Management of Proximal Femoral Periprosthetic Fractures

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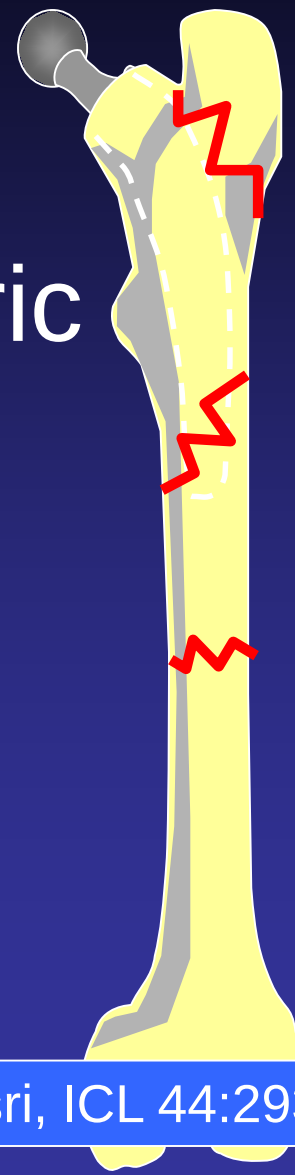
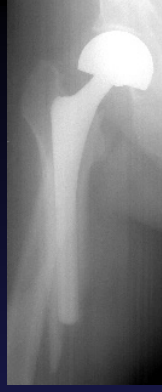
Classification

- Type A 4% Trochanteric
- Type B 87% Tip
- Type C 9% Below tip



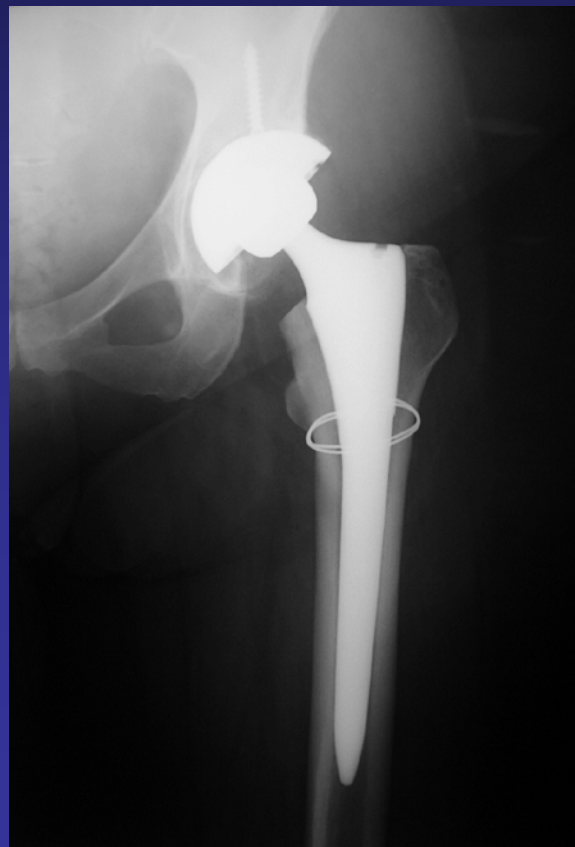


Duncan & Masri, ICL 44:293, 1995

Vancouver Classification

- Based on fracture site, implant stability, and remaining bone stock

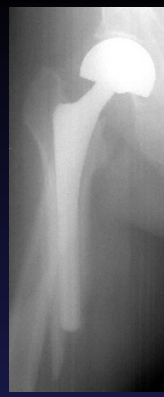
- **Type A (AG or AL)**
- **Type B1**
- **Type B2**
- **Type B3**
- **Type C**



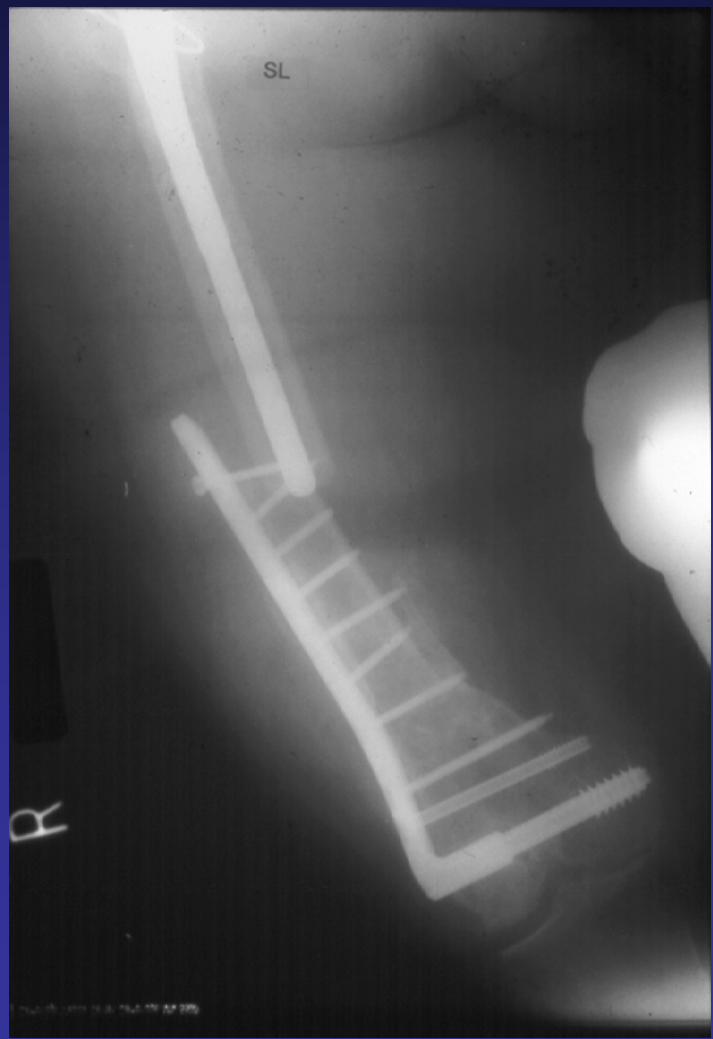
Type B (87%)

- About or just distal to stem.
  - **B1: implant stable (18%)**
  - **B2: implant loose (45%)**
  - **B3: implant loose and bone stock inadequate (37%).**

Periprosthetic Hip Fractures



- Risk factors
  - Transition zone
  - Osteoporosis
  - Rheumatoid arthritis
  - Cortical perforation
  - Preop femoral deformity
  - Revision
  - Osteolysis
  - Stem loosening



Bhattacharyya et al. *JBJS 2007* Mortality After Periprosthetic Fracture of the Femur.

- One yr Mortality rates:
  - 12/106 (11%) periprosthetic patients
  - 51/309 (16.5%) hip fracture patients
  - 9/311 (2.9%) total joint

- Delay of >2 days associated with increase mortality rate at one year

Bhattacharyya et al. *JBJS 2007* **Mortality After Periprosthetic Fracture of the Femur**

- Mortality rate for Vancouver B subclass
  - 6/49 (12%) who underwent revision arthroplasty
  - 8/24 (33%) who underwent ORIF

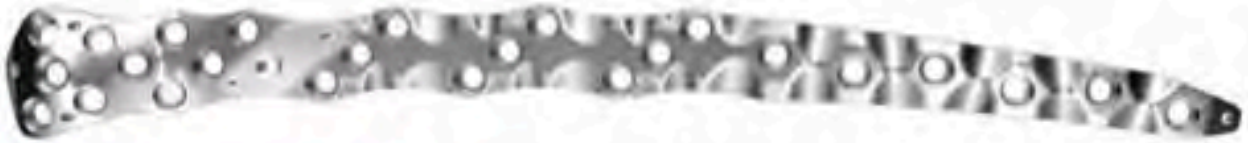
Methods of Fixation

- Non-locking plate
- Hybrid plate
- Locking plate
- Cable plate
- Strut grafts

What is optimal fixation?

