Distal Femur Fracture

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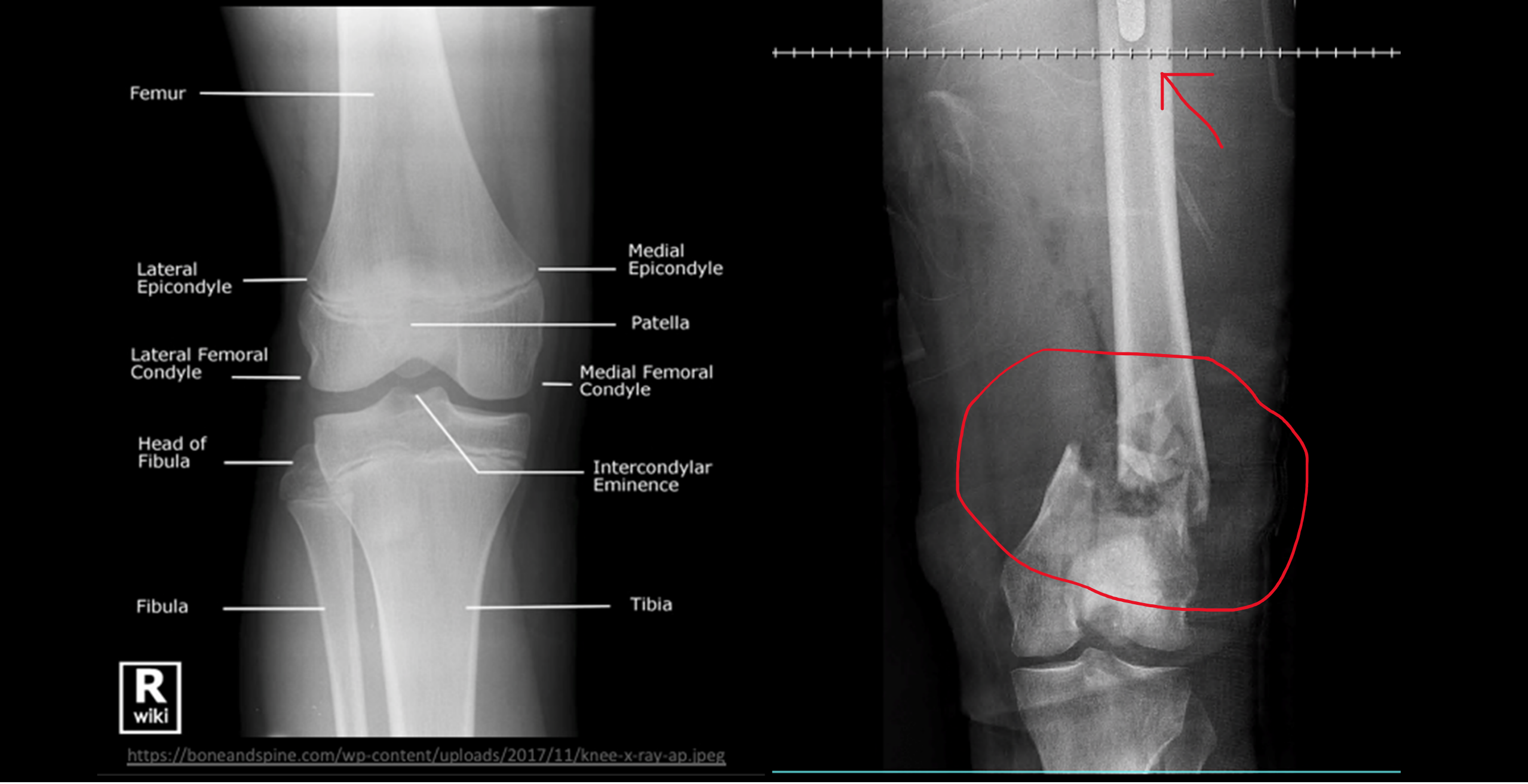
