Periprosthetic Fractures (PPX) of the Hip: Fix, Revise, or do Nothing?

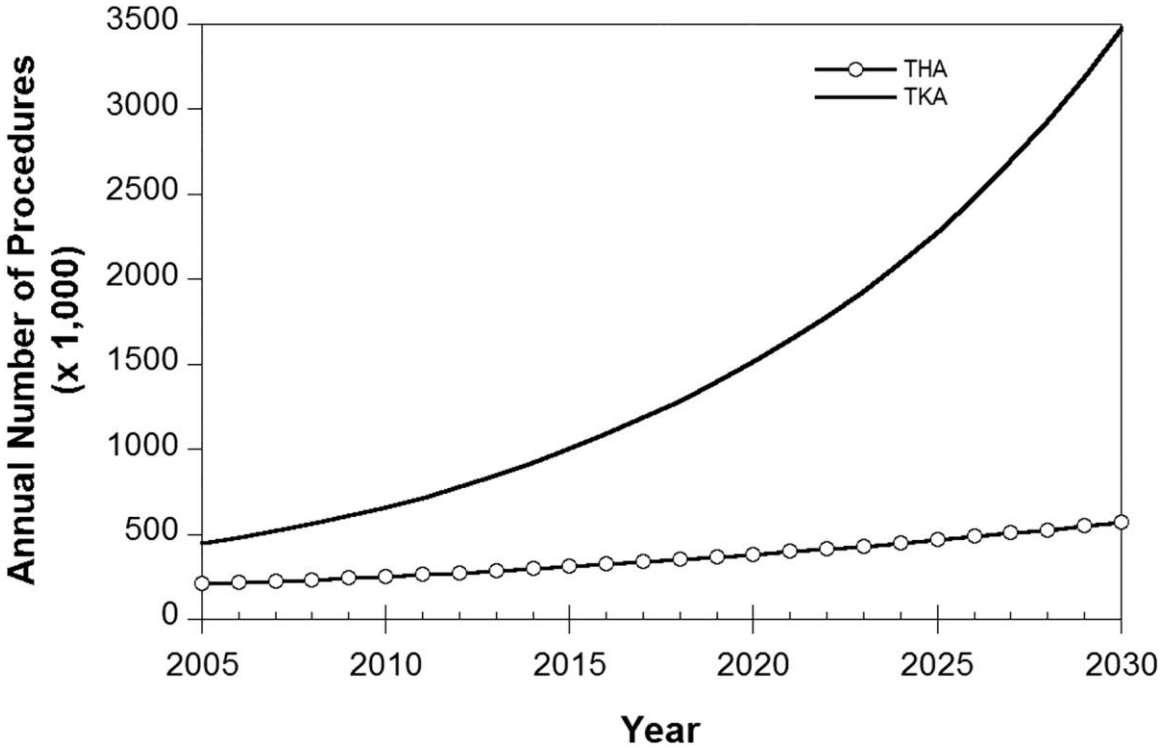
Paul Toogood, MD

Objectives

- Review Epidemiology of PPX
- Apply the Vancouver Classification to some cases

Epidemiology

As rates of primary & revision TJA continue to rise…



Kurtz, 2007

…so too will the number of PPX

J Arthroplasty. 2015 Oct;30(10):1688-91. doi: 10.1016/j.arth.2015.04.038. Epub 2015 May 5.

Periprosthetic Fractures: A Common Problem with a Disproportionately High Impact on Healthcare Resources.

Toogood PA[1], Vail TP[2].

- National Hospital Discharge Survery 2006-2010
  - 26,000 primary TJA
  - 4,400 revision TJA
    - 259 for PPX
      - ORIF femur: 28-52%
      - Revision THA: 17-23%
      - Revision TKA: 5-13%
      - ORIF tibia, patellar ORIF/revision: rare

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Periprosthetic Fractures: A Common Problem with a Disproportionately High Impact on Healthcare Resources.

Toogood PA[1], Vail TP[2].

- Demographics
  - Mean age: 75 (oldest of any revision category)
  - 72% female (largest % female of any revision category)

- Outcomes
  - Admitted emergently/urgently: 83% (most of any revision category)
  - Mean LOS: 5 days (longest of any revision category)
  - Discharge to home: 21% (lowest of any revision category)
  - Mortality: 5% (highest of any revision category)

Summary: Fragile, unprepared population undergoing long, technically challenging procedures leads to poor outcomes

