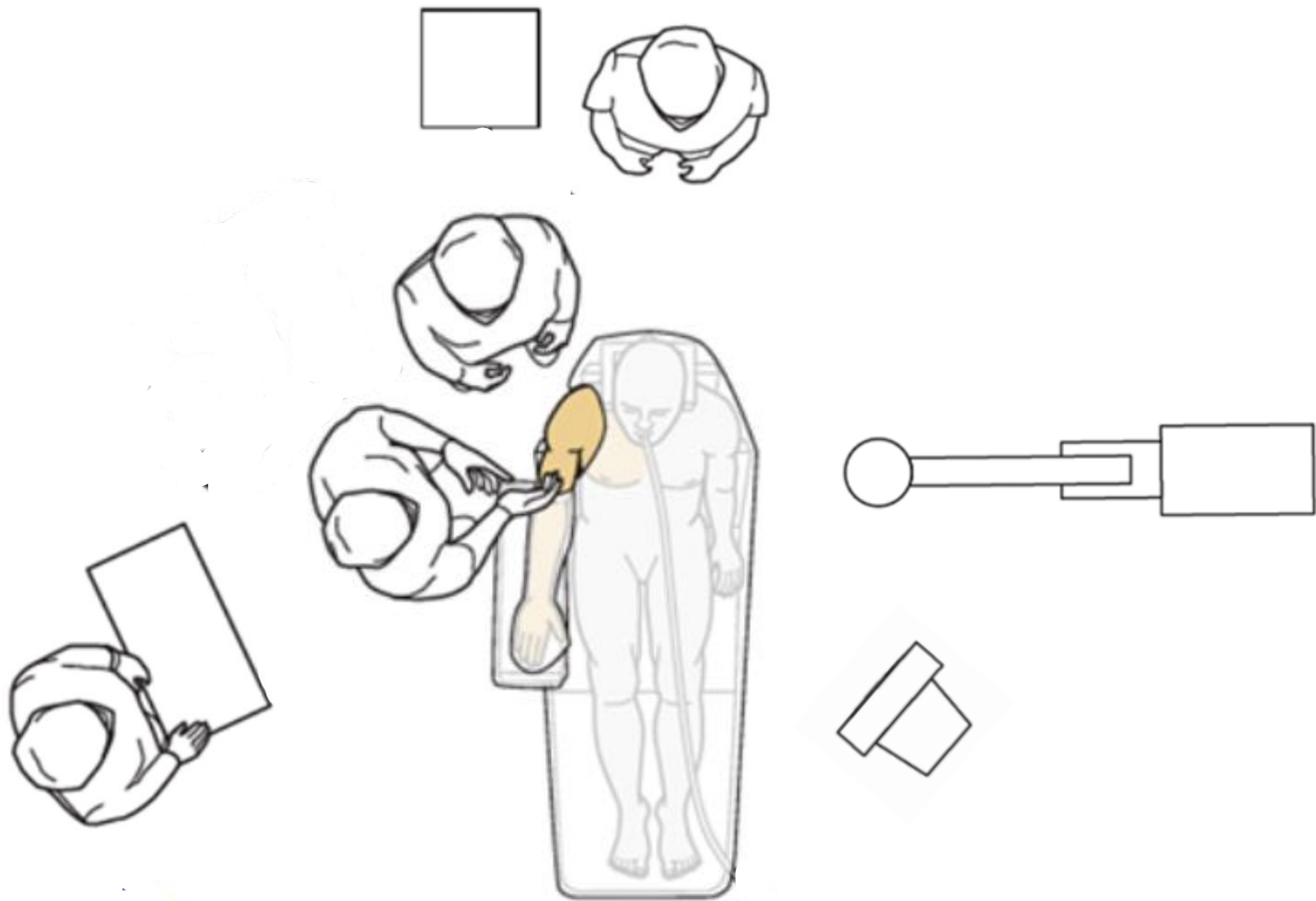


AO