NCB Periprosthetic Proximal Femur Plate

NCB Periprosthetic Trochanter Plate assembled with *NCB* Periprosthetic Proximal Femur Plate (short)

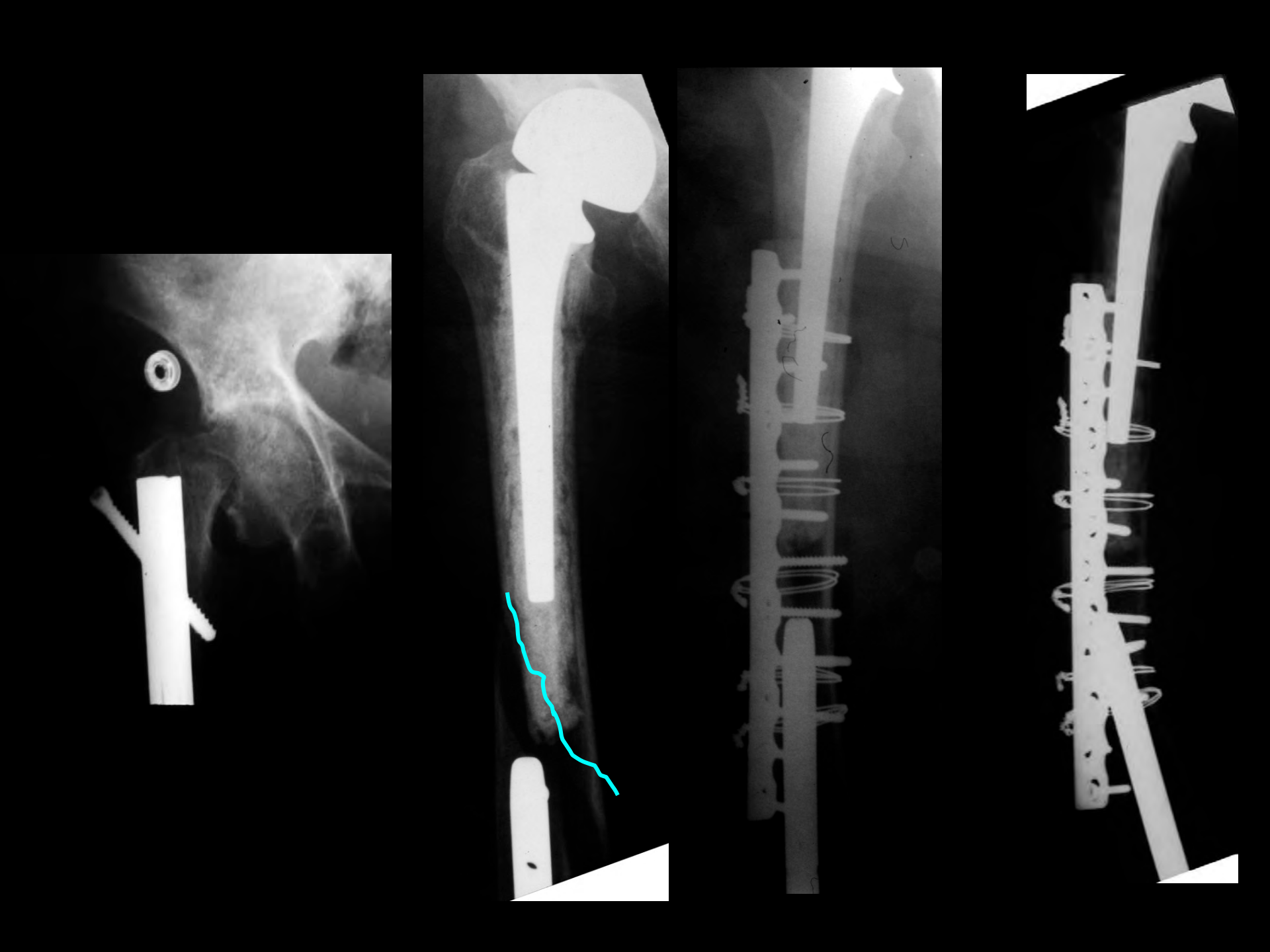


NCB Periprosthetic Distal Femur Plate

NCB Curved Femur Shaft Plate

NCB 30° Cone Polyaxiality

Angular stability with the *NCB* Locking Caps



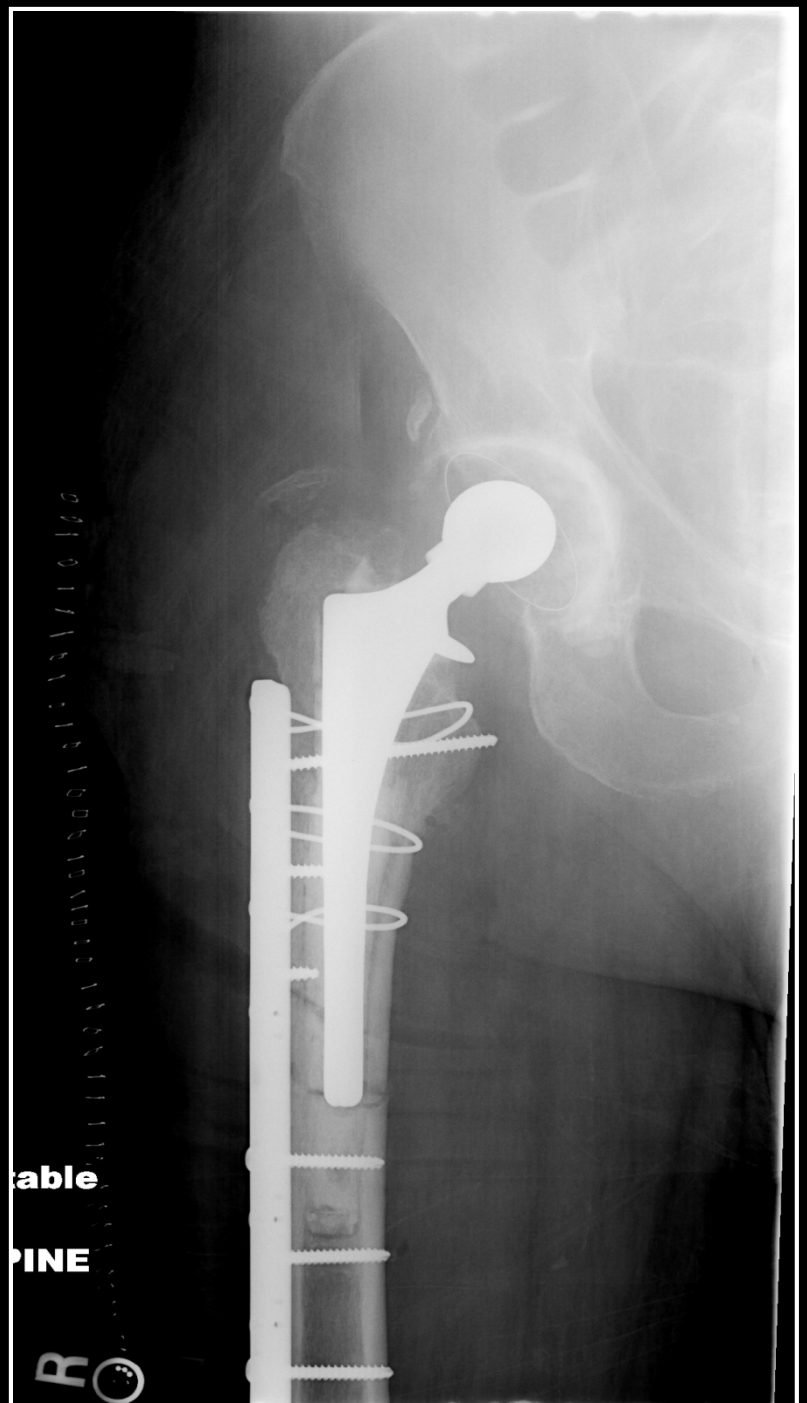

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table
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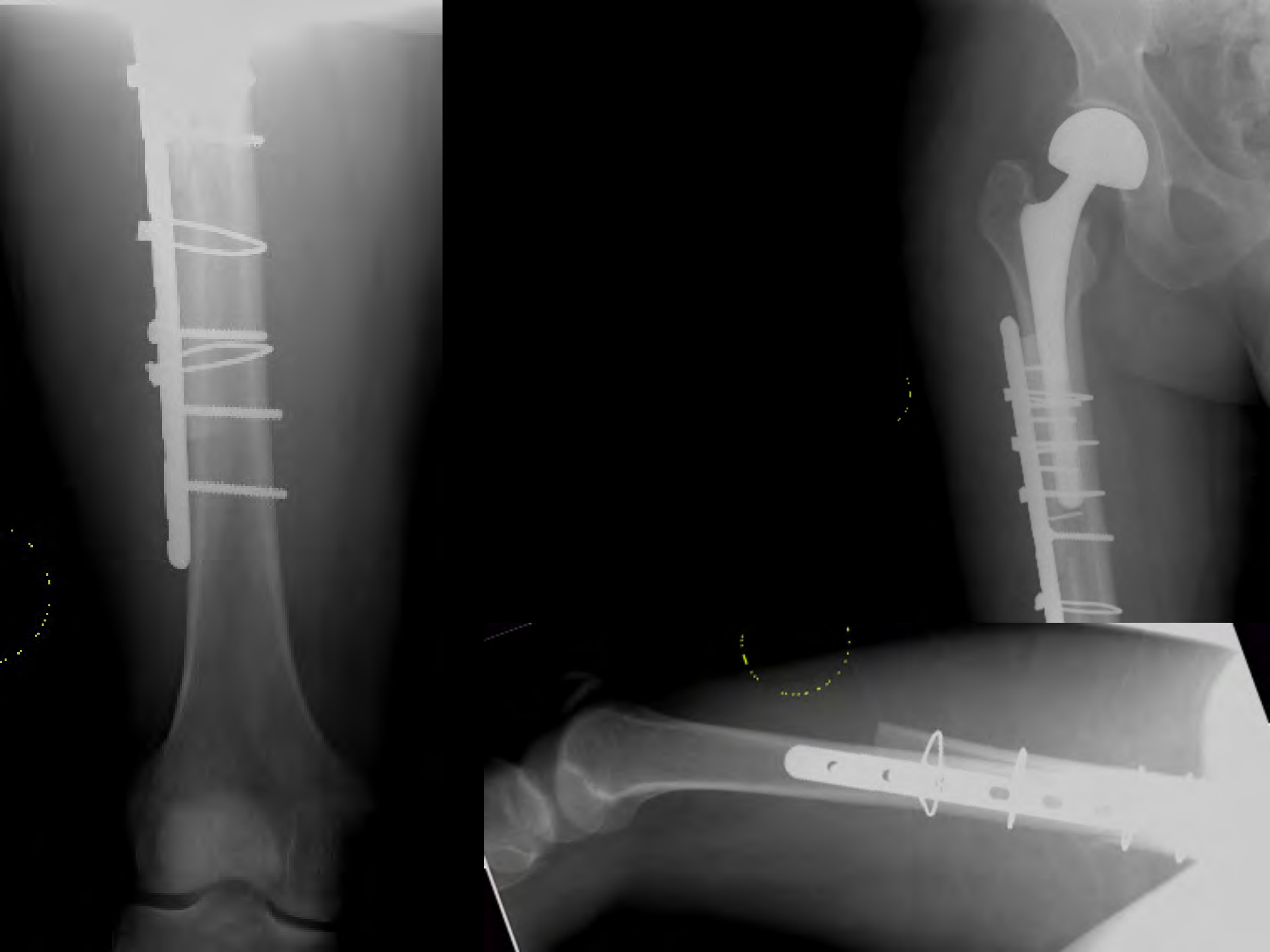