Vancouver Classification

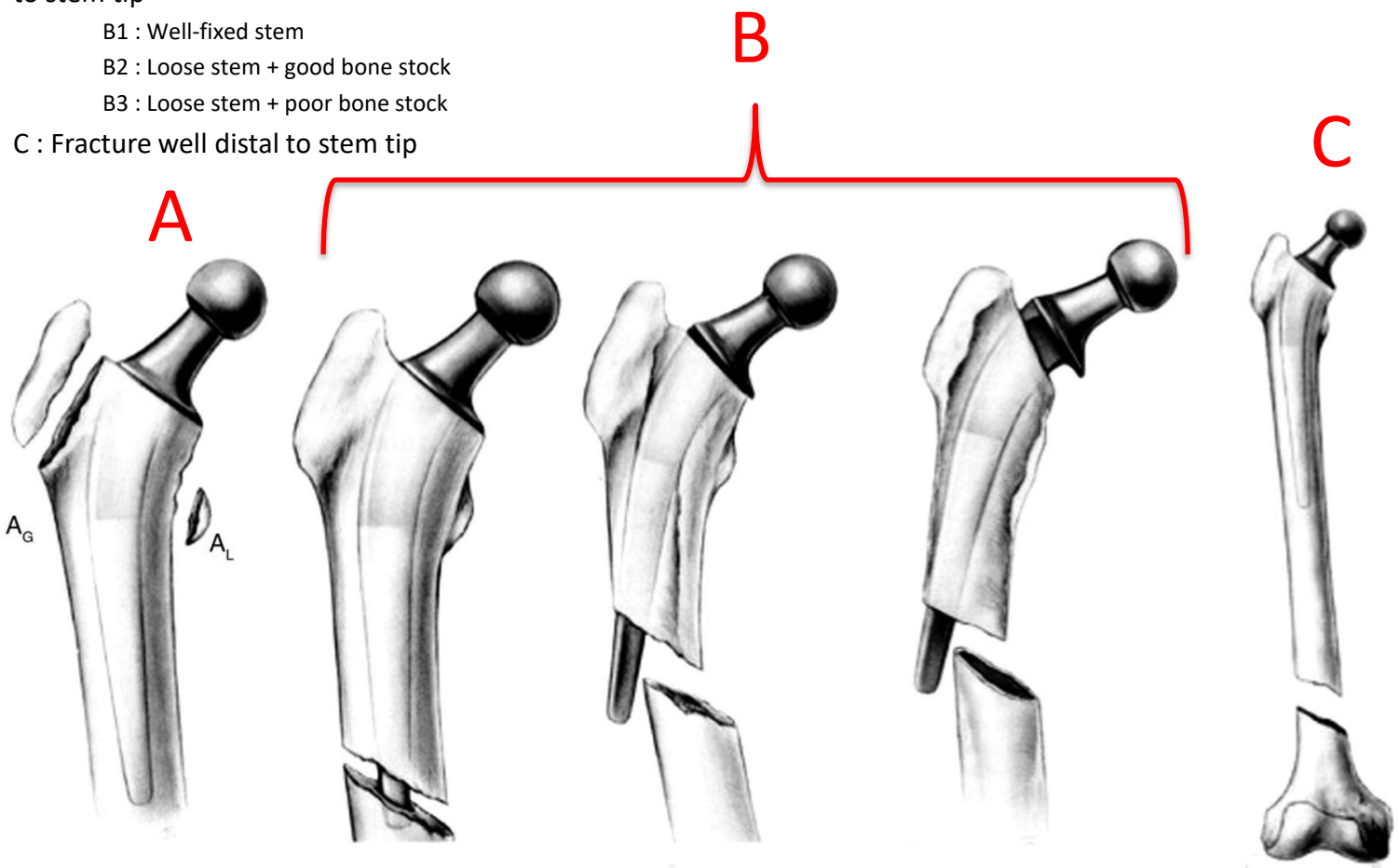
A : Trochanteric fracture

- AG : Greater trochanter
- AL : Lesser trochanter

B : Fracture around stem or just distal to stem tip

- B1 : Well-fixed stem
- B2 : Loose stem + good bone stock
- B3 : Loose stem + poor bone stock

C : Fracture well distal to stem tip



- 73yo F p/w R hip pain, radiographic OA, elects to proceed with THA
- During THA greater trochanter fractures
- Dx: Ag

- Tx
  - Implant Removal
  - Reduction
  - Provisional fixation with clamp/wires
  - Claw plate
  - Implant re-insetion

Treatment: Ag

- Minimal displacement, minimal abductor dysfunction, low demand:
  - Do nothing!
    - TTWB, abduction brace
- Displacement, weakness, instability, higher demand
  - Fix it!
    - If hip unstable, be prepared to address this:
      - Increase head size
      - Increase offset/length
      - Dual mobility construct

Cable/claw plate: soft tissue irritation

Suture/wire: poorer fixation

Treatment: Al

- True Al
  - Do nothing!
    - Protected WB
- Medial calcar fracture/subsidence
  - Revision THA
    - Fluted, modular, taper stem

- 91yo F s/p GLF
- Revision R THA 5years ago
  - Cement mantle unchanged from immediate post-op
- Dx: B1