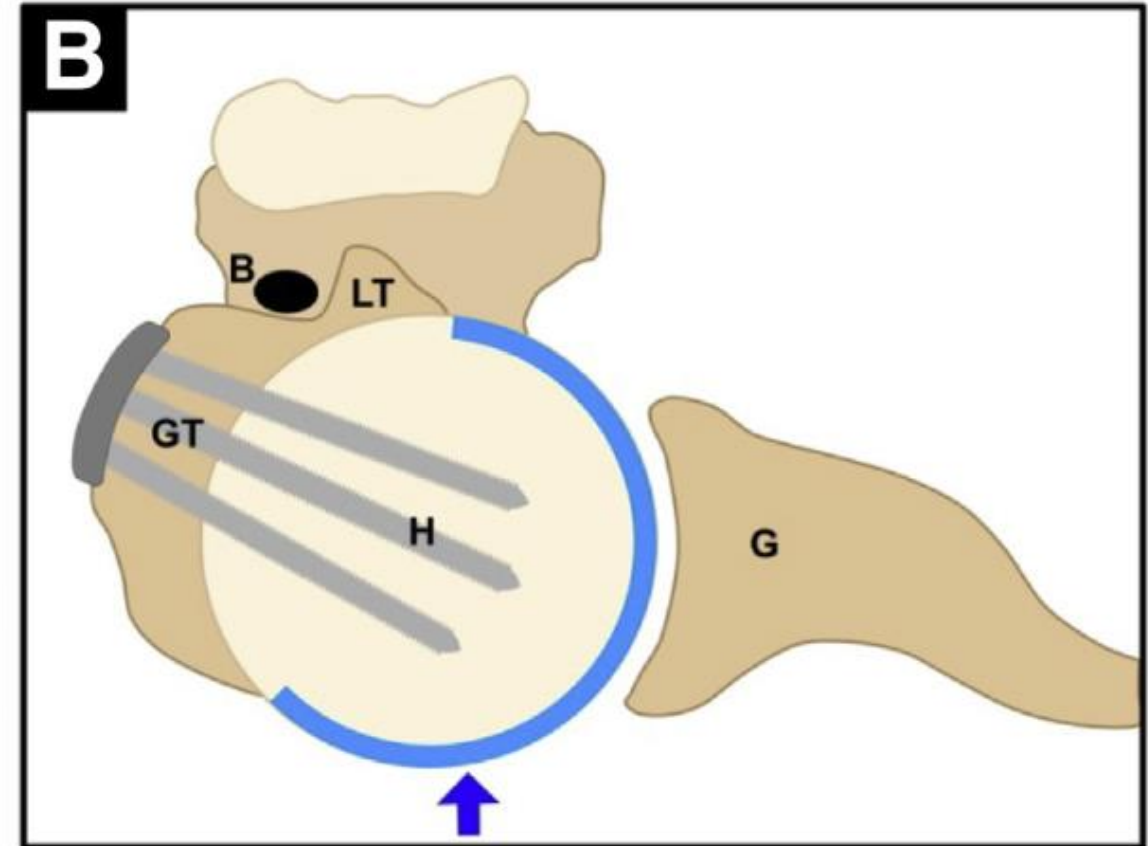
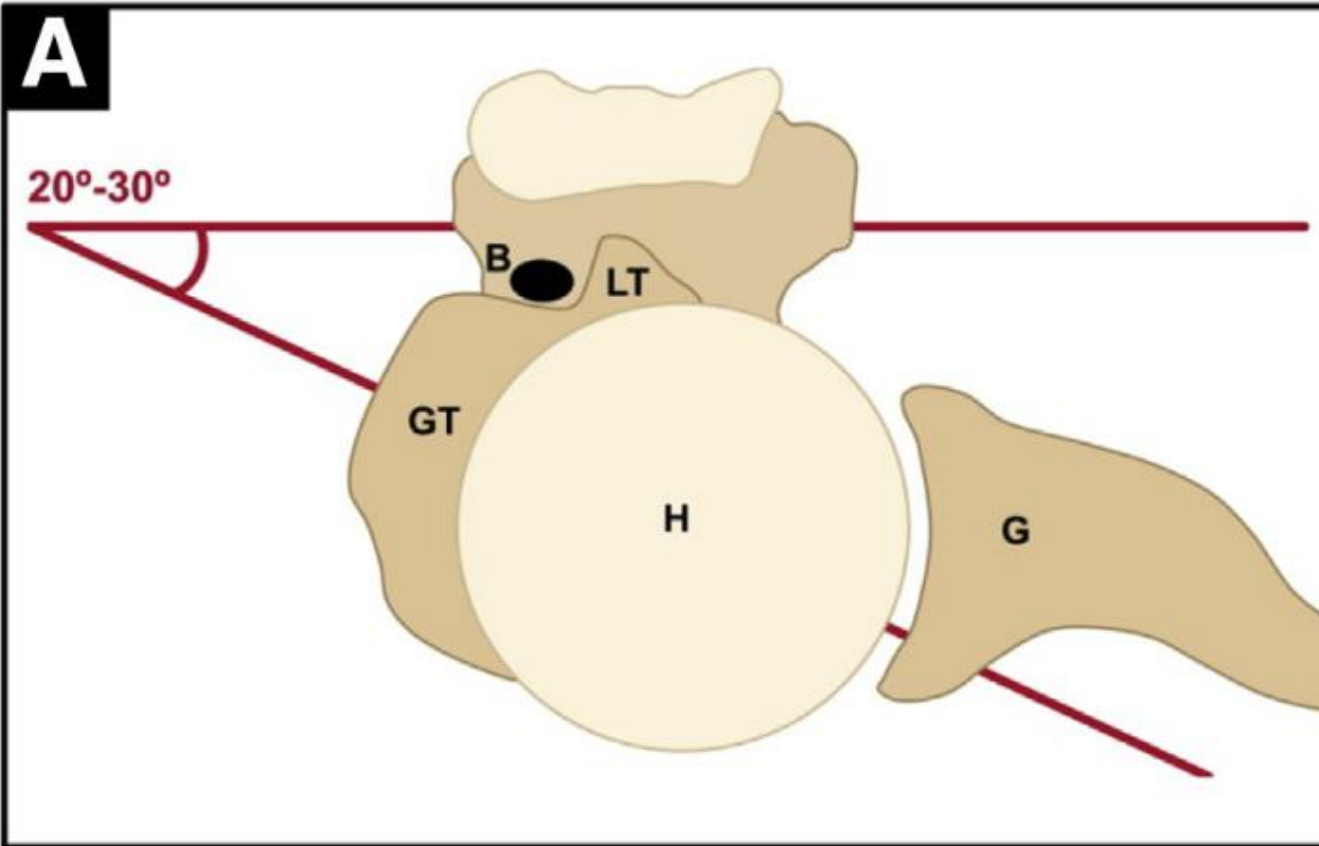






