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Acetabular Fractures and THA: Primary vs. Staged Approach

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Summary

- Consider 1º THA – Femoral head damage, dome impaction, stable fixation of acetabular fractue, ?severe osteoporosis- not a staged approach
- ORIF is still the gold standard even in the elderly

Summary

- PREVENTION
- 2º THA – know the anatomy (sciatic nerve), remove HO, culture, remove hardware as needed, bone defects (CT)
- Staged Approach- elevated wbc, esr or crp or positive alpha defensin or positive aspiration, wbc/hpf>5
- Results of either 1º or 2º THA not as good as those without an acetabulum fracture

JM

- 70 yo rancher
- MVA
- Anterior column/anterior wall posterior hemitransverse acetabular fracture with dome impaction
- Anterior glenoid fracture ORIF

Who is Elderly?

- Increasing incidence
  - Prevalence arthroplasty
  - "Graying of America"
  - Increased lifespan
  - Triathlons, Ultramarathons

Indications for ORIF

- Displaced acetabular fractures (roof arc <45°, <10mm dome)
  - –> 1 mm
  - –subluxation
- Lack of secondary congruence in both columns
- 20 - 40% posterior wall displacement

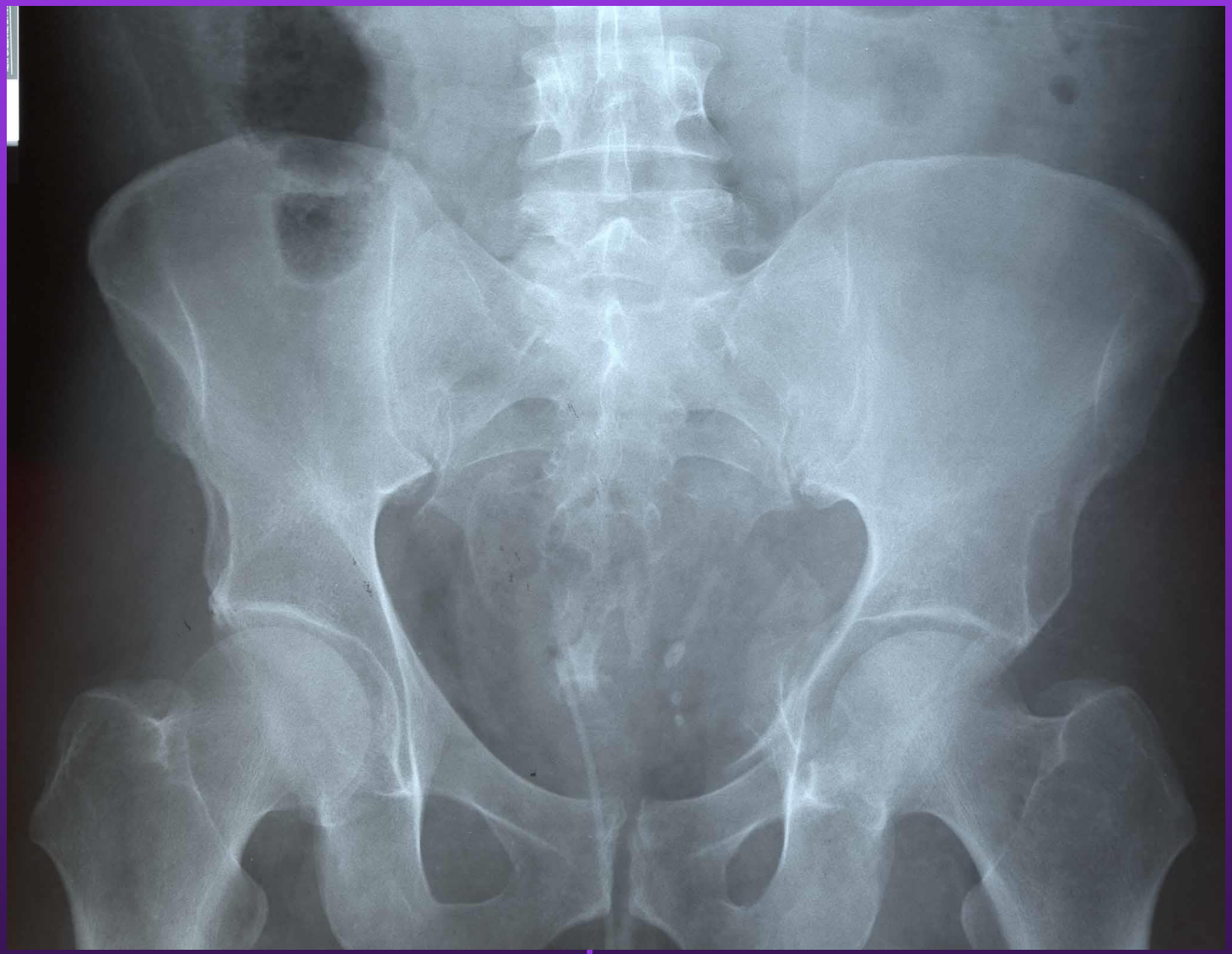
Contraindications

- Lack of know how (better is not good enough – needs to be perfect)
- Comorbidities (CV, non ambulators, etc)
- Non compliant (alzheimers, Schizo)
- Severe osteoporosis

Letournel

"Osteopenia is one of the most important contraindication of ORIF of an acetabular fracture"

JM – 8/10/00



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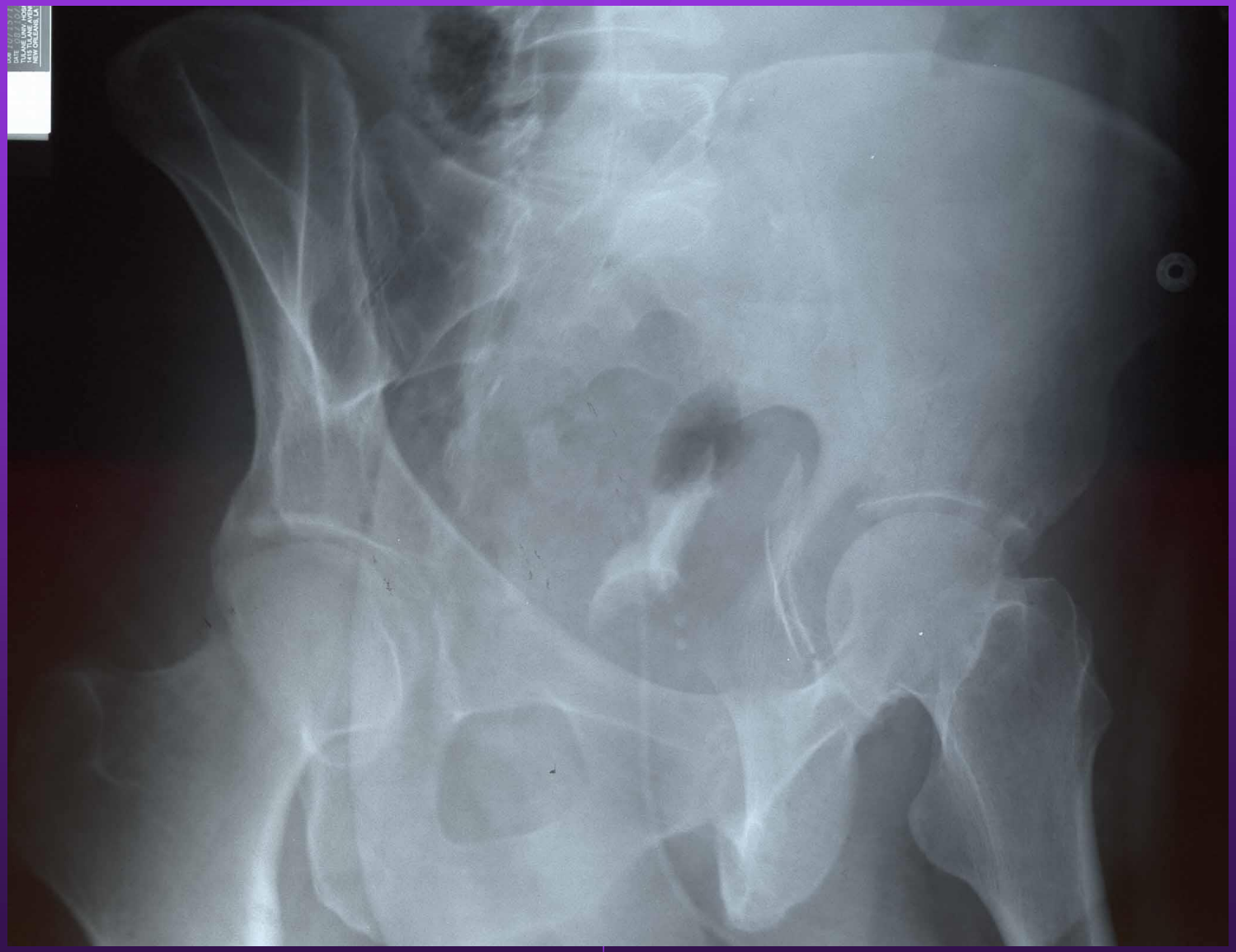