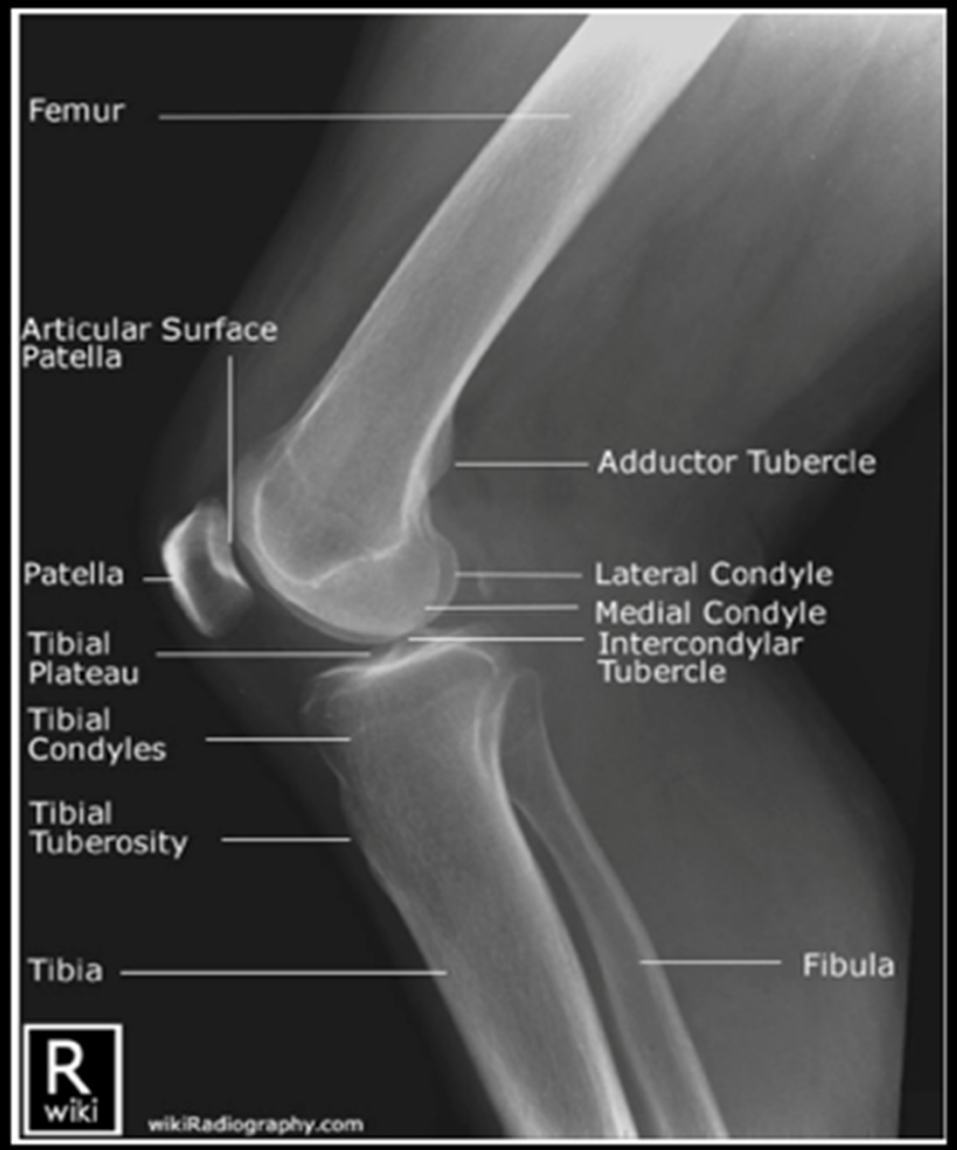
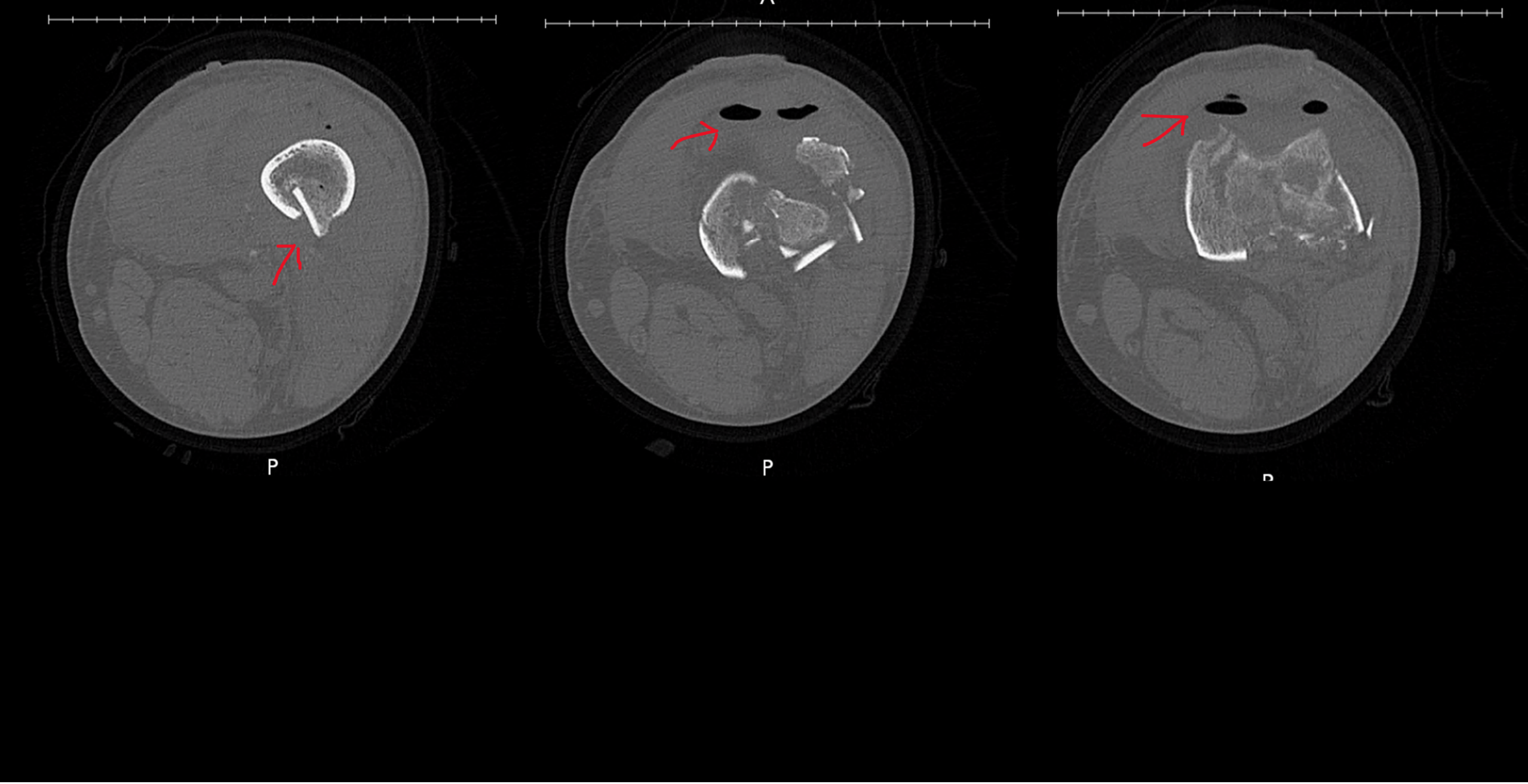
Clinical History