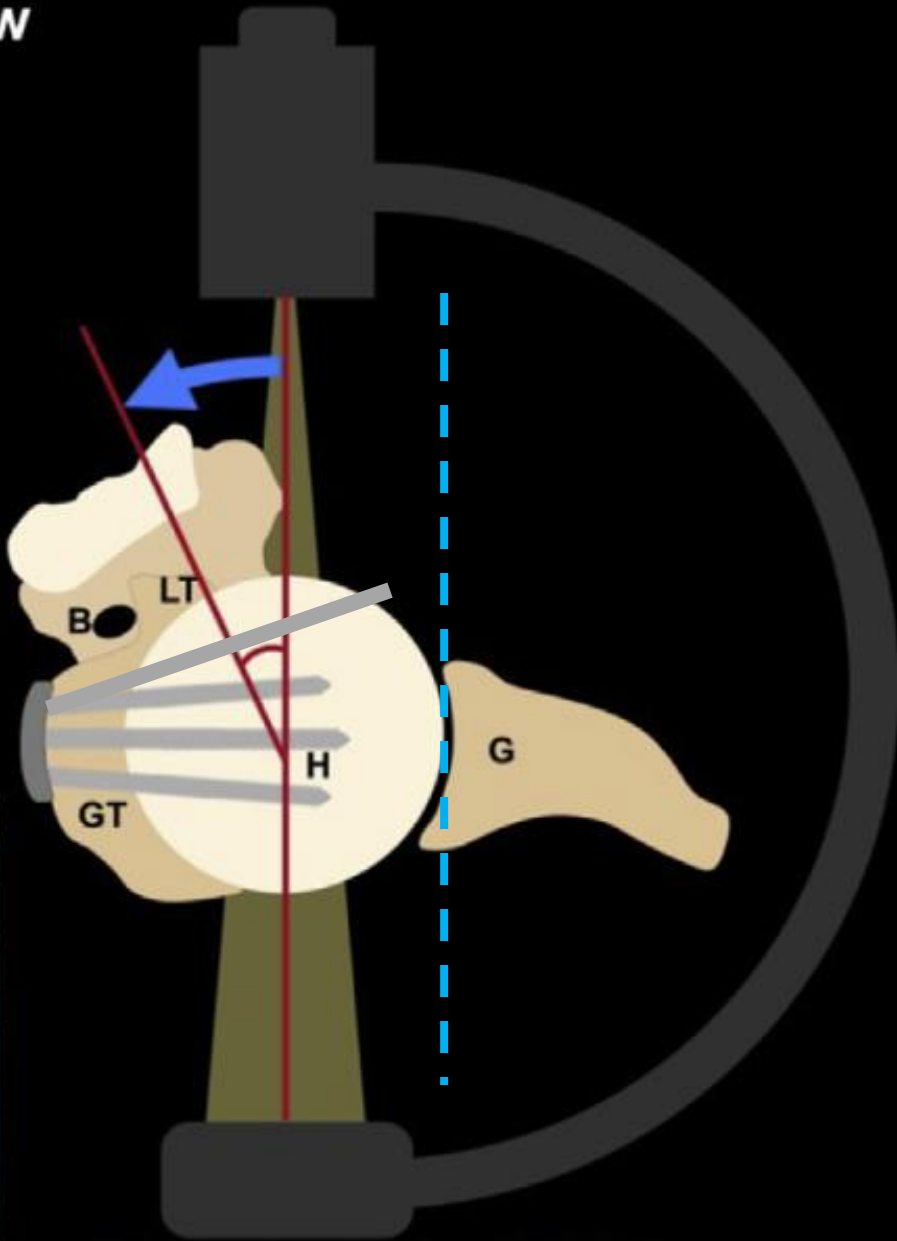


# How to get good AP and Lateral views?





# A Screw View

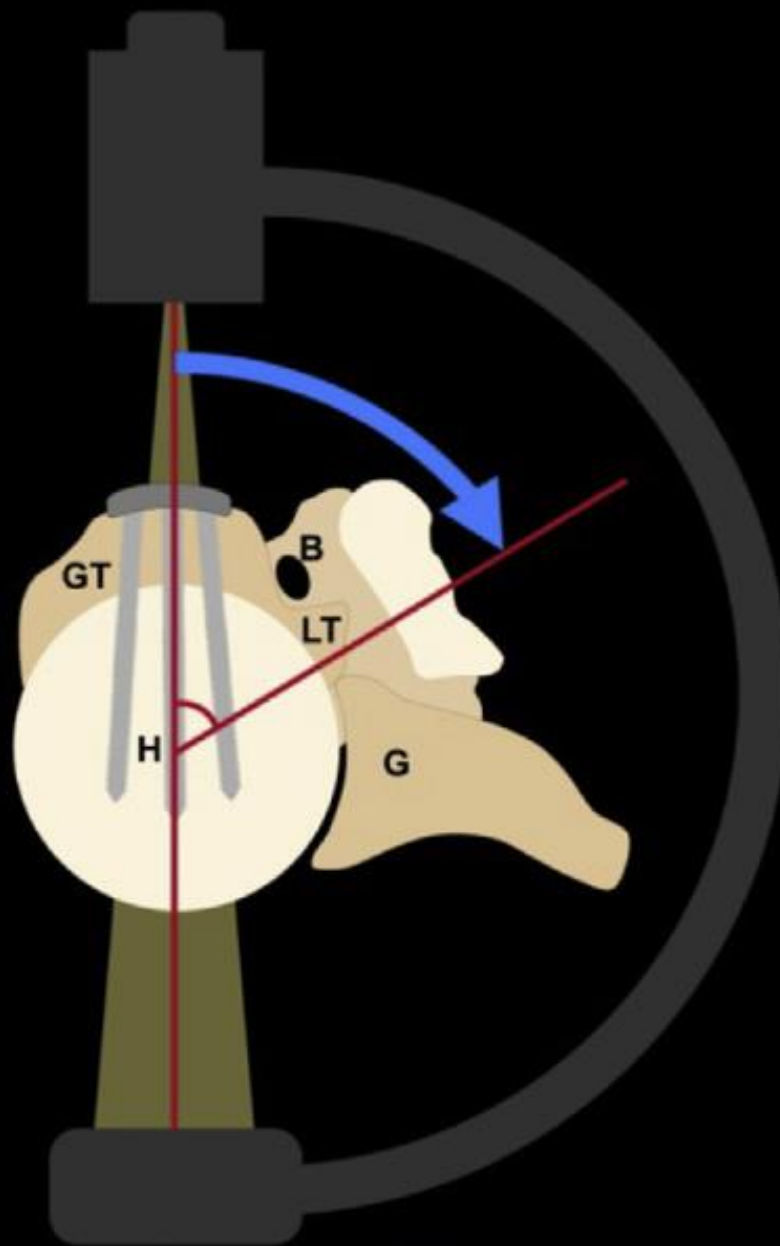


External rotation 20°-30°