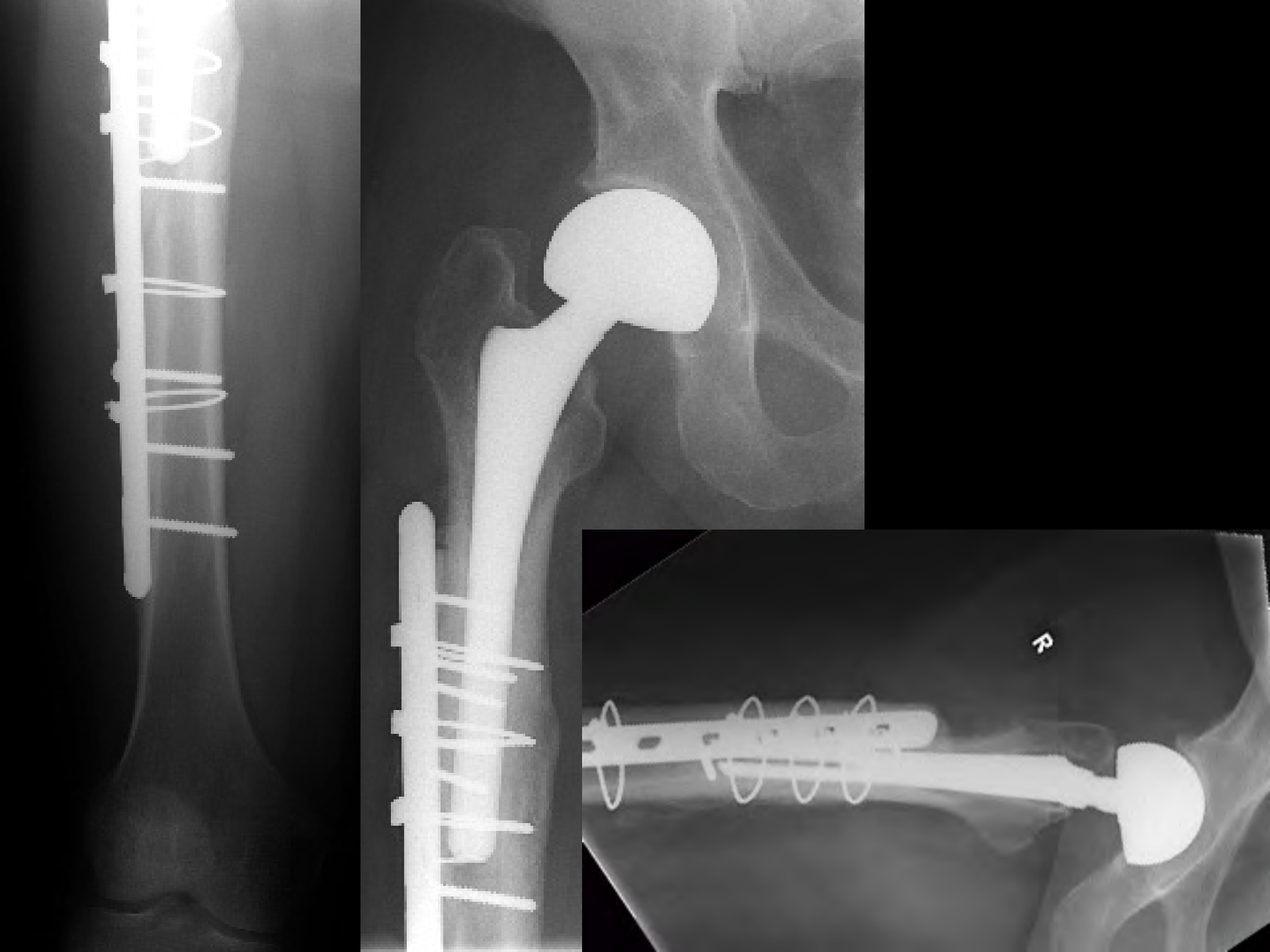
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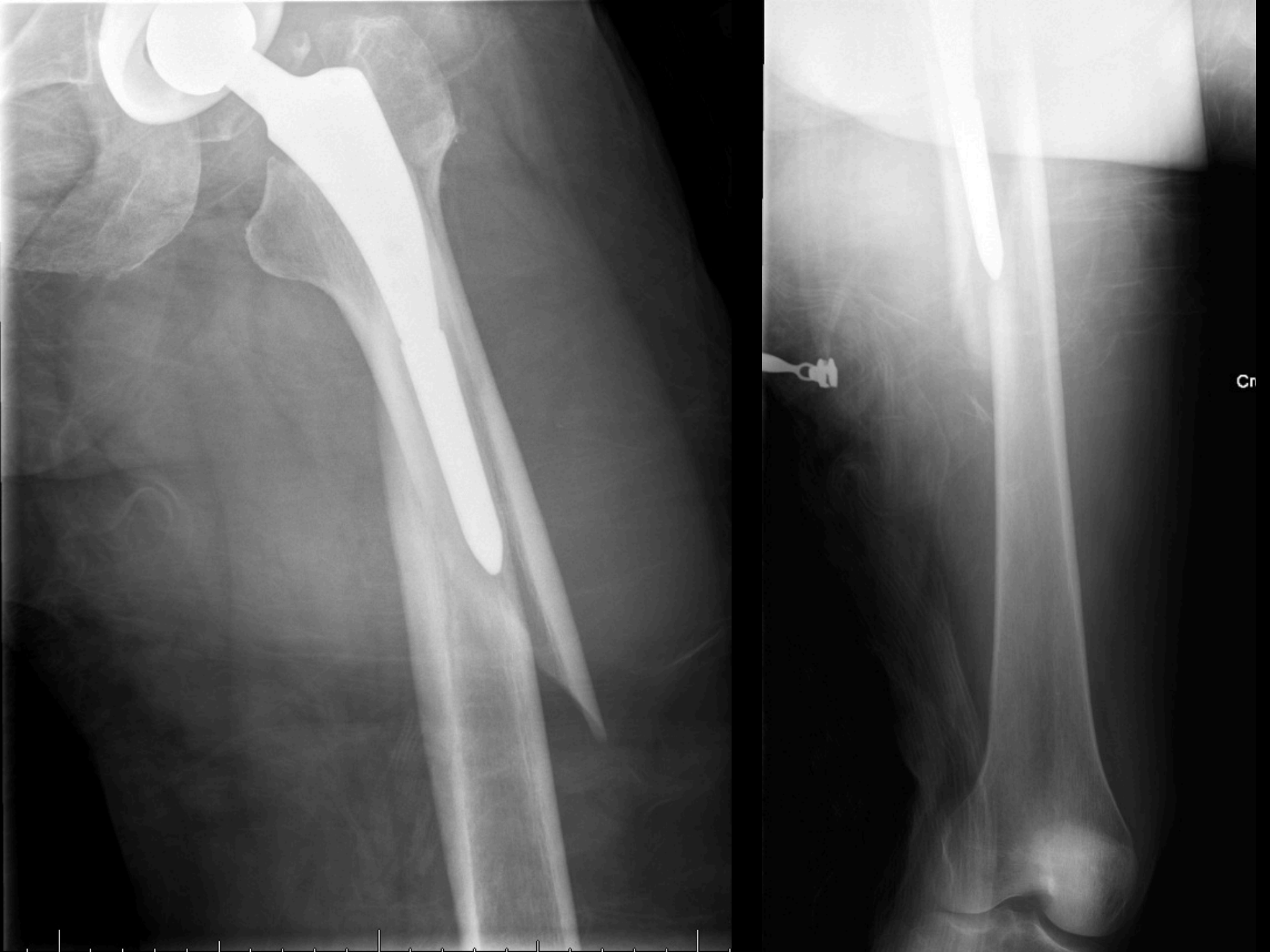



(18:11)


(17:50)


(18:12)