- Quick summary of the history and physical exam with notable findings
  - Pt is a 59 year old man s/p MCC with LOC and GCS 7, intubated on scene. Obvious deformity to left leg, tourniquet placed. Systolic pressures in 40s. Received 1 unit of whole blood on Lifeflight.
  - CT Head-C-spine-Chest-Abdomen-Pelvis and CTA Neck, as well as CT knee
  - PMH of left hip arthroplasty
  - Other Diagnosis: hemorrhagic shock, AKI, Left internal carotid injury, vertebral artery injury, NSTEMI
  - In trauma bay, palpable pulses once volume resuscitated


Femur
Lateral Epicondyle
Medial Epicondyle
Patella
Lateral Femoral Condyle
Medial Femoral Condyle
Head of Fibula
Intercondylar Eminence
Fibula
Tibia
R wiki
https://boneandspine.com/wp-content/uploads/2017/11/knee-x-ray-ap.jpeg



https://upload.orthobullets.com/topic/322085/images/lateral.jpg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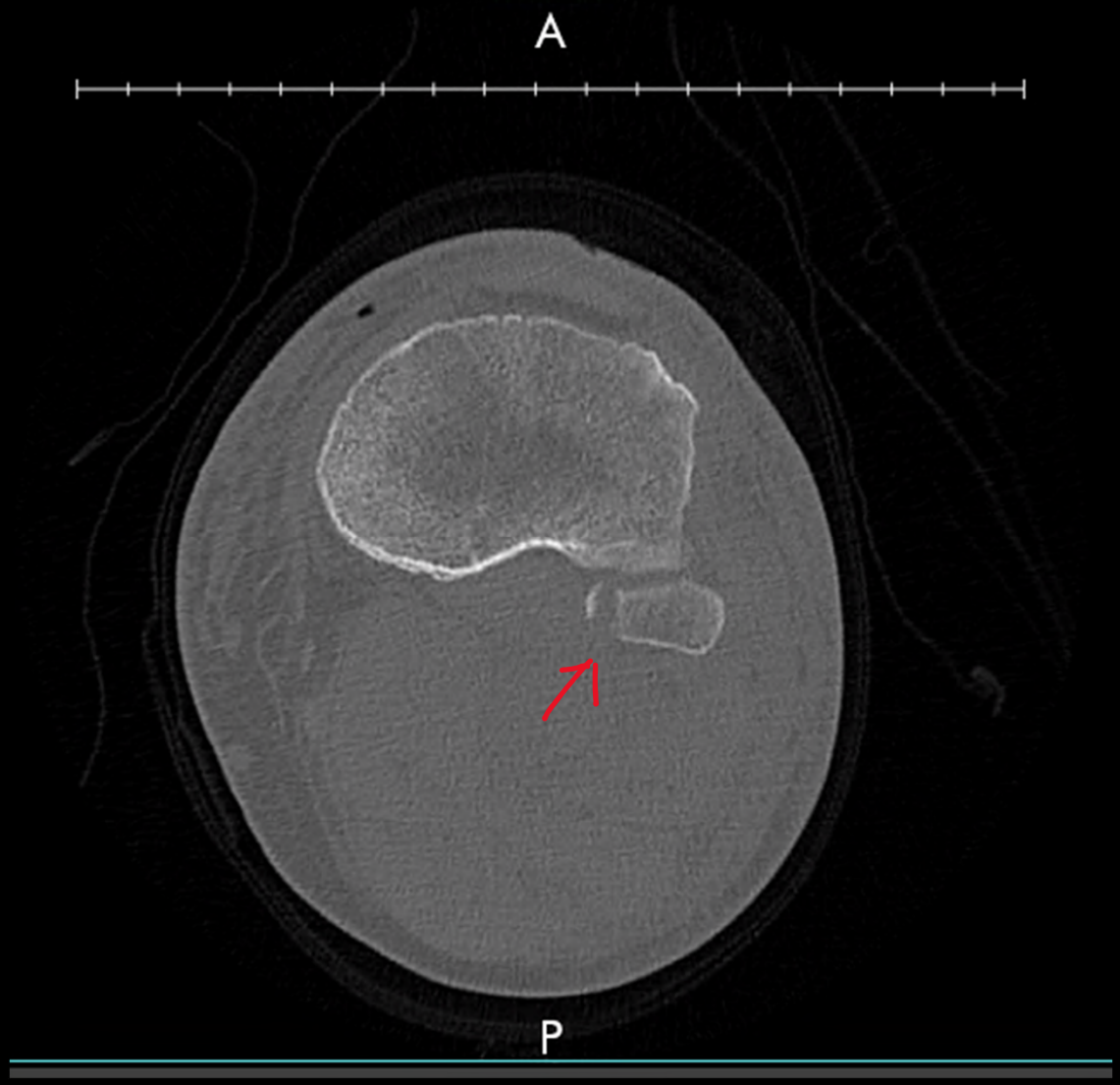
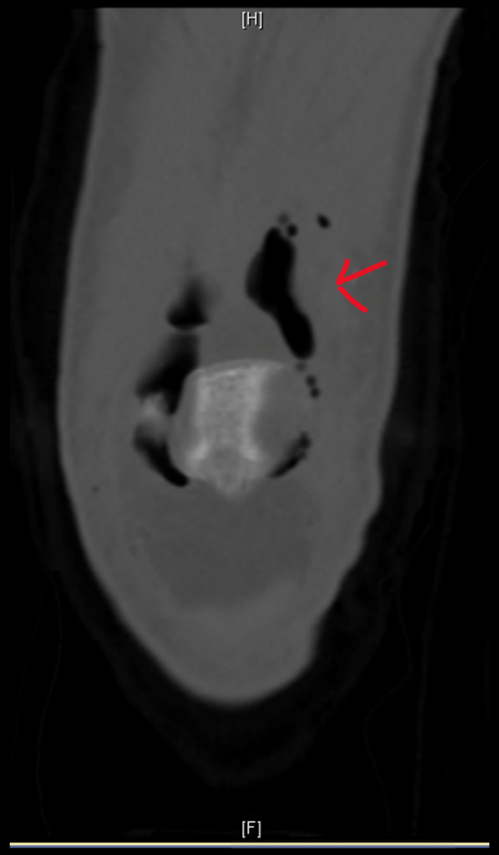
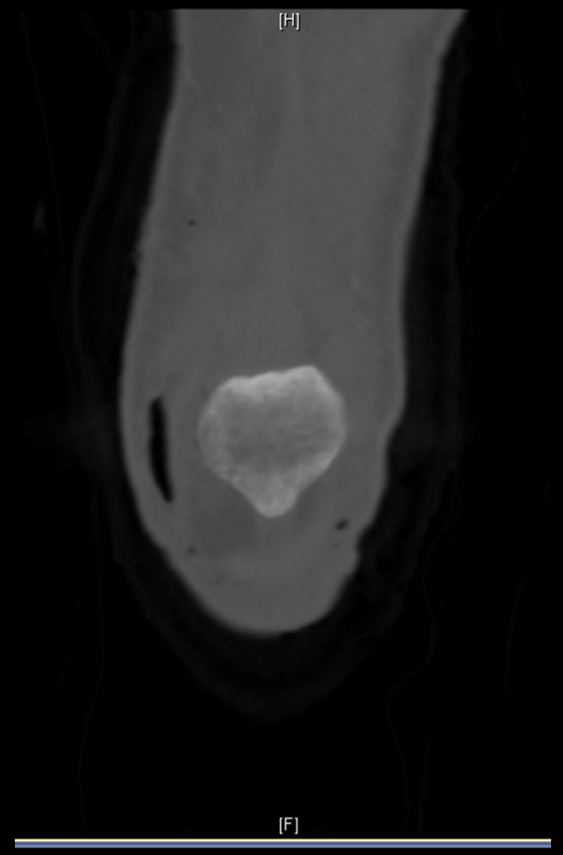
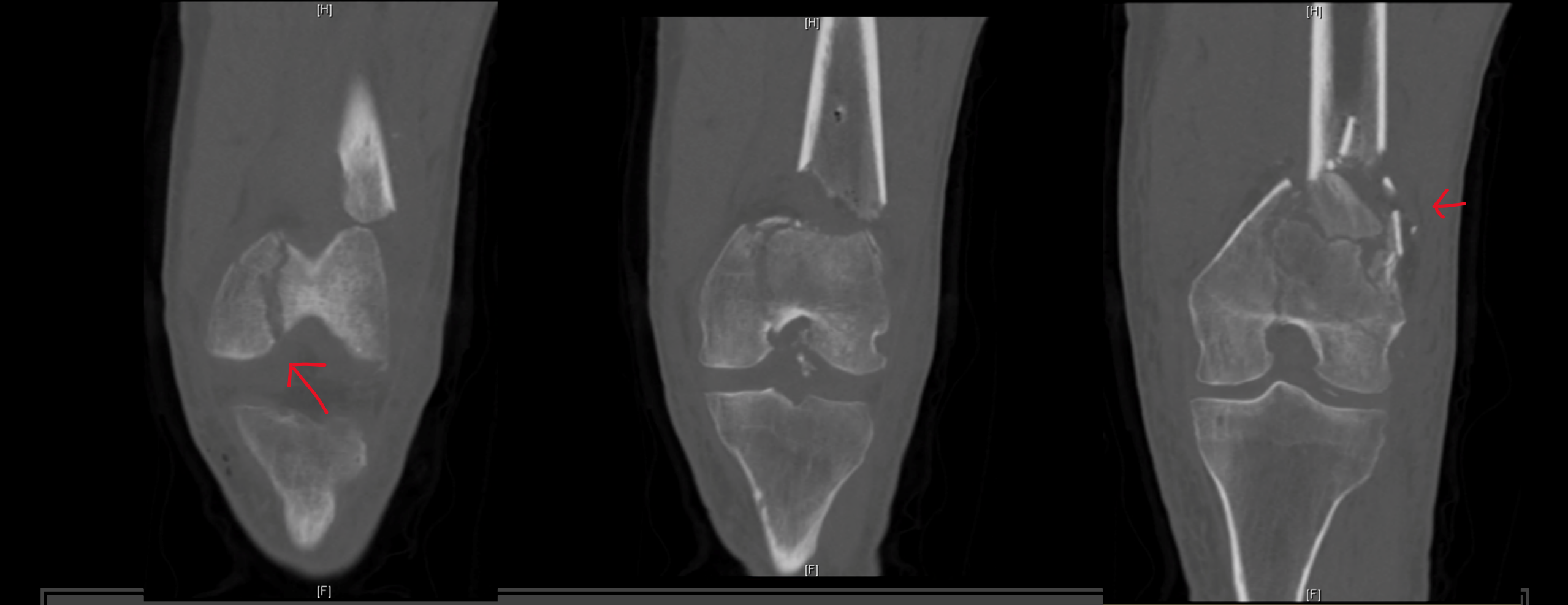