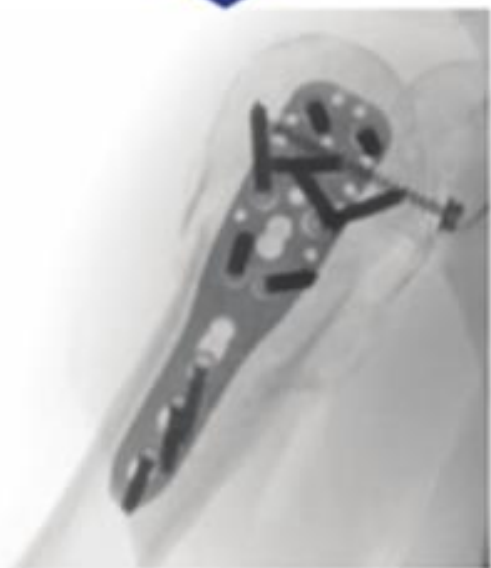
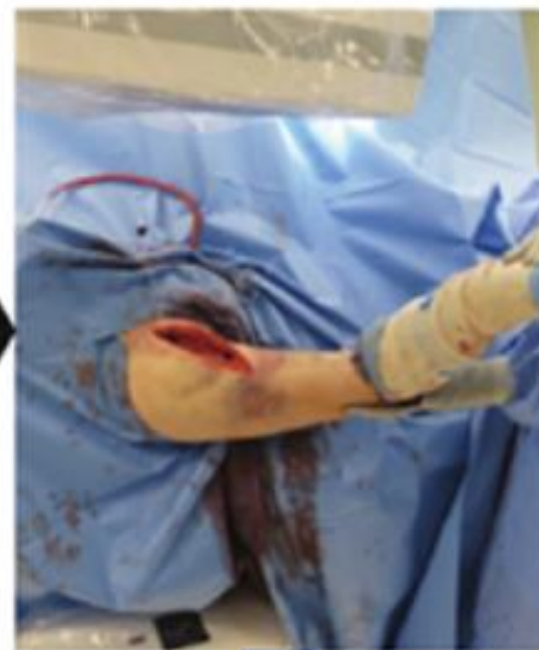
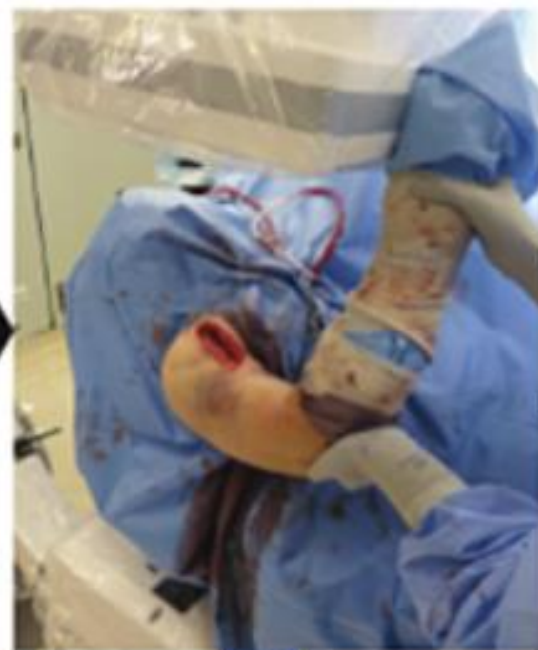
## B Plate View



Internal rotation until forearm  