Cross Table
R
PN


Cross Table
R
PN

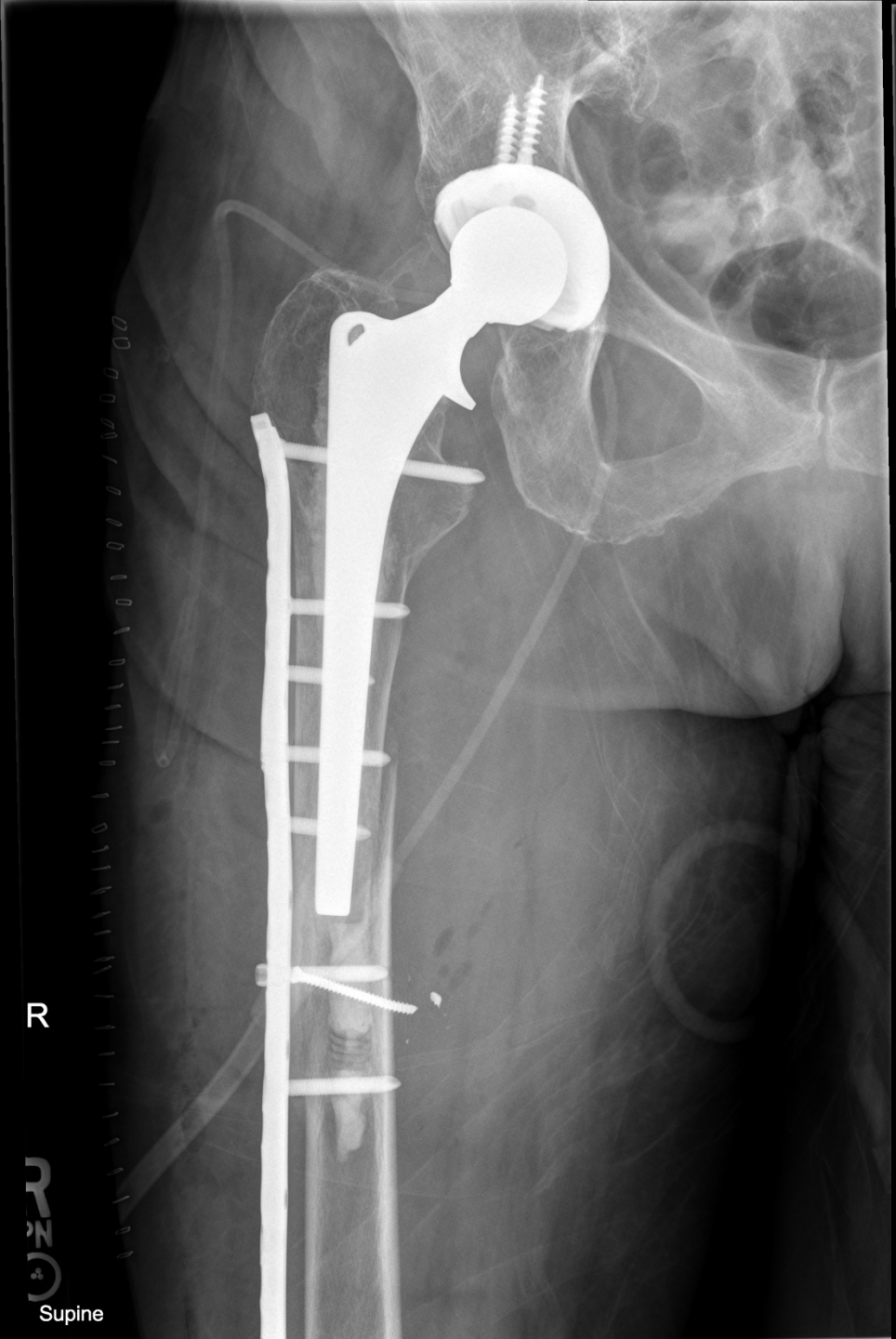

RIGHT


R
Portable


R
ss Table
ortable


STAB
Portable


STAB
Portable