Axial cuts of CT

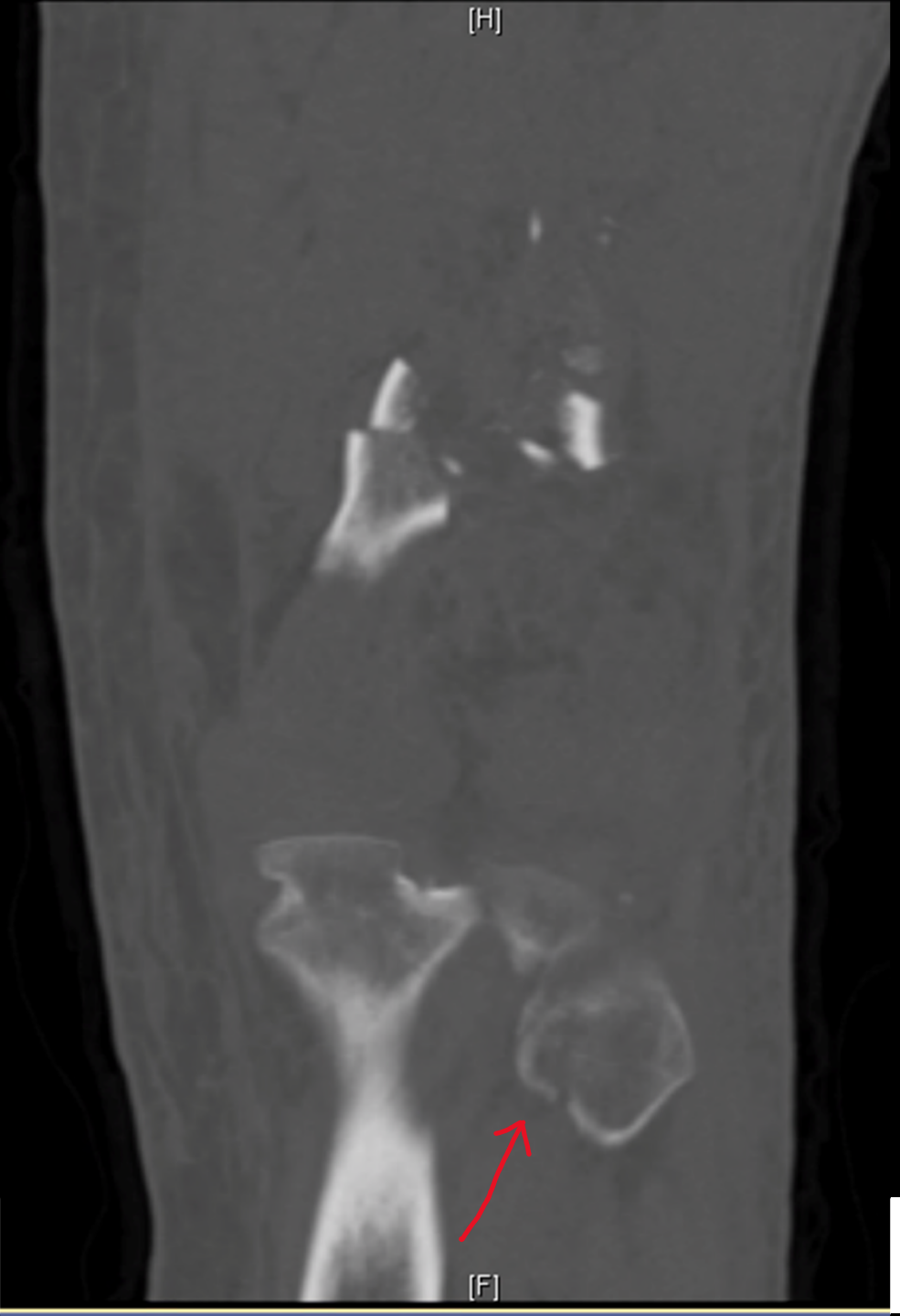




Coronal cuts of CT



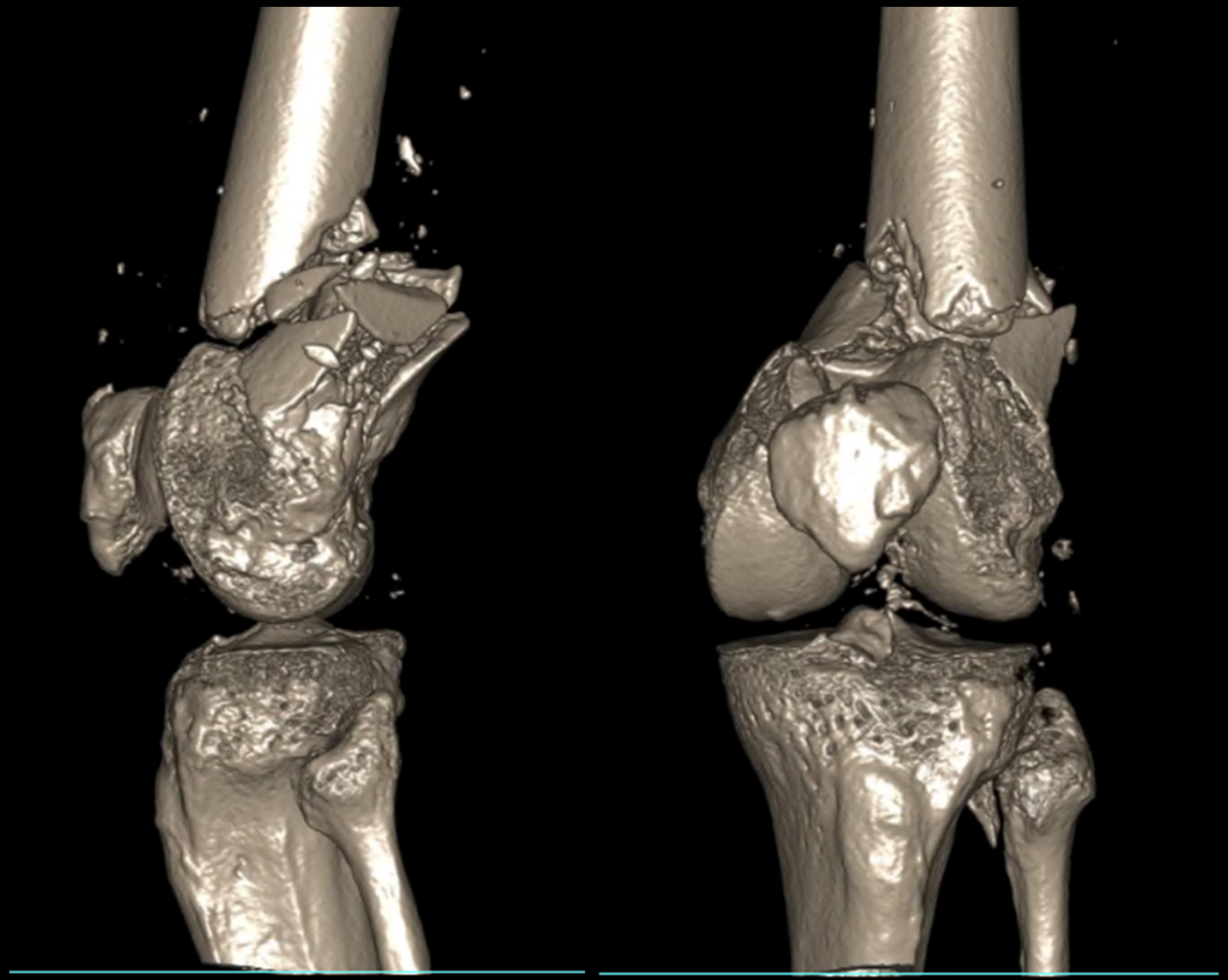
Coronal cuts of CT



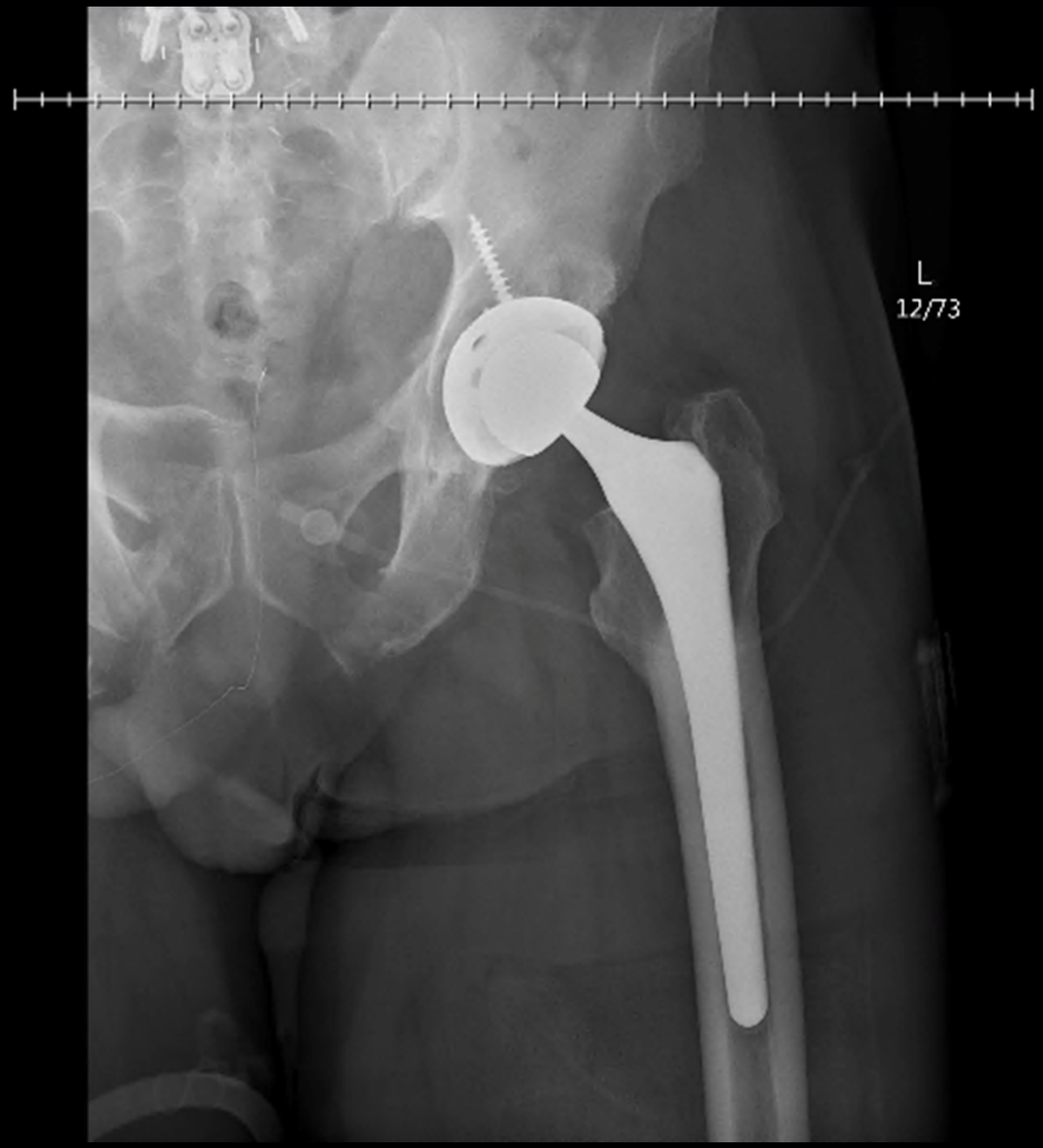
Coronal cuts of CT

- Fibular head fracture present in this section

3D Reconstructions of the Knee



Plain film of ipsilateral hip



Key Imaging Findings

- Plain film summary:
  - Comminuted distal femur fracture with intraarticular extension
  - Apex posterior angulation (Recurvatum)
  - AO-OTA type 33-C3
- CT knee summary:
  - Intraarticular air suggesting open fracture
  - Fractures in the sagittal and coronal plane
  - Fibular head fracture