parallel to the body plane







20

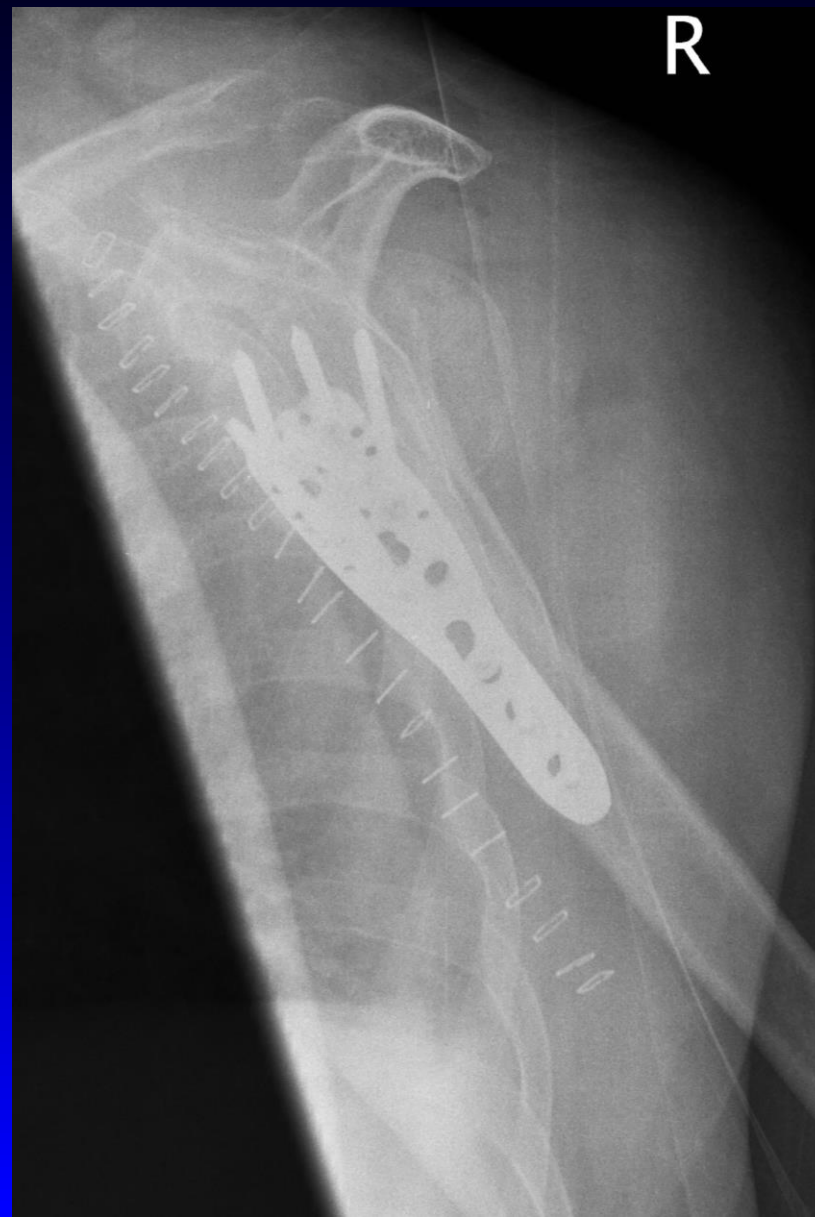
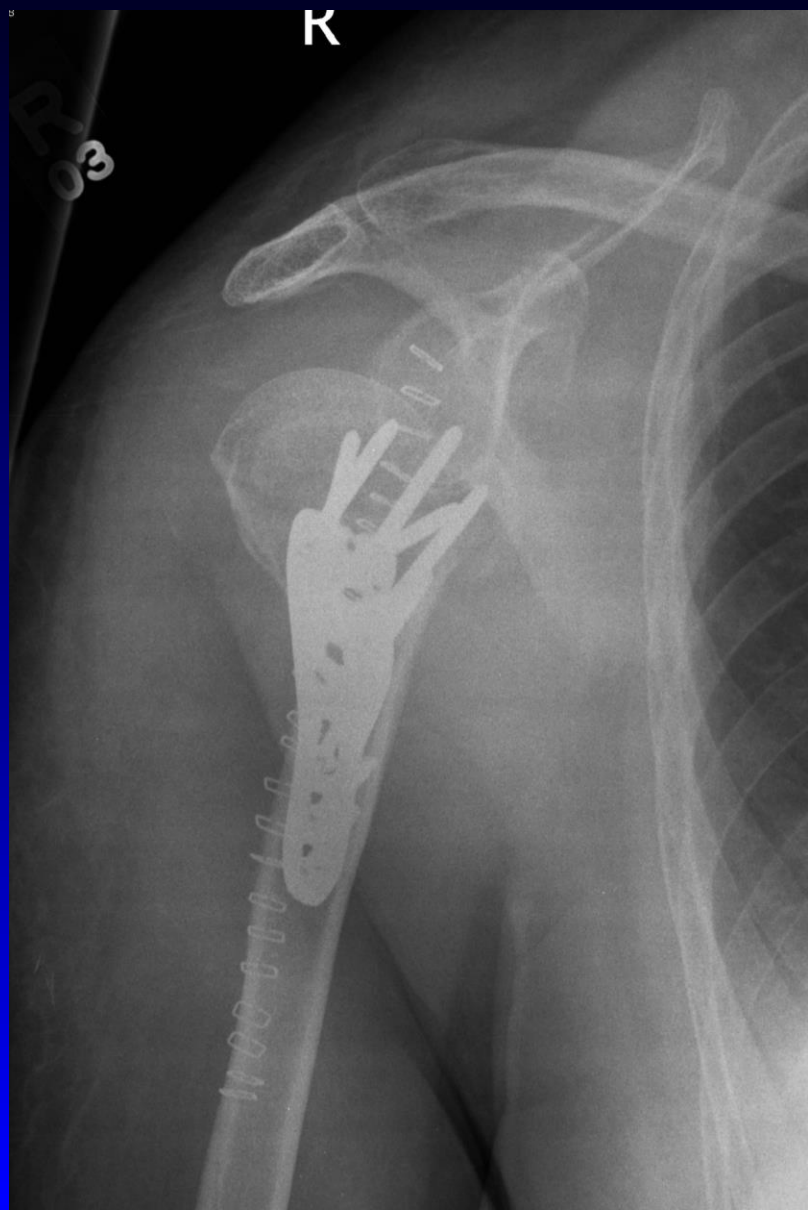
Lateral view is important