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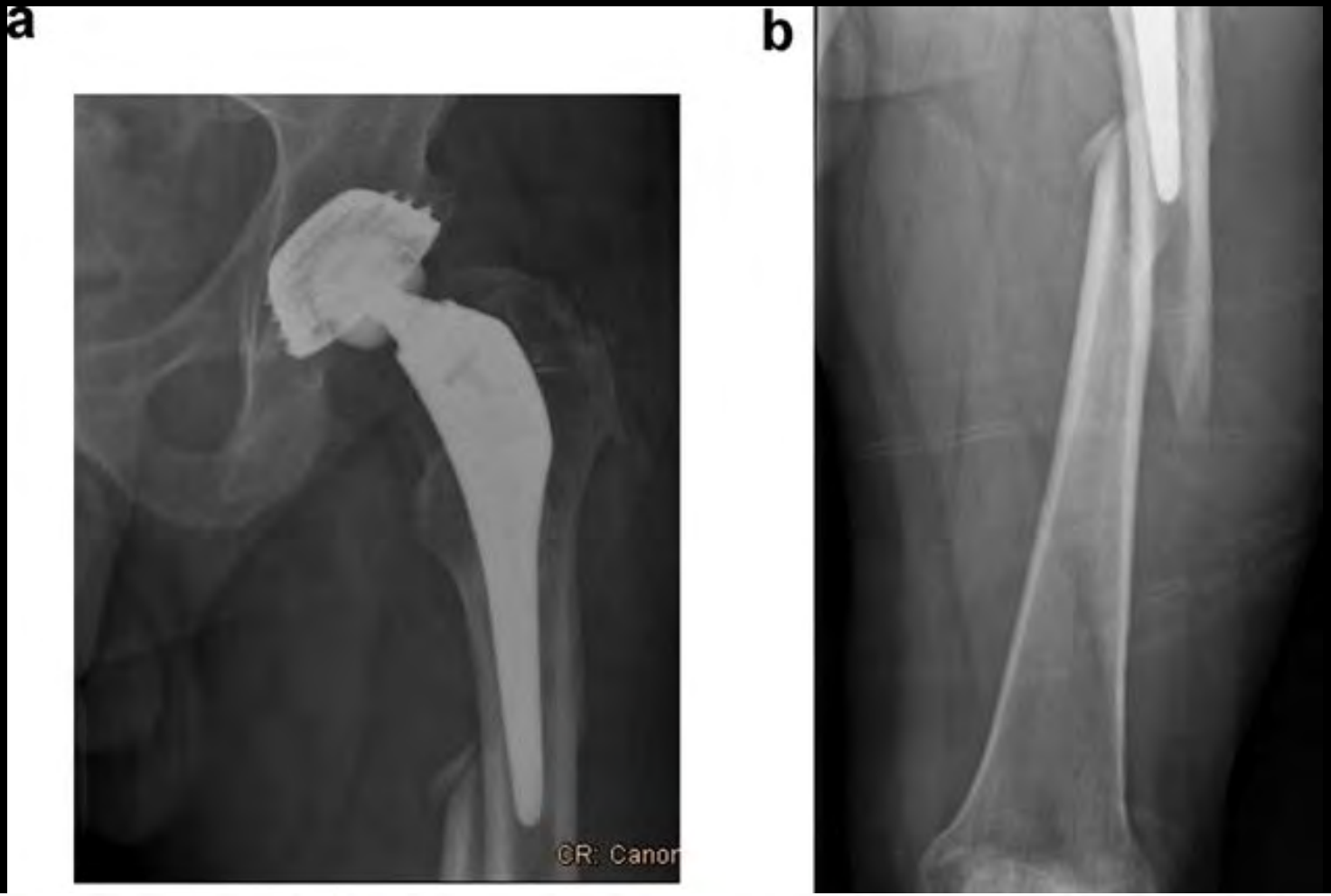
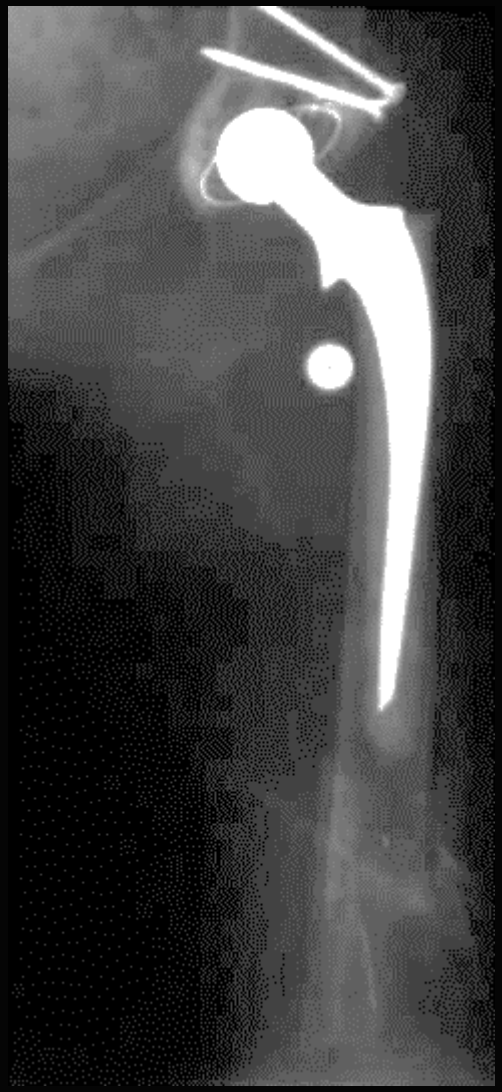
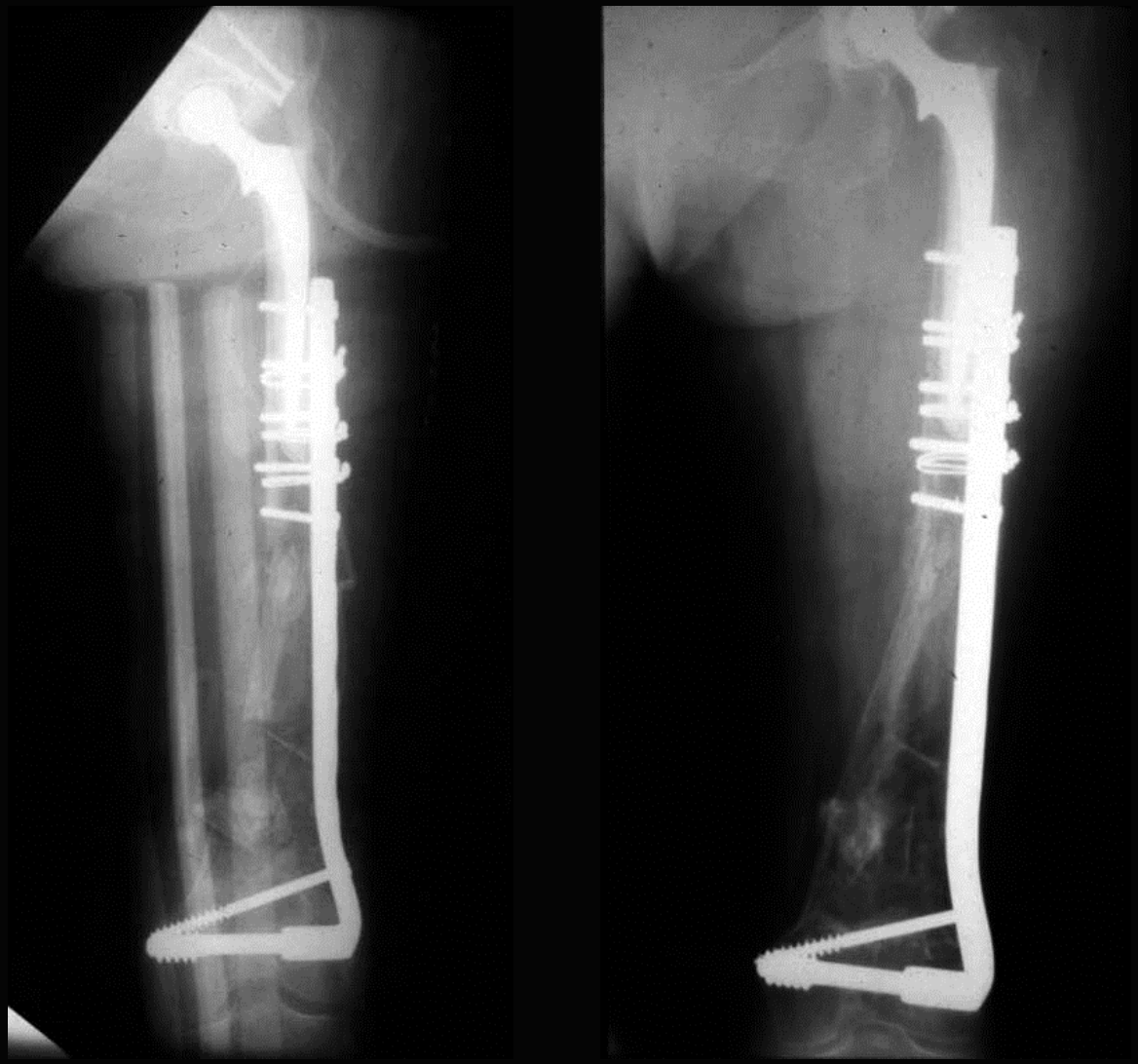
MIS Plating