- Tx:
  - Anatomic reduction
  - Compression with lag screws
  - Neutralization plating:
    - Locking screws in short segment/poor bone
    - Cerclage to resist pull-off
    - Orthogonal plating to allow WBAT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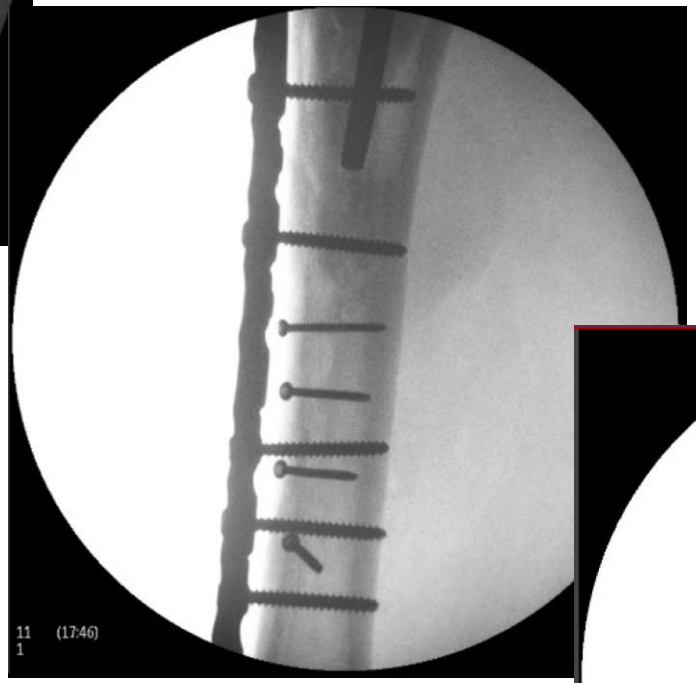
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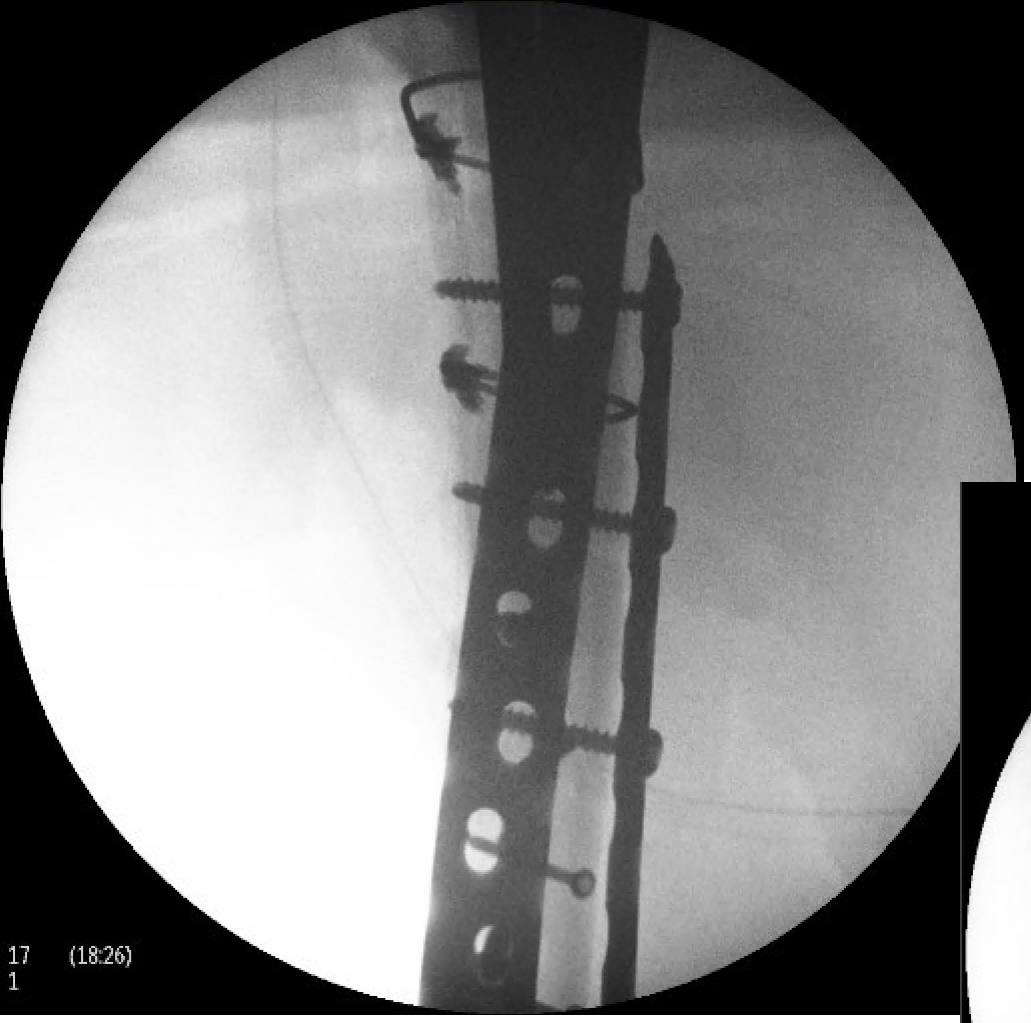
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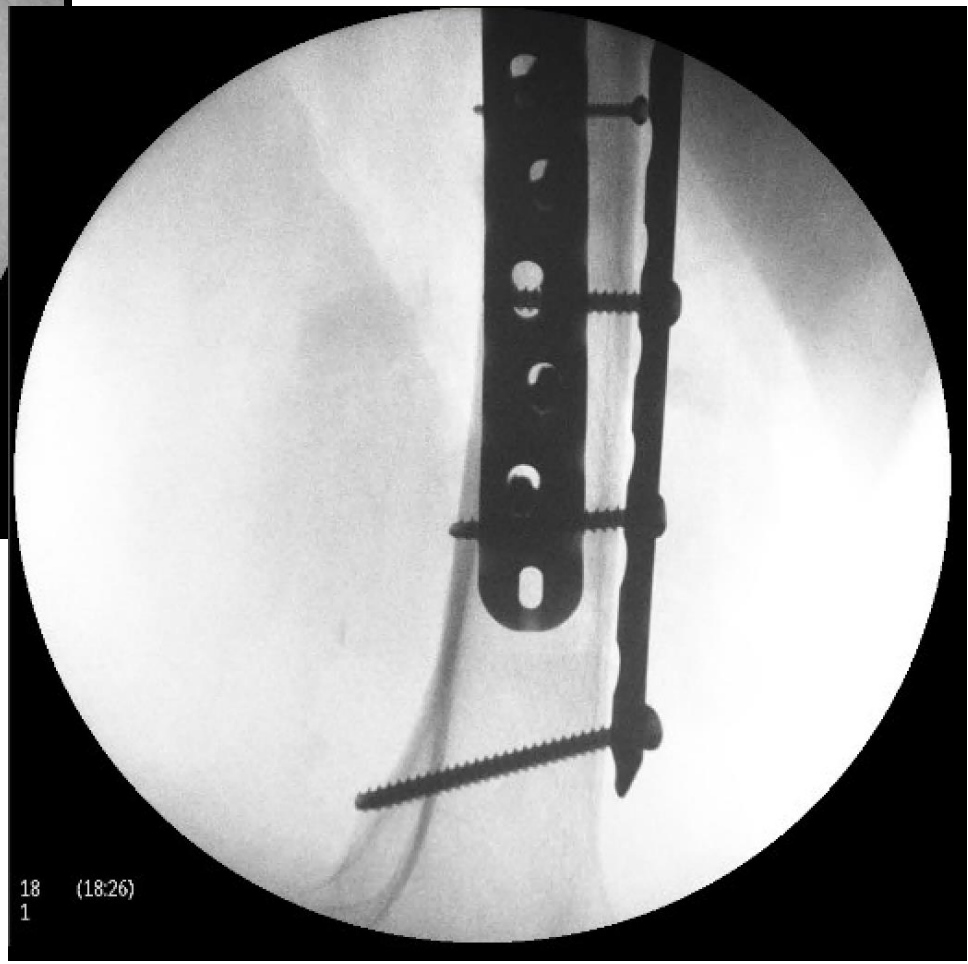
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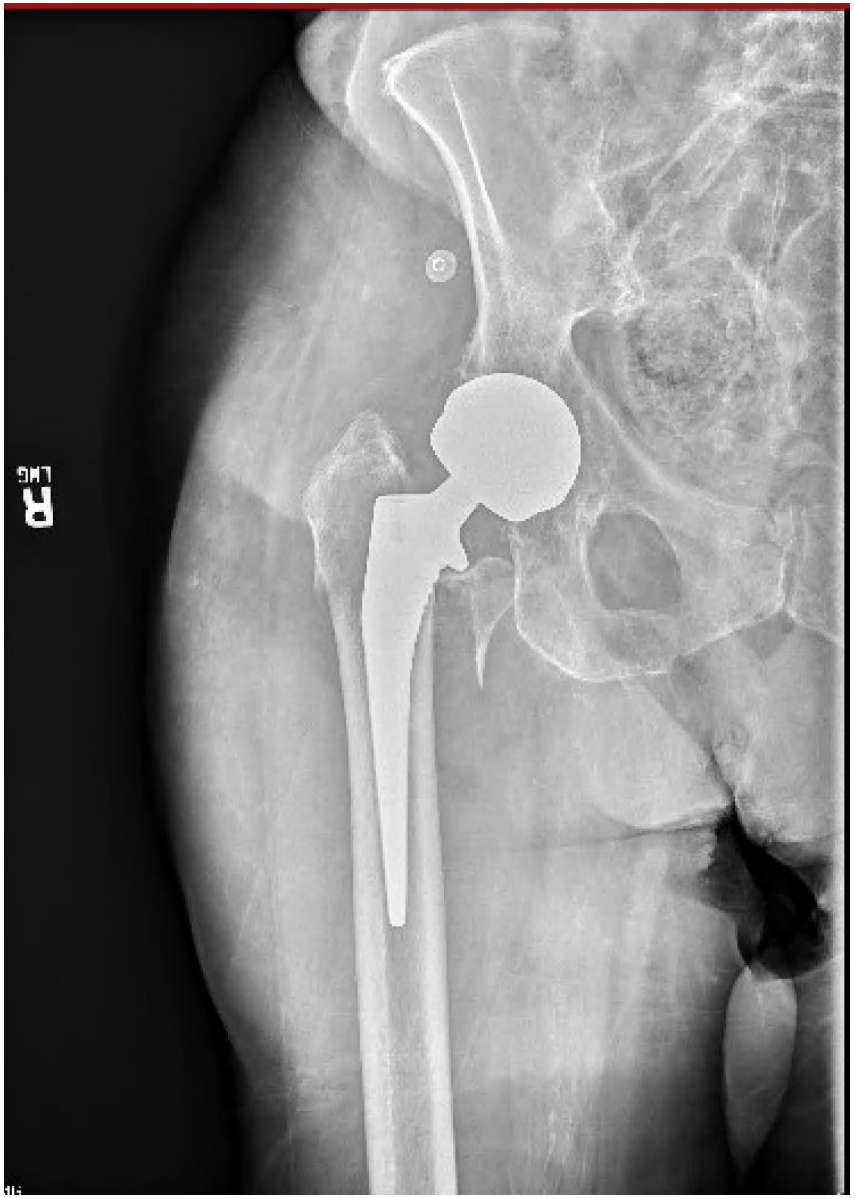
- Tx:
  - Anatomic reduction
  - Compression with lag screws
  - Neutralization plating:
    - Locking screws in short segment/poor bone
    - Cerclage to resist pull-off
    - Orthogonal plating to allow WBAT