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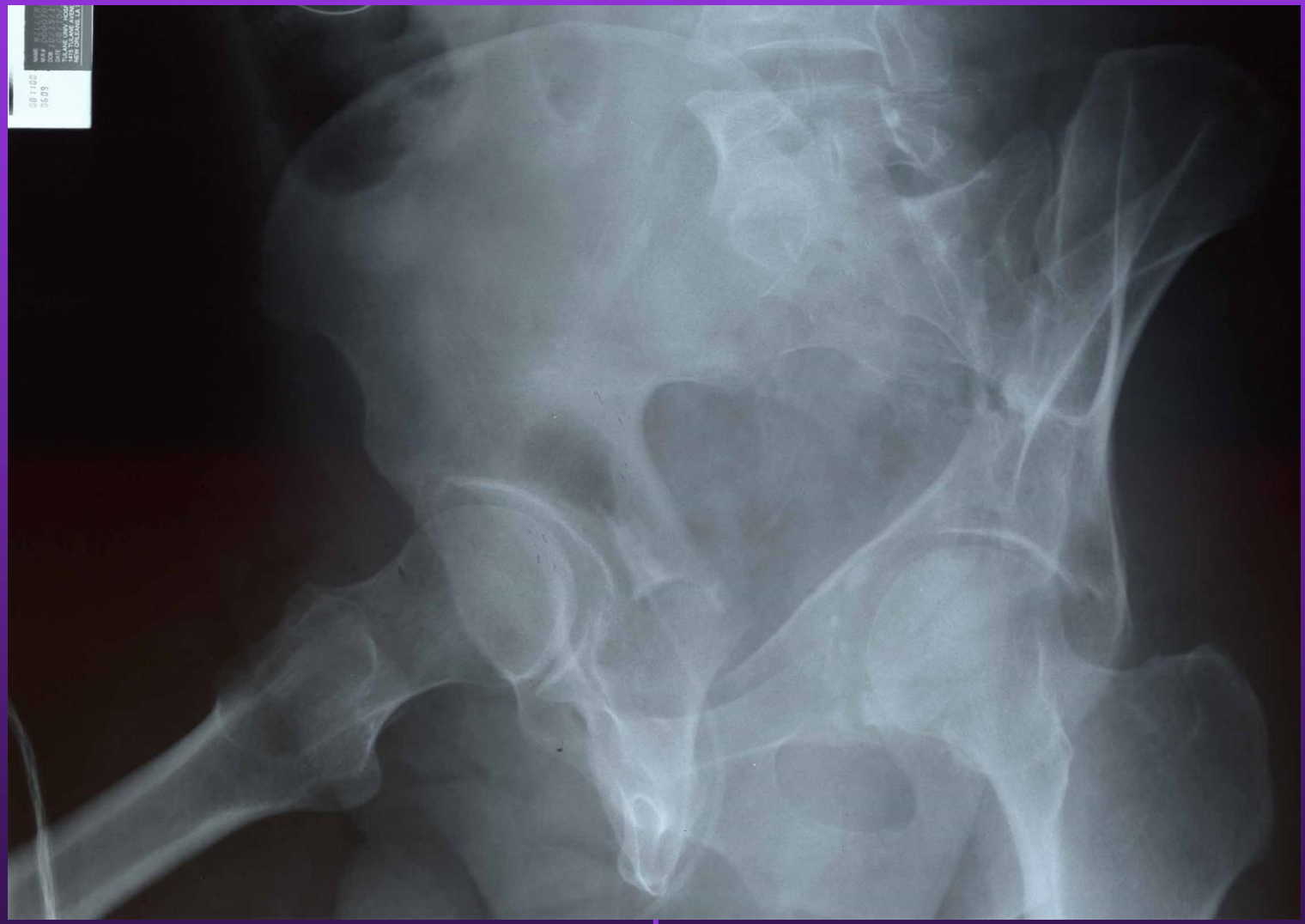