S. Ruchholtz et al./Injury, Int. J. Care Injured 44 (2013) 239–248





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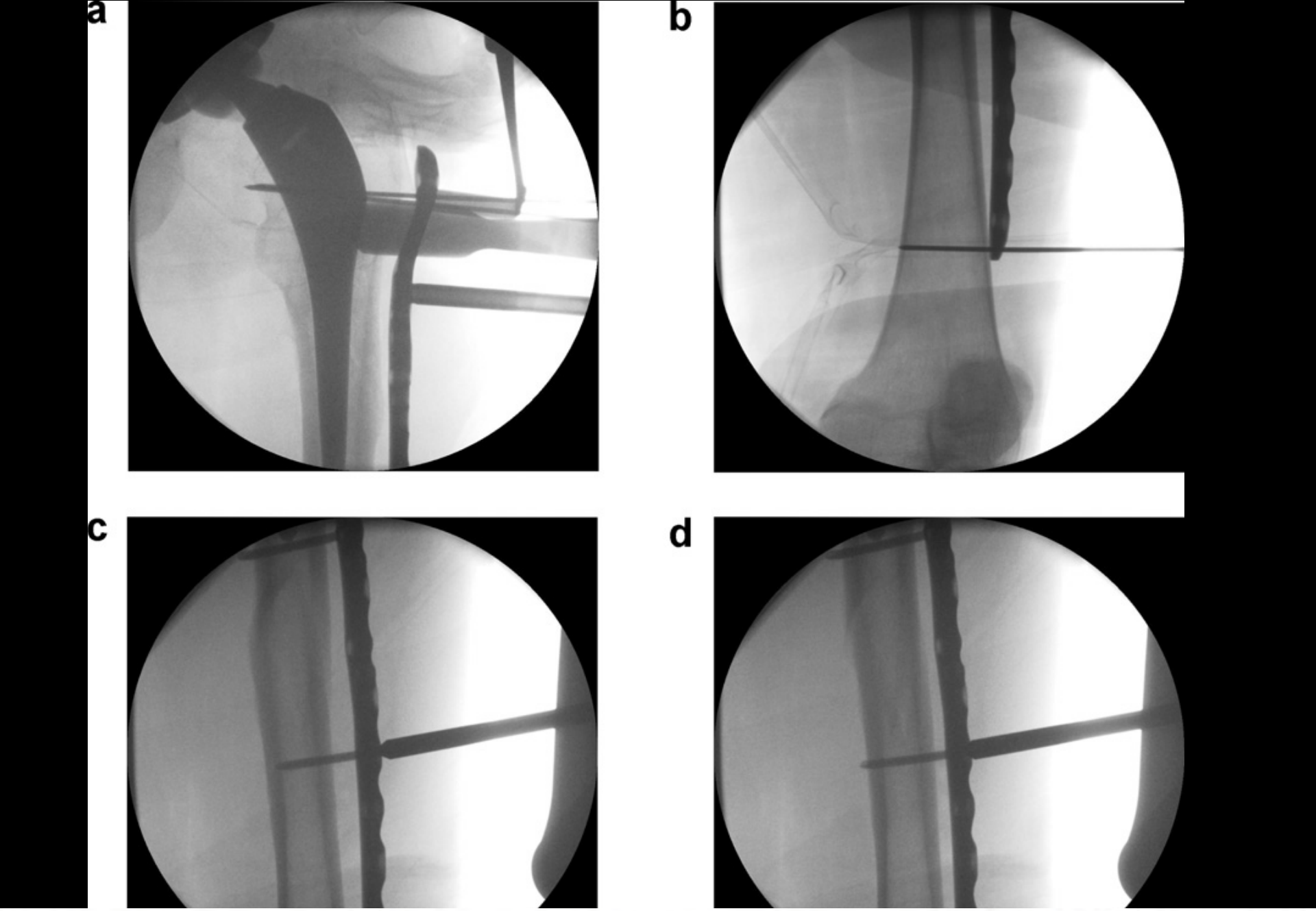

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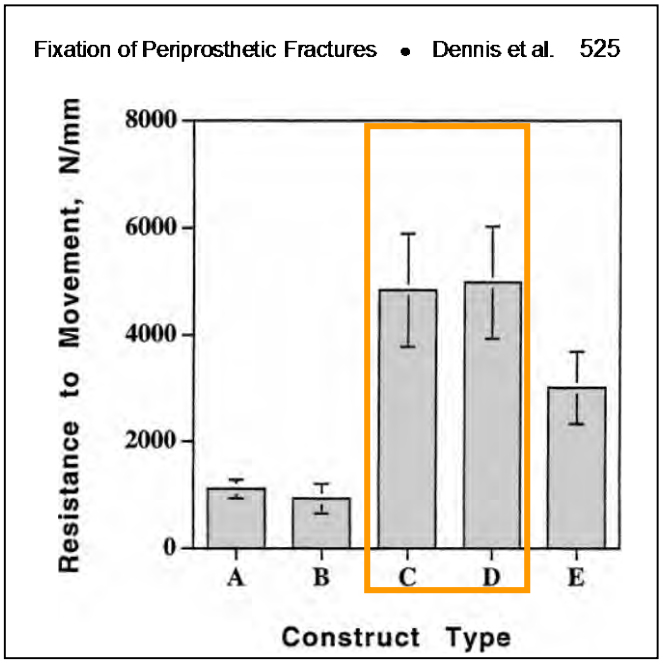
The Journal of Arthroplasty Vol. 15 No. 4 2000

Fixation of Periprosthetic Femoral Shaft Fractures Occurring at the Tip of the Stem

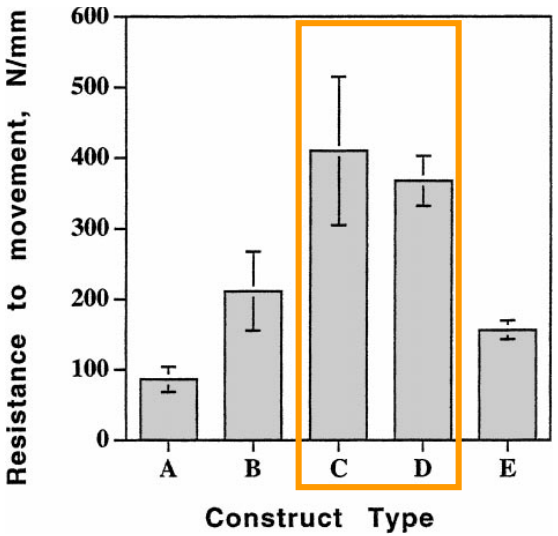
A Biomechanical Study of 5 Techniques

Michael G. Dennis, MD, Jordan A. Simon, MD, Frederick J. Kummer, PhD, Kenneth J. Koval, MD, and Paul E. DiCesare, MD