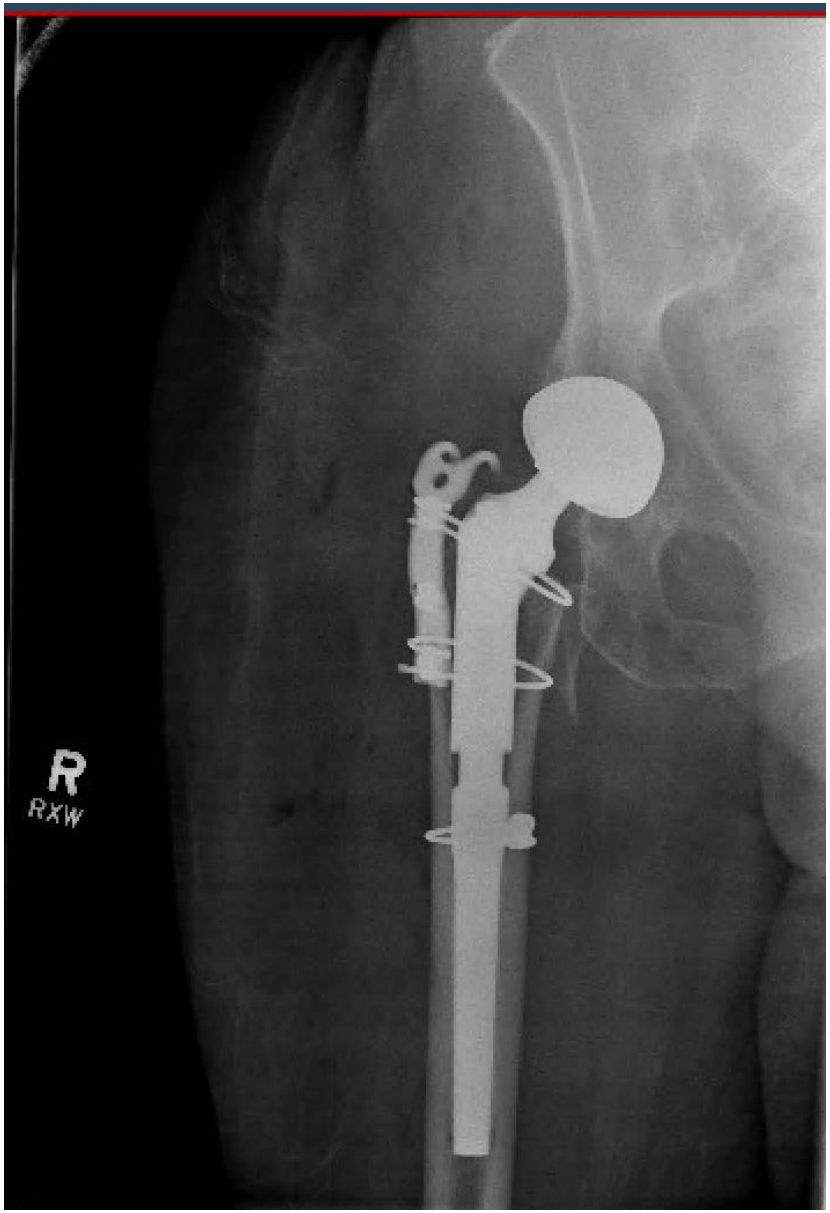
Treatment: B1

- Fix it!
  - Plates/screws
  - Cables
  - Locking screws (polyaxial)