66 yr old female isolated #

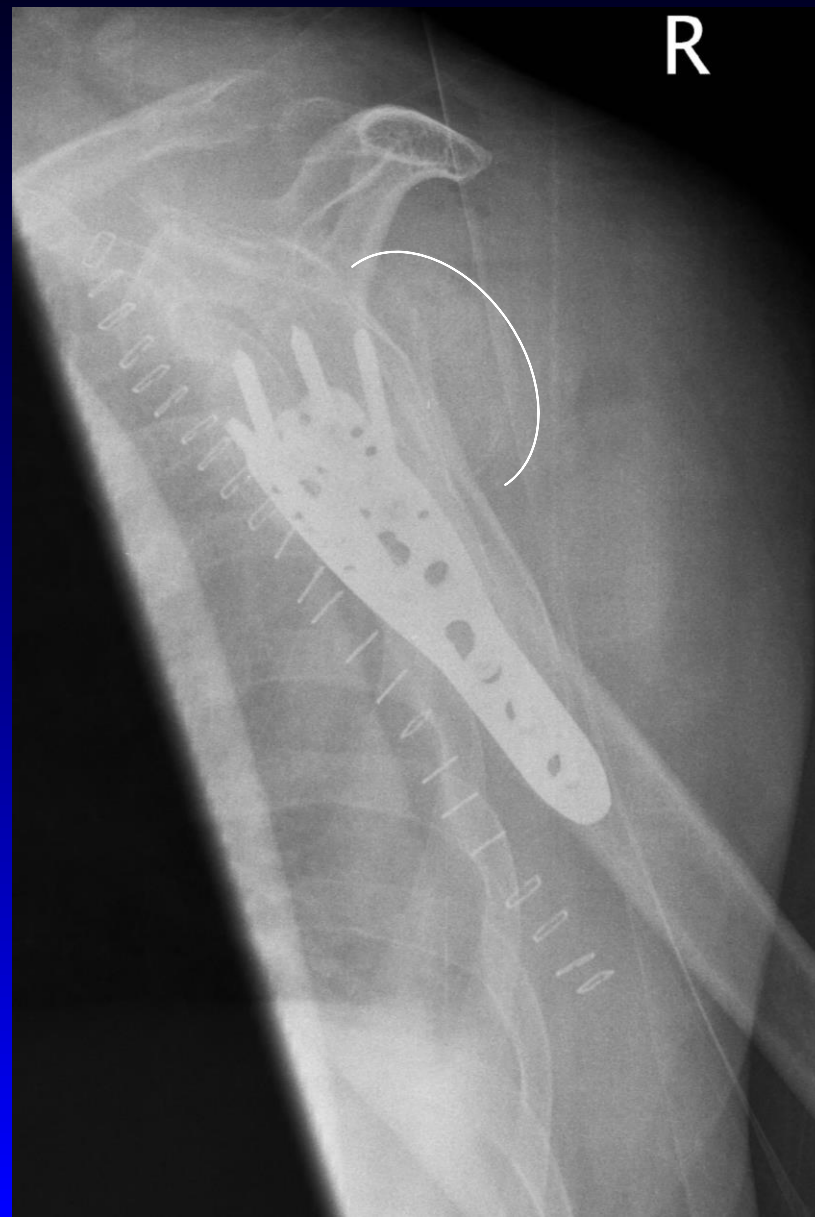




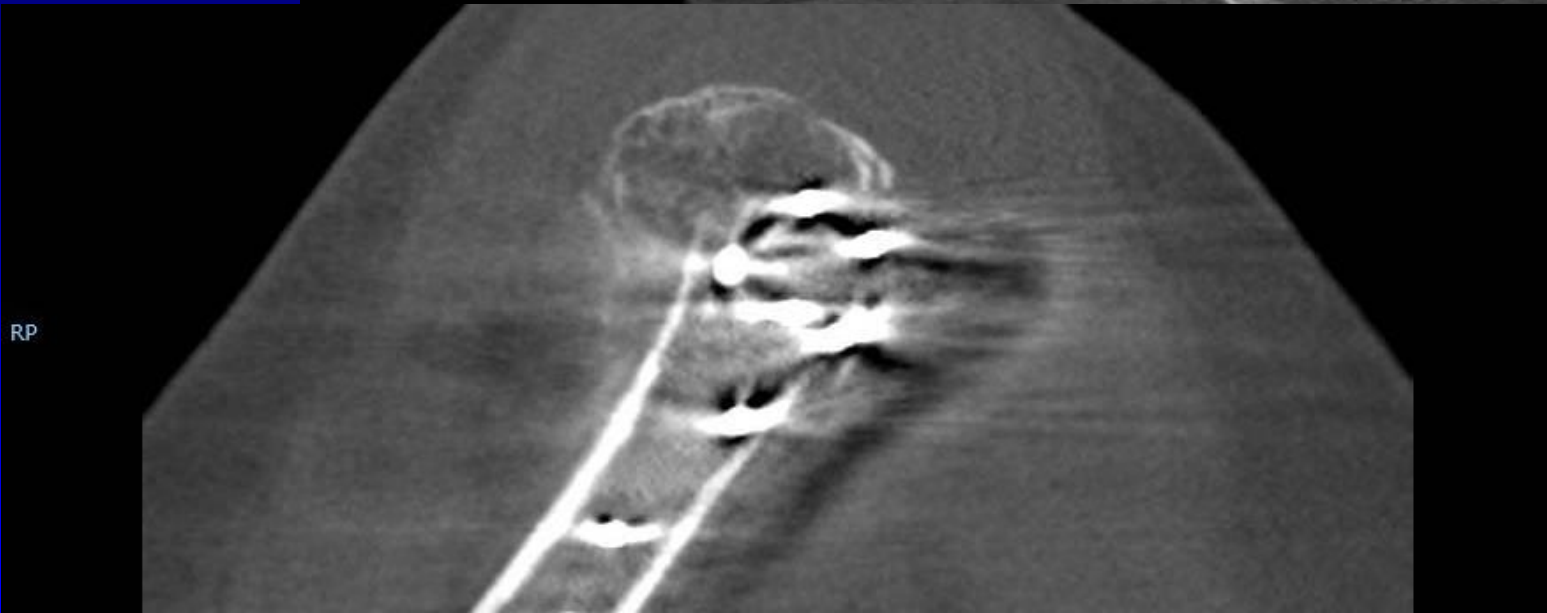
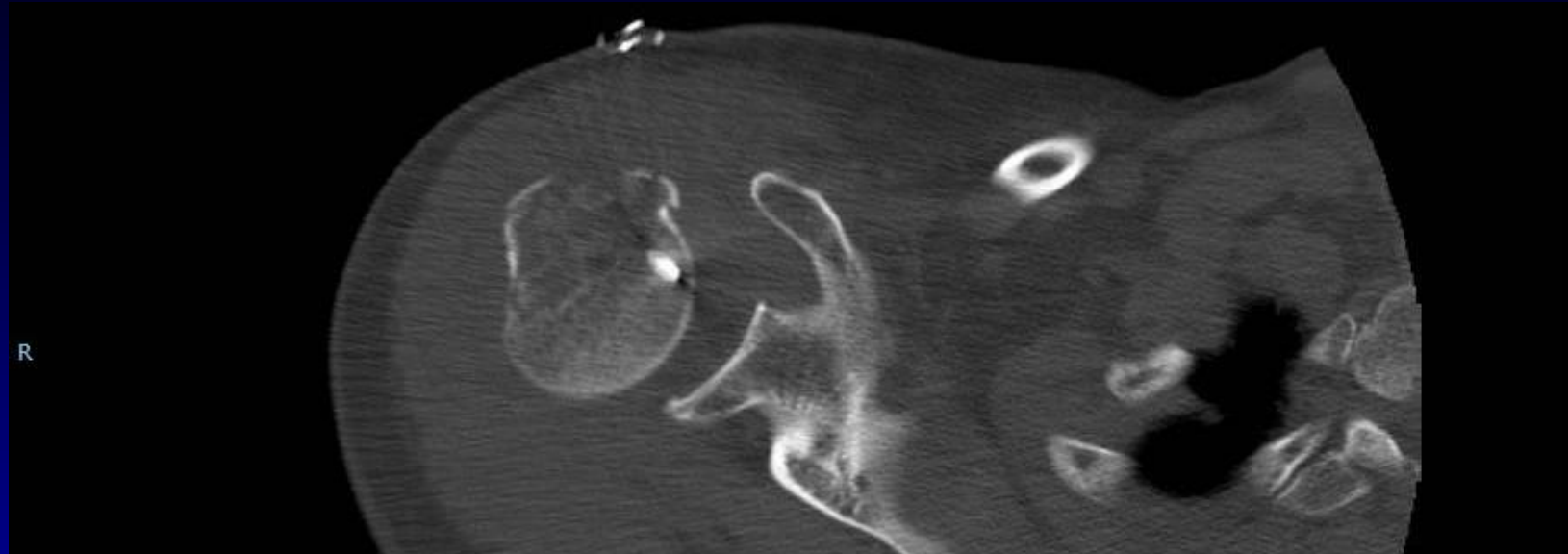
# 2 weeks post-operatively