Abstract: This study evaluated 5 currently used periprosthetic femoral shaft fracture fixation techniques to determine which technique provided the greatest fixation stability. Periprosthetic fractures in 30 synthetic femurs were fixed with a plate with cables, plate with proximal cables and distal bicortical screws (Ogden concept), plate with proximal unicortical screws and distal bicortical screws, plate with proximal unicortical screws and cables and distal bicortical screws, or 2 allograft cortical strut grafts with cables. These specimens were then tested in 3 physiologic loading modes. The plate constructs with proximal unicortical screws and distal bicortical screws or with proximal unicortical screws, proximal cables, and distal bicortical screws were significantly more stable in axial compression, lateral bending, and torsional loading than the other fixation constructs studied. **Key words:** periprosthetic, femur fracture, cables, cerclage.

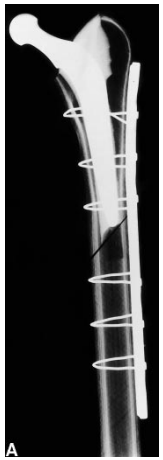


Axial Loading



Lateral Bending

Torsion



ut grafts with cables.

Clinical Biomechanics 26 (2011) 13–22

Contents lists available at ScienceDirect

Clinical Biomechanics

journal homepage: www.elsevier.com/locate/clinbiomech

Periprosthetic fracture fixation of the femur following total hip arthroplasty: A review of biomechanical testing

Mehran Moazen [a,*], Alison C. Jones [a], Zhongmin Jin [a], Ruth K. Wilcox [a], Eleftherios Tsiridis [b,c]

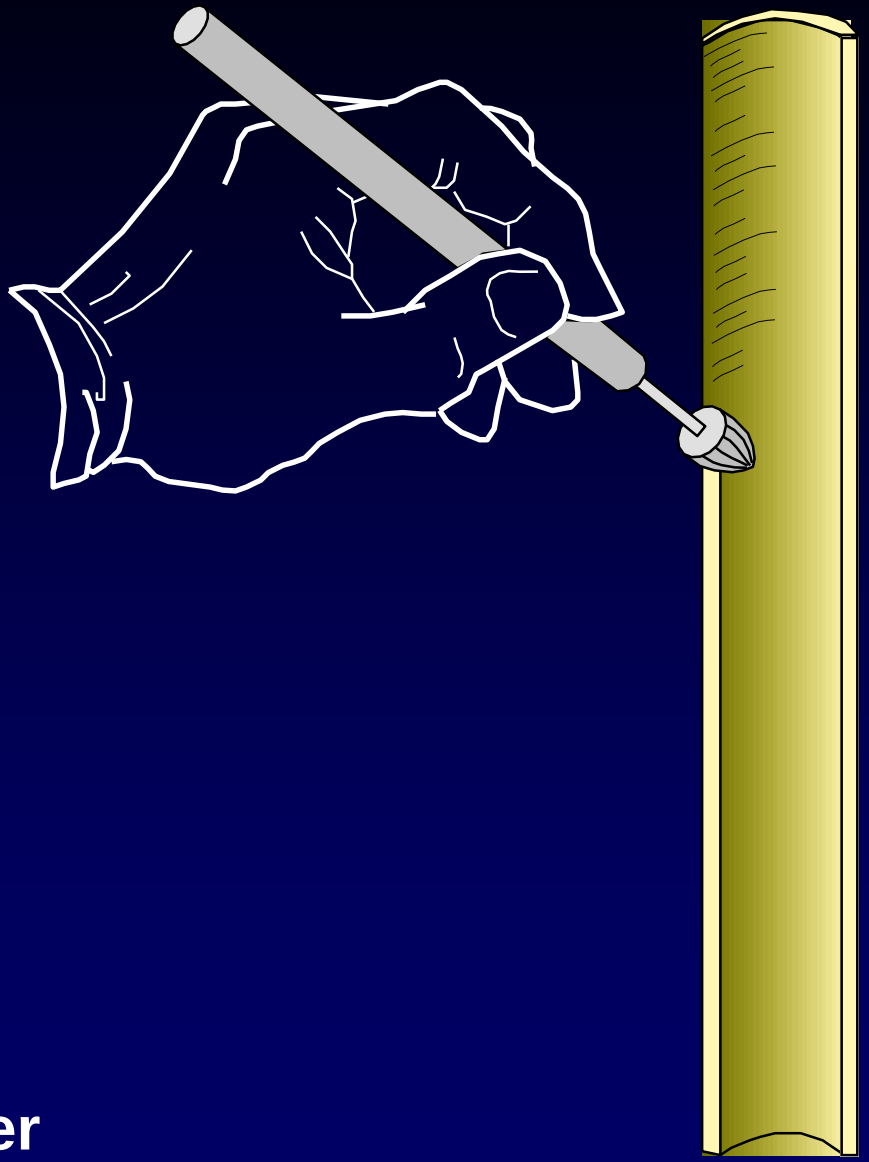
[a] *Institute of Medical and Biological Engineering, School of Mechanical Engineering, University of Leeds, Woodhouse Lane, Leeds, LS2 9JT, UK*
[b] *Academic Department of Orthopaedic and Trauma, Section of Musculoskeletal Disease, Institute of Molecular Medicine, School of Medicine, University of Leeds, Woodhouse Lane, Leeds, LS2 9JT, UK*
[c] *Department of Surgery and Cancer, Division of Surgery, Imperial College London, B-block Hammersmith Hospital, Du-Cane Road, London, W12 0HS, UK*

Conclusions hampered by lack of standardization in testing procedures and measurements.

Areas needing more research:

strut grafts: length vs fit, ideal location

relative benefits of locking vs. non-locking plates



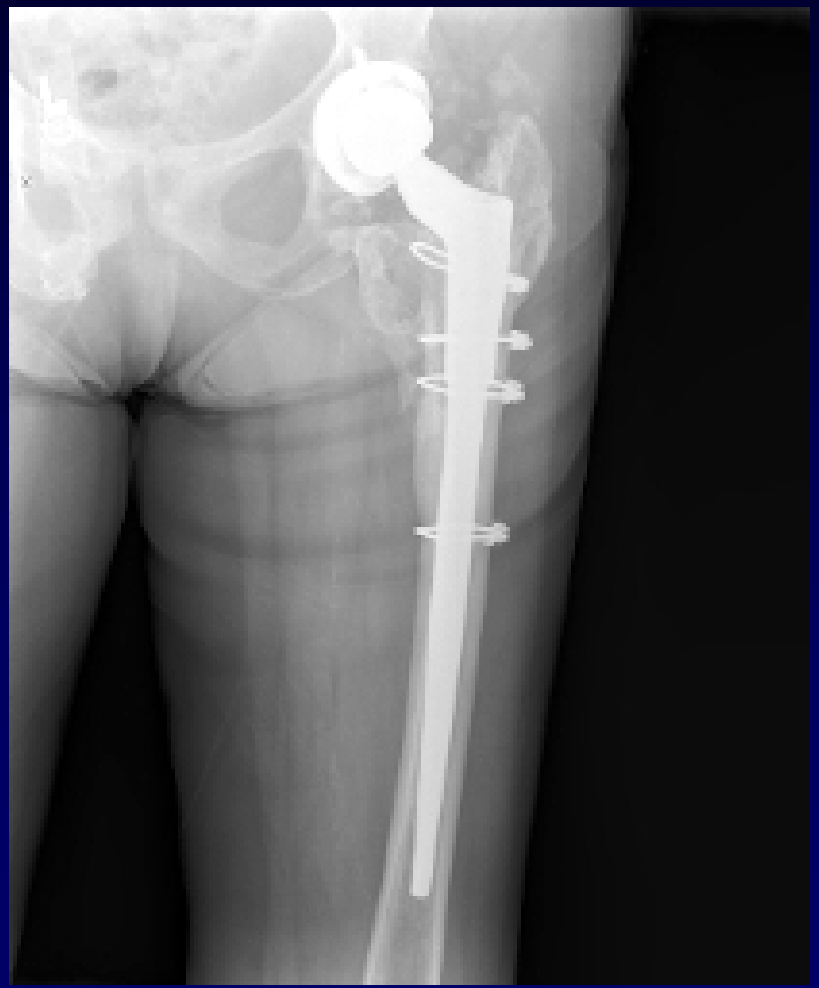
Chandler

WELL FIXED PROSTHESIS

Maintain components

LOOSE PROSTHESIS

Revise components



PERIPROSTHETIC FRACTURE

Avoid:

- Stress Risers
- Transition Zones
- Hoop Stresses
- Excessive Force

Summary

- Challenging fractures to treat
- Patients are usually elderly with multiple medical comorbidities
- Prevention is key
- Surgeon should know exact pattern of fracture, prosthesis stability, and bone quality

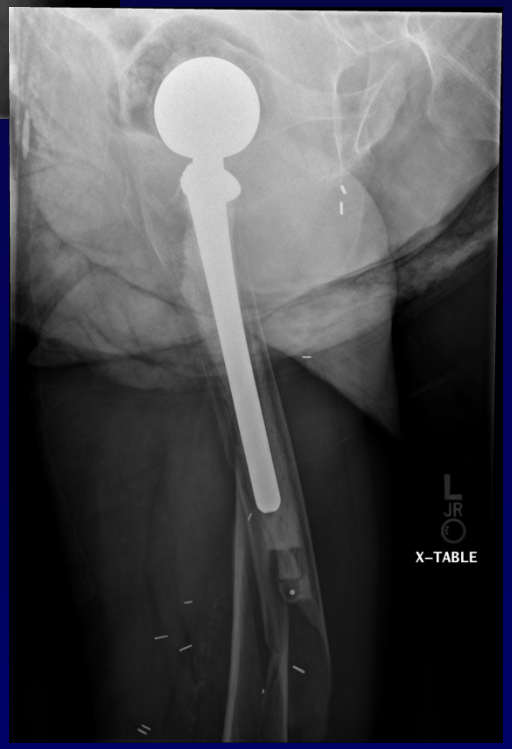
Duncan C; Masri B. Inst Course Lect 44:293-304, 1995.

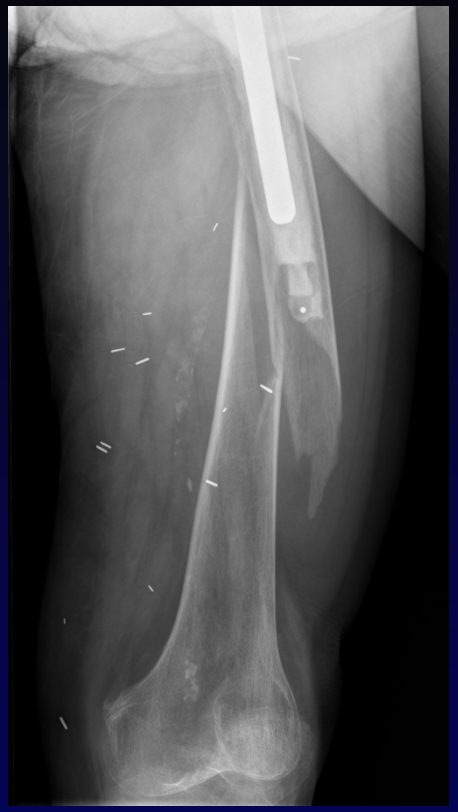
Lee S, Bostrom M. Instr Course Lect 2004;53:111-118


Thank You

78yo fell while walking dog

What to do?



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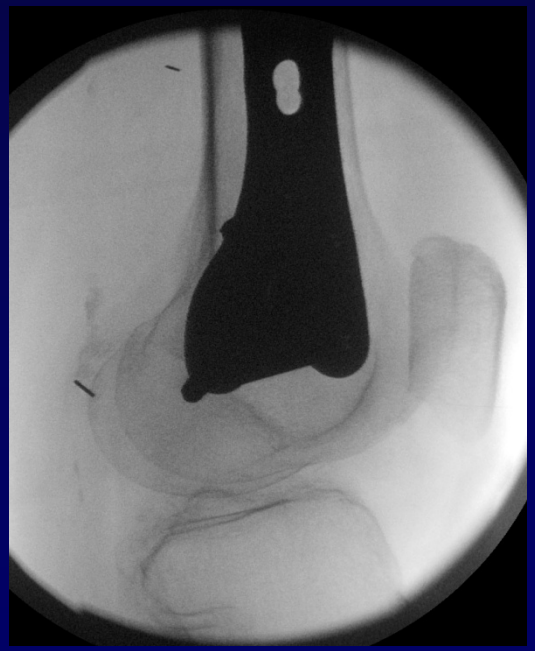

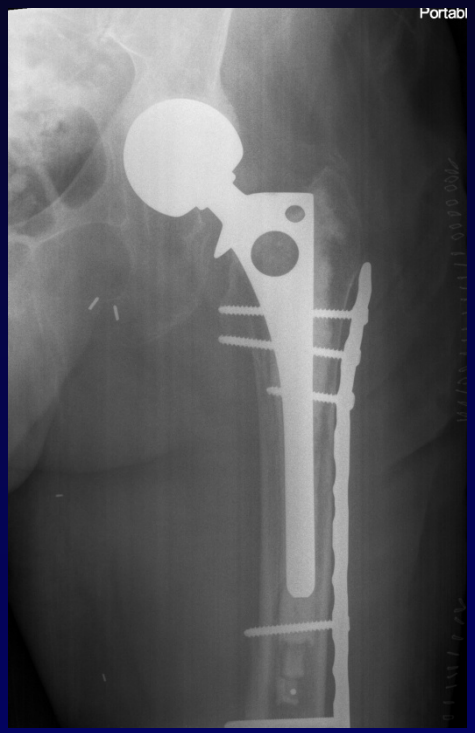
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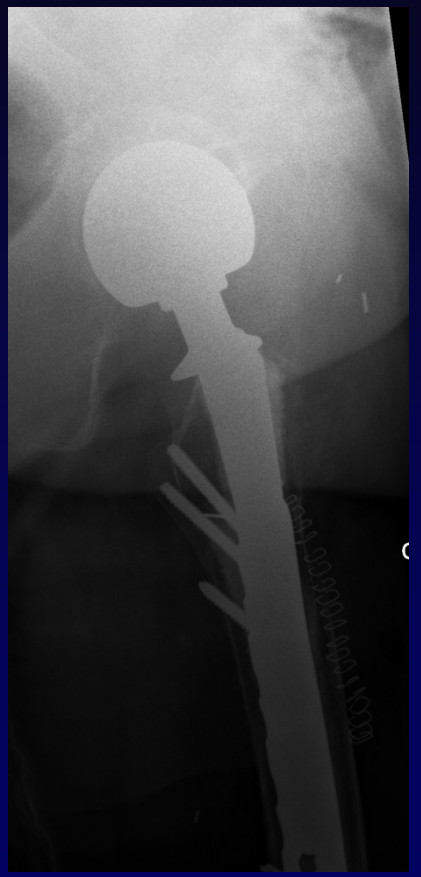

67yo with previous ORIF and THA. No history of pain prior to fall after slipping on ice

What to do?