- 86yo F s/p GLF
- Well functioning Metal-on-Metal hip 15 years prior
- Dx: B2



- Tx:
  - Modular diaphyseal engaging stem
  - Prophylactic cerclage wire distal to current fracture
  - Obtaining prior operative report to know inner diameter of current acetabular component
  - Dual mobility head
  - Capture trochanter
  - Was prepared for full revision



Treatment: B2

- Revise it!
  - Remove prior implant
  - Revision stem with distal diaphyseal fixation
  - Proximal fracture fragments assembled around implant and secured with cerclage wires

- 77yo M p/w R hip pain after fall
  - Perthes as a child
  - First THA in 30s
  - Multiple revisions aseptic loosening and instability

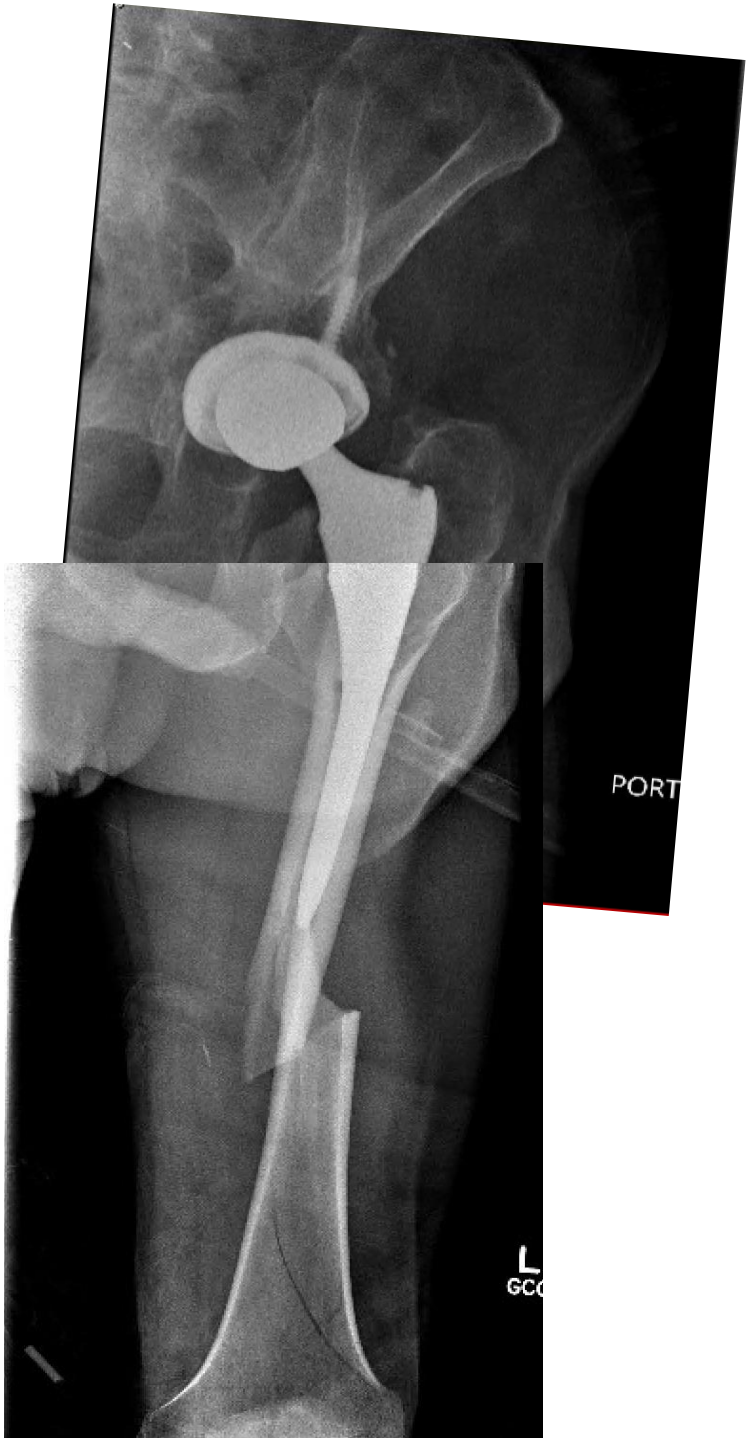
- Dx: B3

- Tx:
  - En Bloc resection of proximal femur
  - Proximal femoral replacement with long cemented stem
  - Constrained liner