Discussion

- This was a polytraumatized 59 year old man with an open femur fracture, representing the high-energy mechanism of the MCC.
- The extensive comminution, as well as bleeding suggested an open fracture on physical exam, and the air present in the joint on CT supported this notion
- Pt was taken for I&D as well as placement of Ex-Fix
- Further management when pt is hemodynamically stable will likely include ORIF vs IMN
- Ultimately, treatment will likely be temporizing to give good bone stock for a total knee arthroplasty given the extensive articular surface involvement

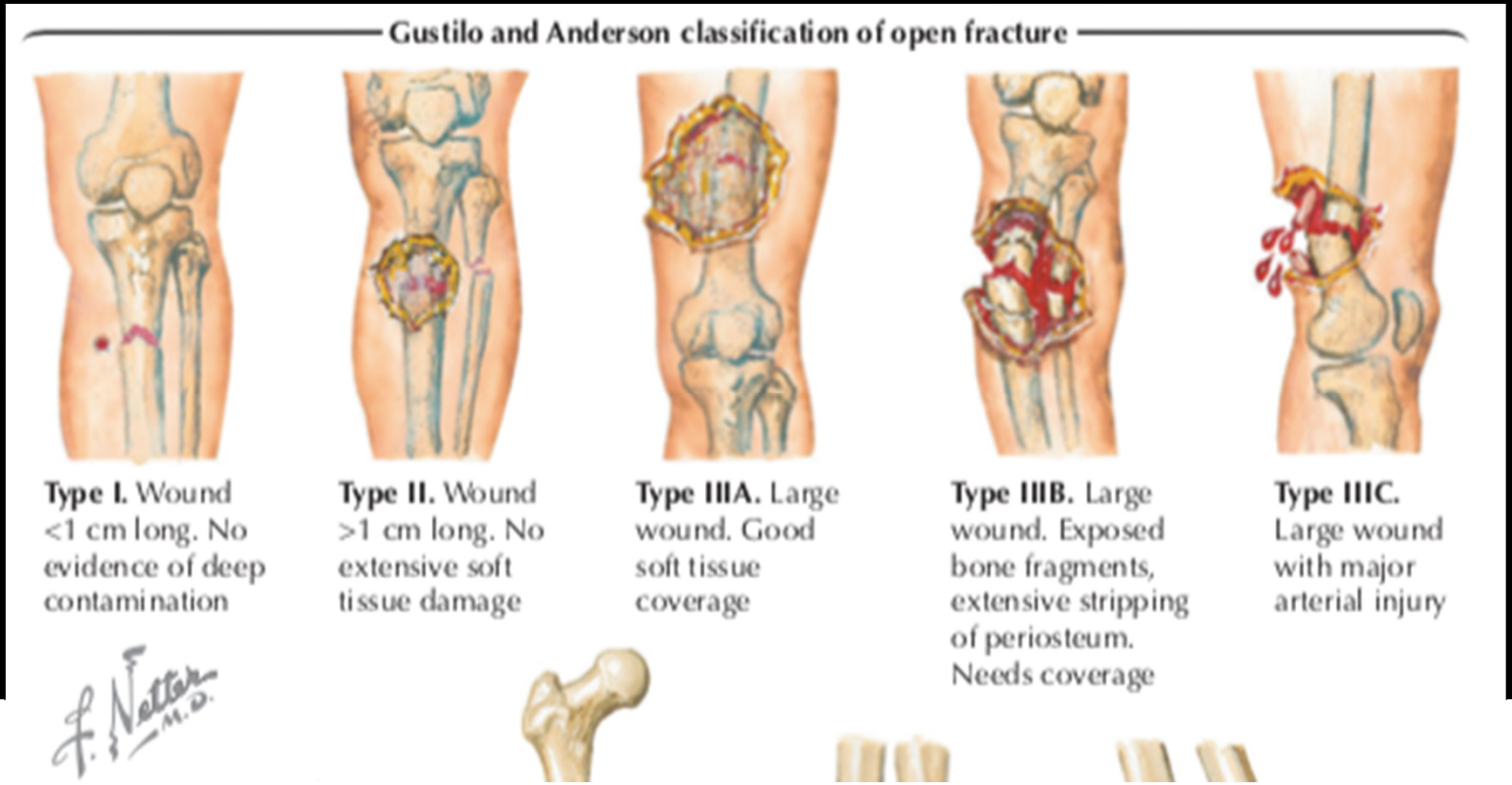
Cost of Imaging (relevant to knee)