# 2 weeks post-operatively



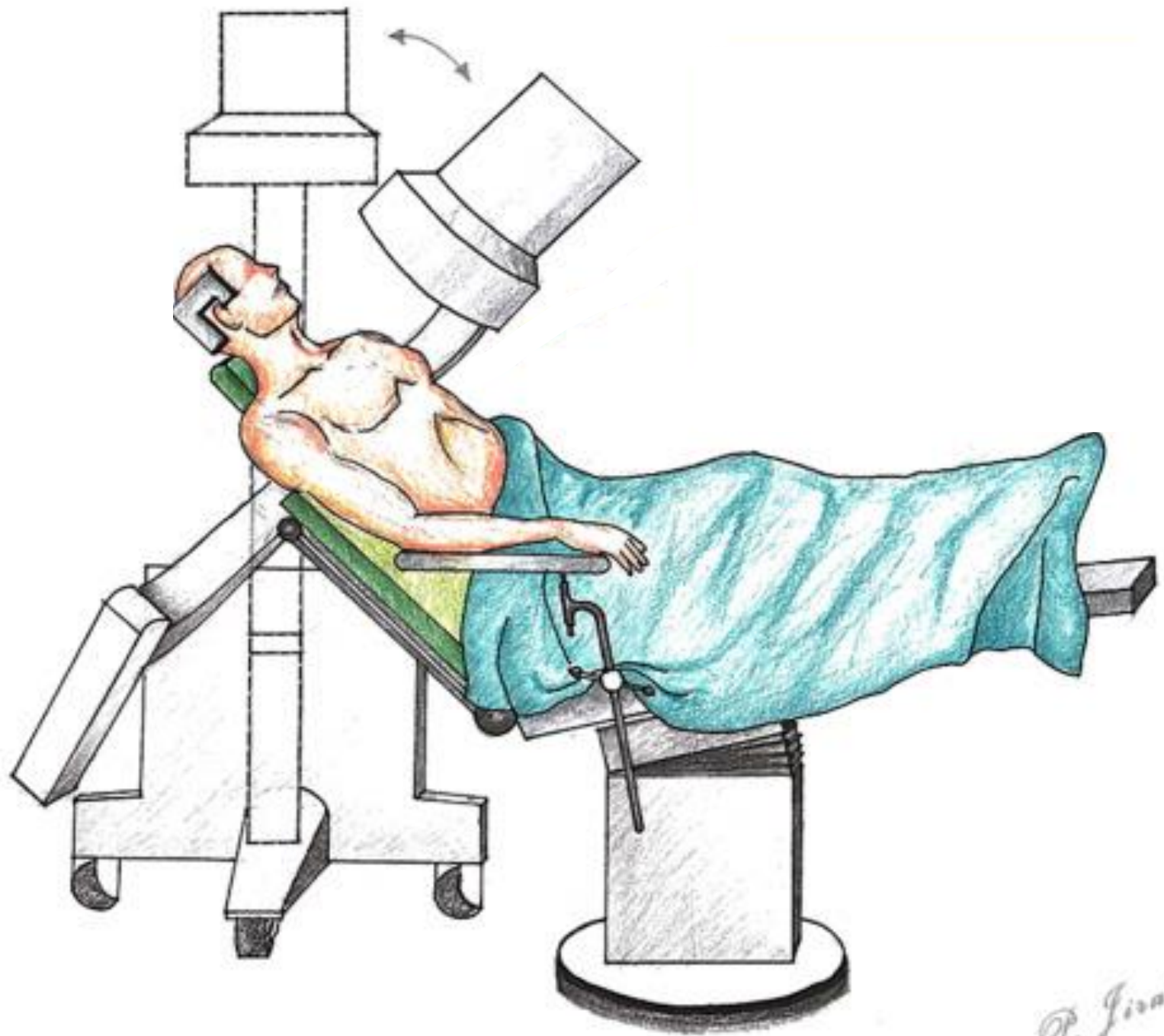
# CT scan

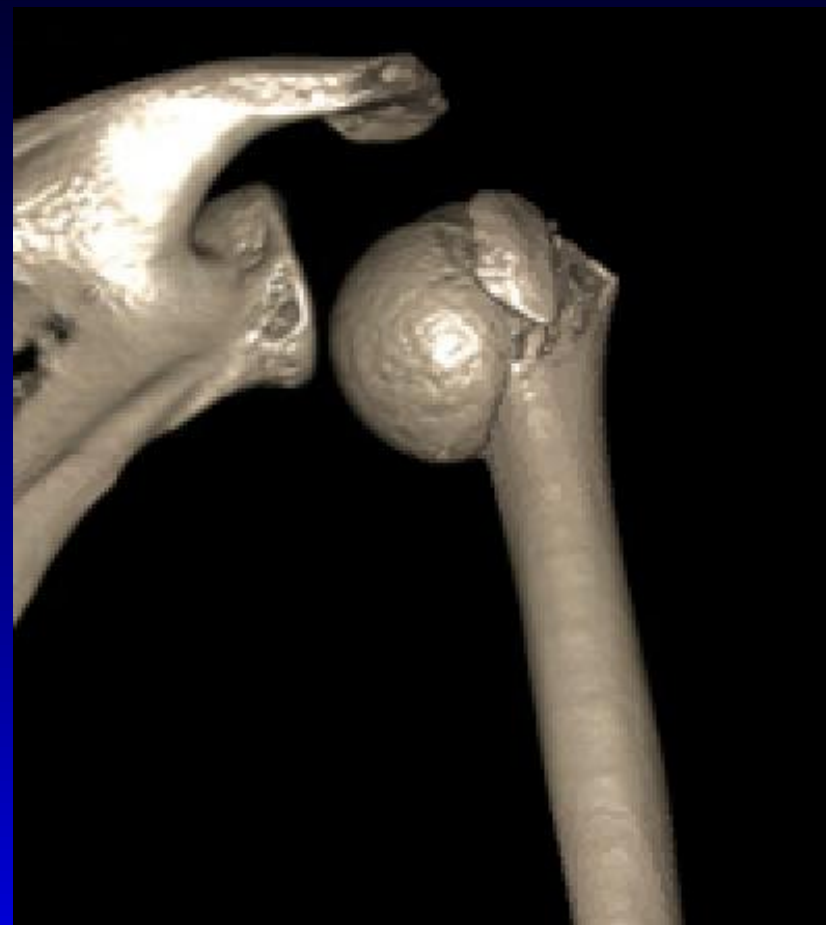


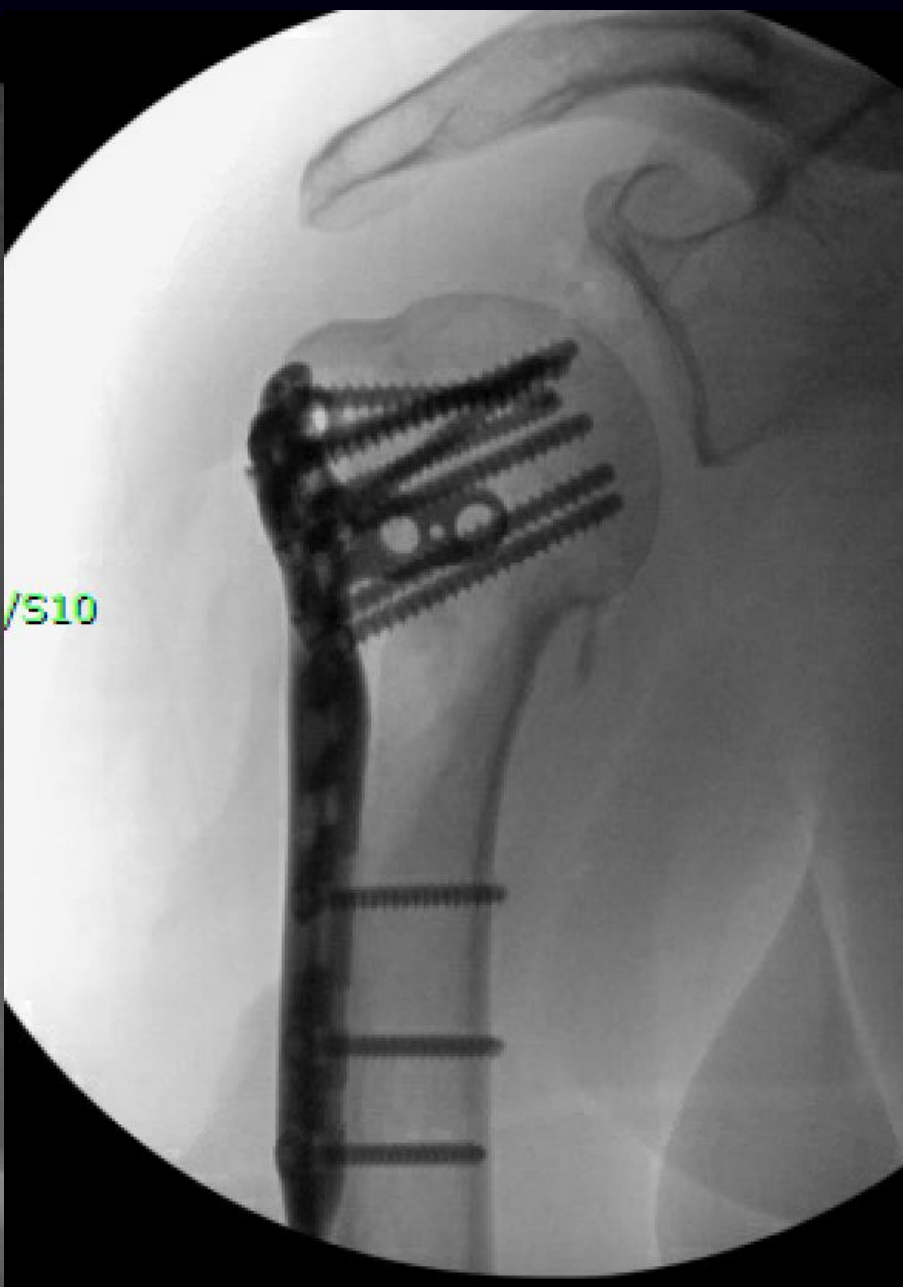
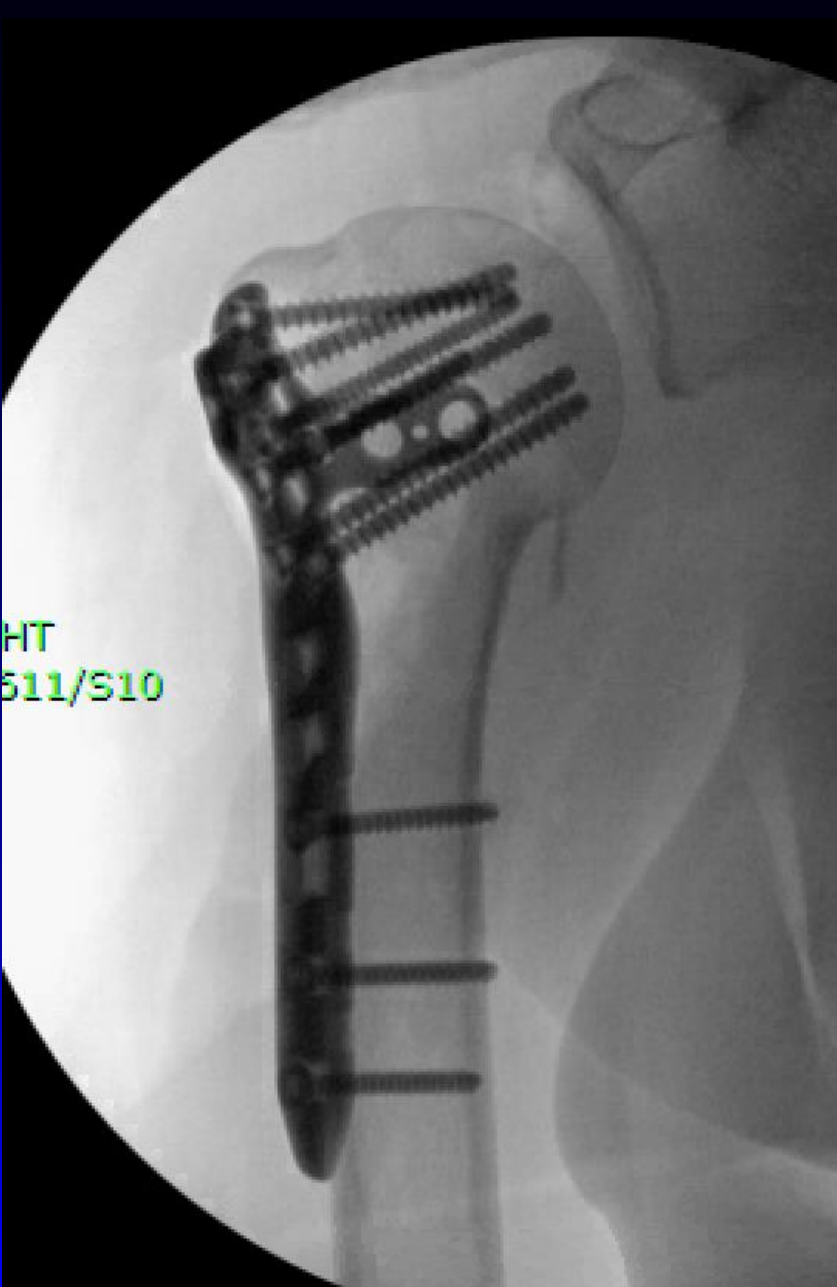
# Revision fixation











# Summary

- CT can be beneficial for pre-op assessment for complex fractures
  - Can help understand fragment size and location
  - May help decision making for ORIF vs. arthroplasty
- 3D C-arm is an option
- Need to get good intra-op C arm images
  - Patient and C arm positioning to get good AP and lateral images
  - Look for reduction and screw placement



# Thank you!

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