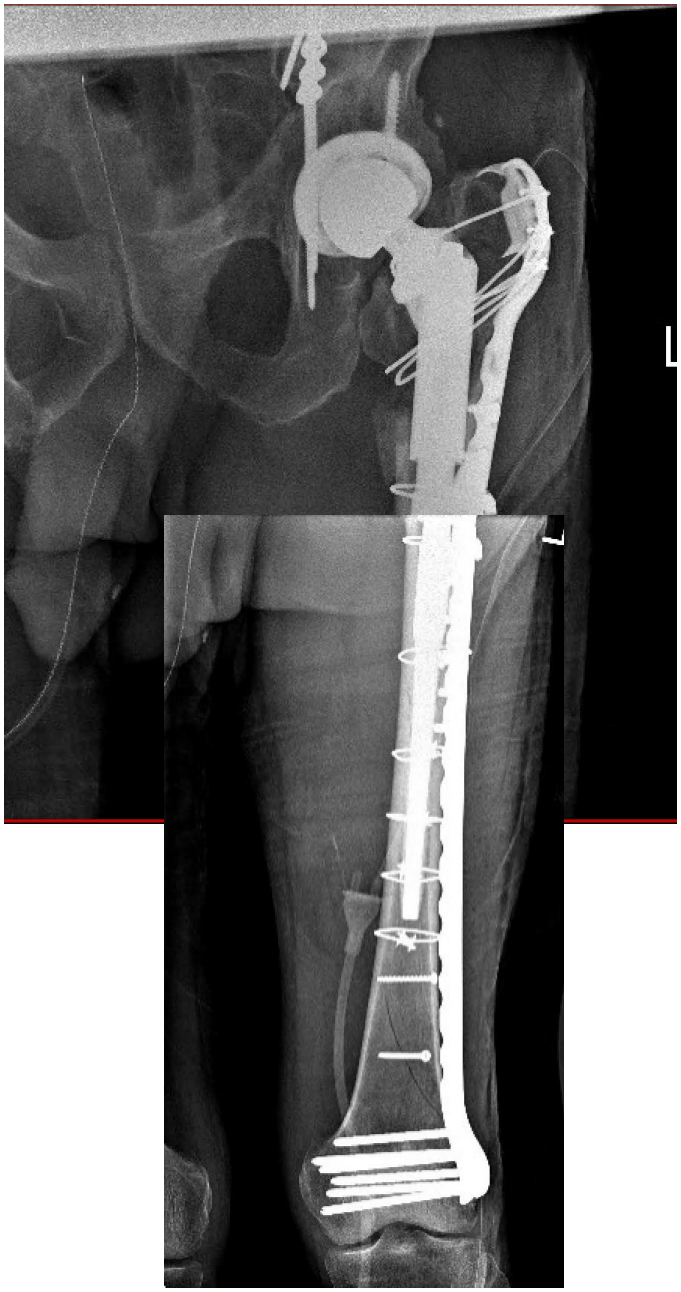
Treatment: B3

- Replace it… implant and bone!
  - Rebuild bone stock:
    - Diaphyseal engaging stem with allograft struts
    - Impaction grafting and long cemented stem
    - Allograft-prosthetic composite
  - Tumor prosthesis
    - Proximal femoral replacement

- 78yo M struck by car
- THA 12 years prior
- Ipsilateral LC2 pelvis fracture
- Dx: B2/C



- Tx:
  - Reduction of distal diaphysis and metaphysis
  - ORIF of C portion
    - Lag screws
    - Cerclage where new stem planned
    - Neutralization plate
  - Revision of B2 portion
    - Modular diaphysel engaging stem
  - Capture trochanter w/ claw plate

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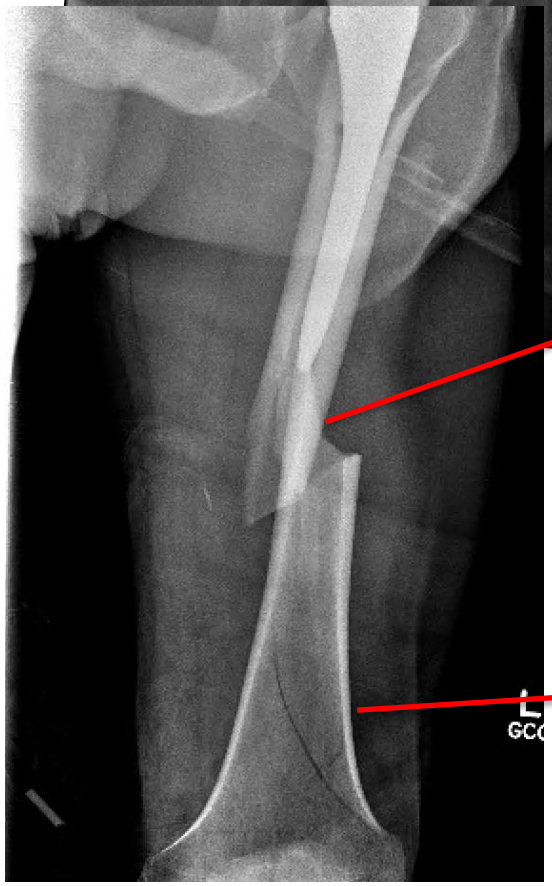


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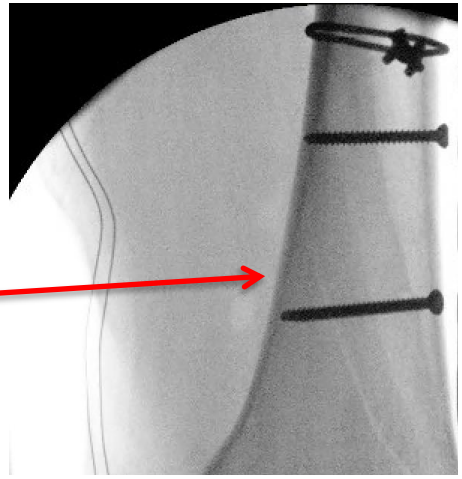