- CT Knee w/o contrast = $3,078
- Plain film Knee AP and lateral = $523
- Plain film hip 3 view = $861

https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/

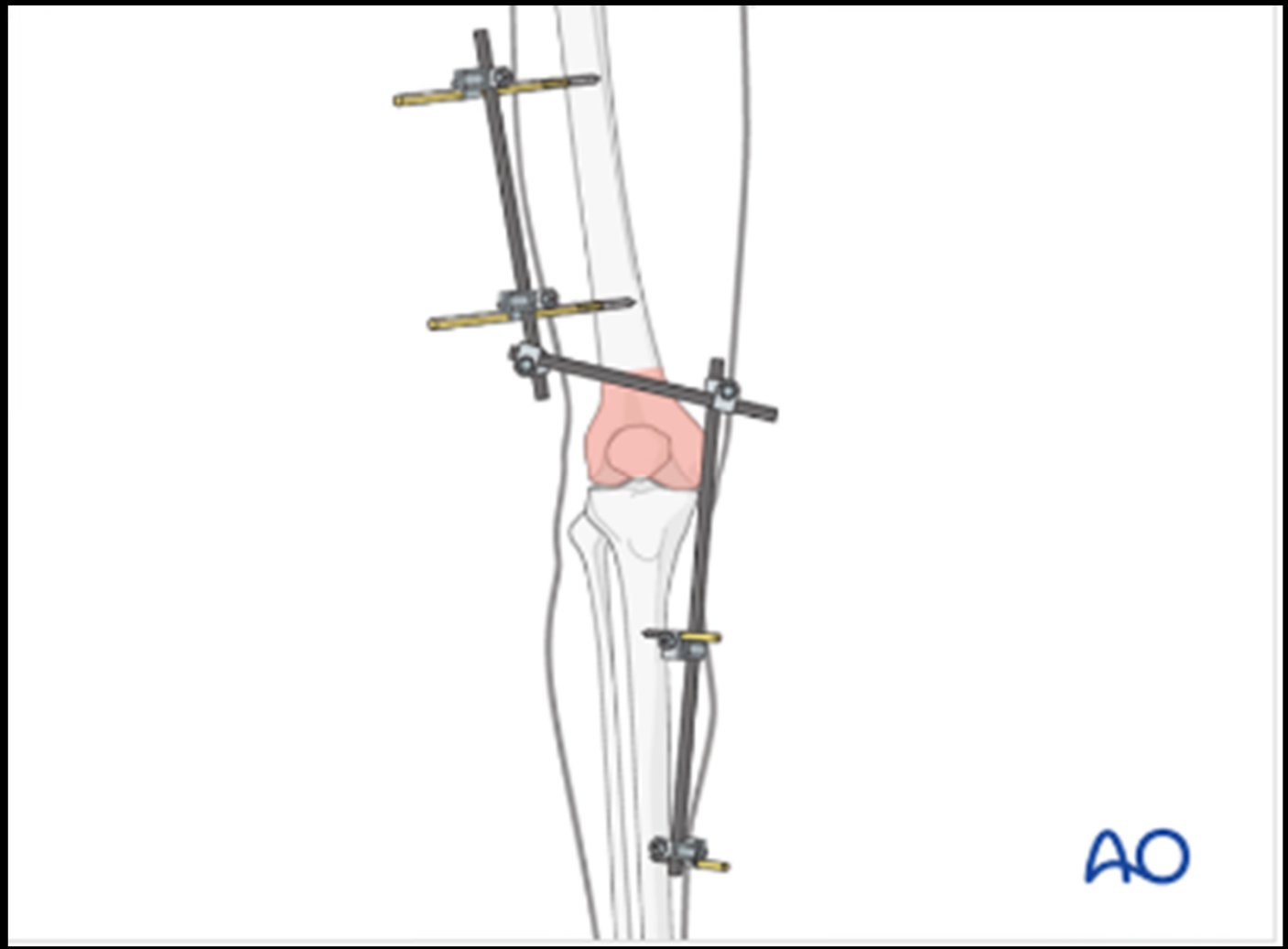
Final Diagnosis

- Left Distal Femur Fracture
  - AO-OTA Type 33-C3
  - Gustilo-Anderson Type 3A



https://www.orthobullets.com/trauma/1041/distal-femur-fractures

Treatment



https://surgeryreference.aofoundation.org/orthopedic-trauma/adult-trauma/distal-femur/complete-articular-fracture-multifragmentary-articular/temporary-external-fixator

Treatment

https://www.orthobullets.com/trauma/1041/distal-femur-fractures

ACR appropriateness Criteria

Variant 7: **Adult or child 5 years of age or older. Significant trauma to the knee (eg, motor vehicle accident, knee dislocation). Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Radiography knee	Usually Appropriate	☢
CTA lower extremity with IV contrast	Usually Appropriate	☢☢☢
Arteriography lower extremity	May Be Appropriate	☢☢
CT knee with IV contrast	May Be Appropriate (Disagreement)	☢
CT knee without IV contrast	May Be Appropriate	☢
MRA knee without and with IV contrast	May Be Appropriate	O
MRI knee without IV contrast	May Be Appropriate	O
MRA knee without IV contrast	Usually Not Appropriate	O
Bone scan with SPECT or SPECT/CT knee	Usually Not Appropriate	☢☢☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
MR arthrography knee	Usually Not Appropriate	O
MRI knee without and with IV contrast	Usually Not Appropriate	O
US knee	Usually Not Appropriate	O

Take Home Points

- Communited distal femur fractures occur via high energy mechanism such as MCC
- Plain film helpful in the trauma bay to quickly identify fractures
- CT scan often necessary to further classify fracture and assist with operative planning
- CT can also identify open fractures via air in joint or soft tissues

References

- Egol, K., MD, Koval, K., MD, & Zuckerman, J., MD. (2015). Distal Femur Fractures. In *Handbook of Fractures* (5th ed., pp. 235-237). New York: Wolters Kluwer.
- Thompson, Jon C, and Frank H. Netter. *Netter's Concise Orthopaedic Anatomy*. Philadelphia, PA: Saunders Elsevier, 2010.


Questions?
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