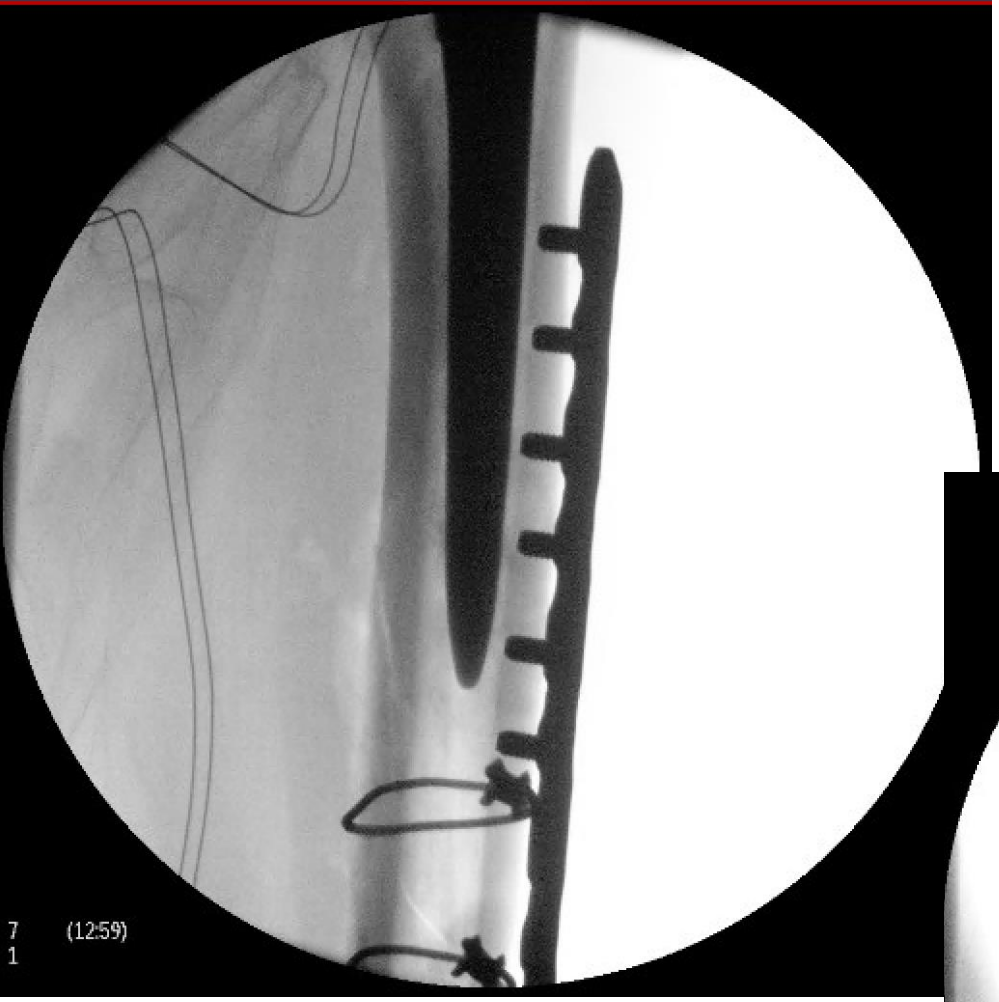
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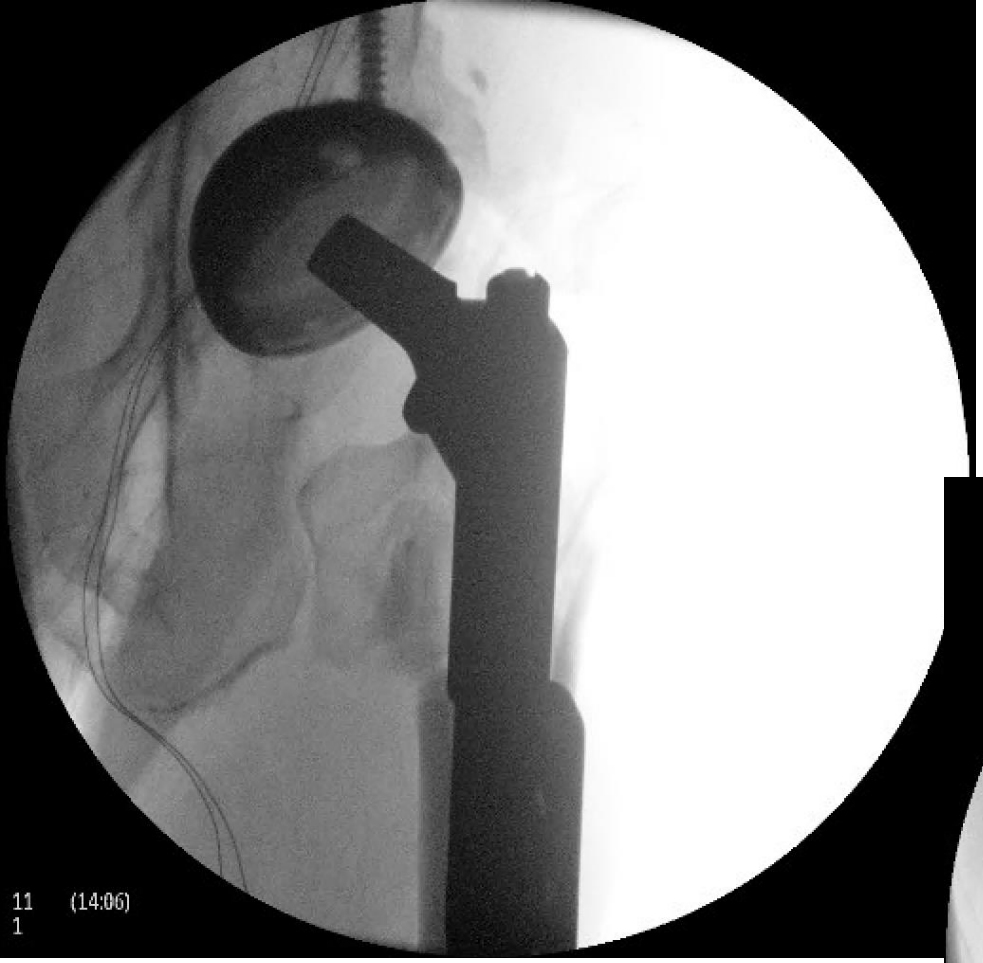
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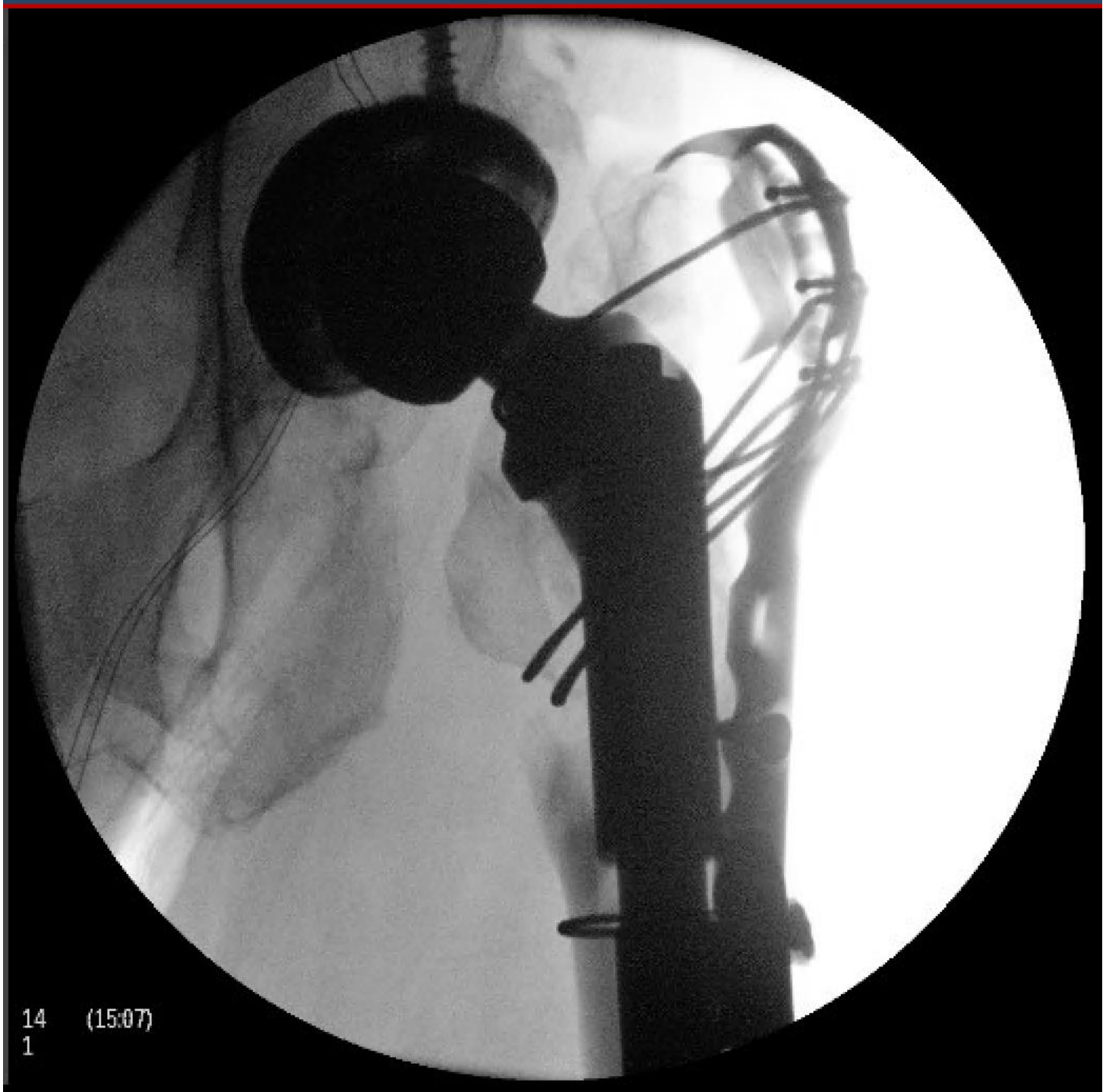
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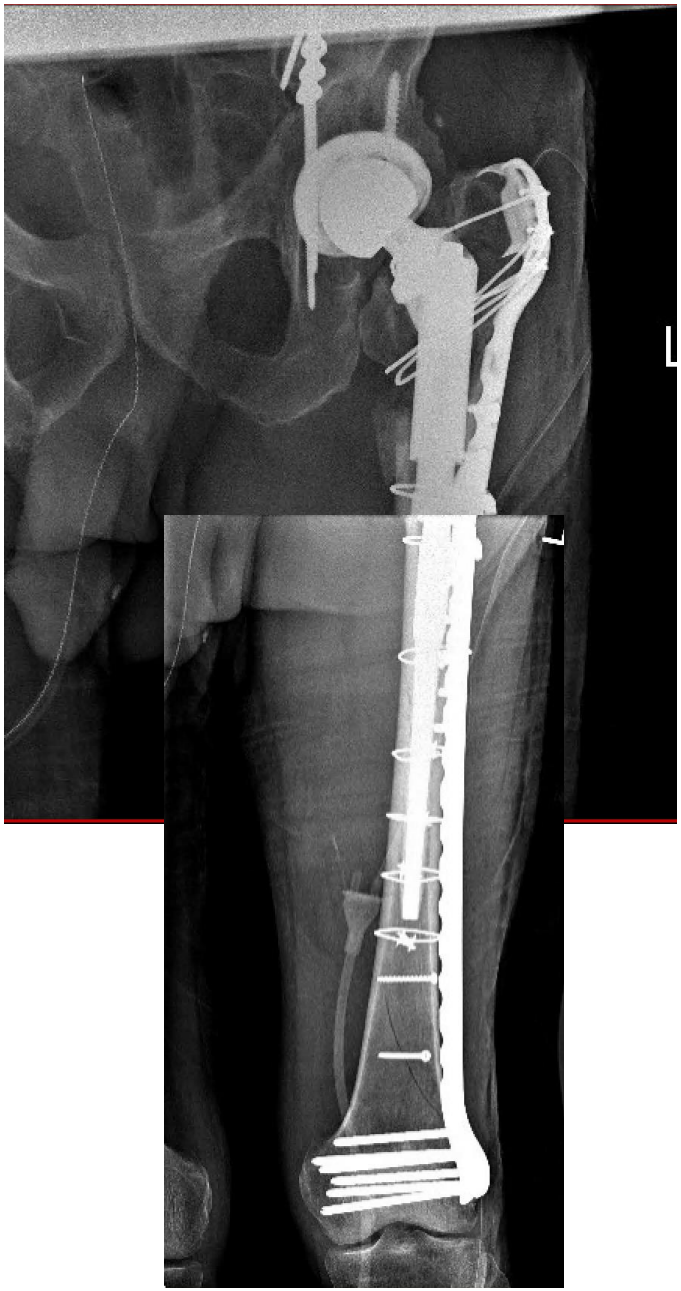
- Keys for this Case:
  - Reconstruction of distal diaphysis and metaphysis
  - Avoiding lag screws in diaphysis where stem planned
  - Stem engagement in reconstructed diaphysis
  - Capture trochanter
  - Careful stability assessment
    - Length/offset/version



Treatment: C

- Fix it!
  - Plat/screws
  - Cables
  - Locking screws
  - Take advantage of shaft fixation below prior implant