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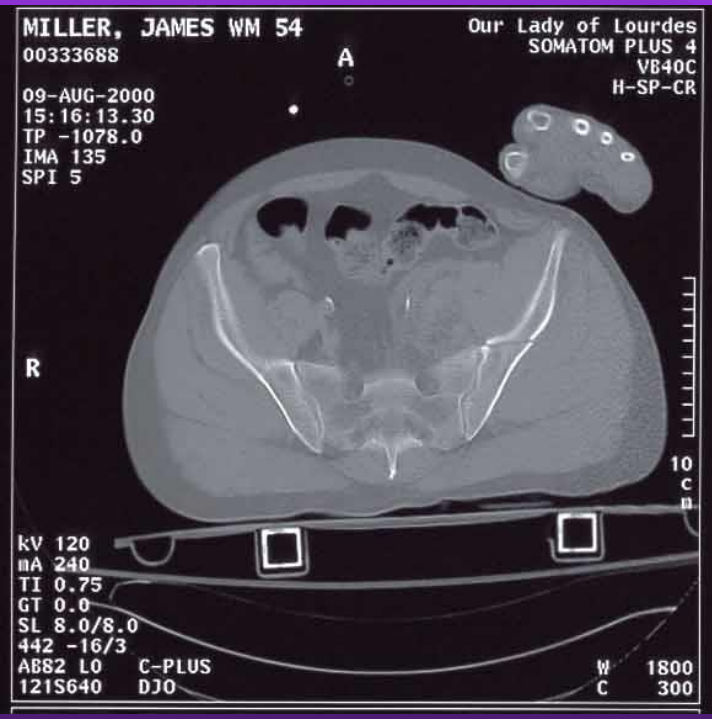
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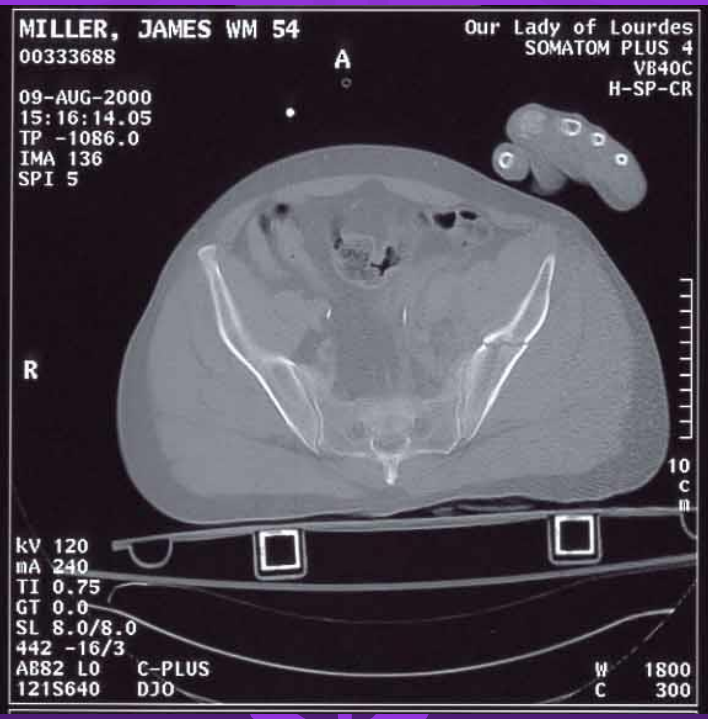
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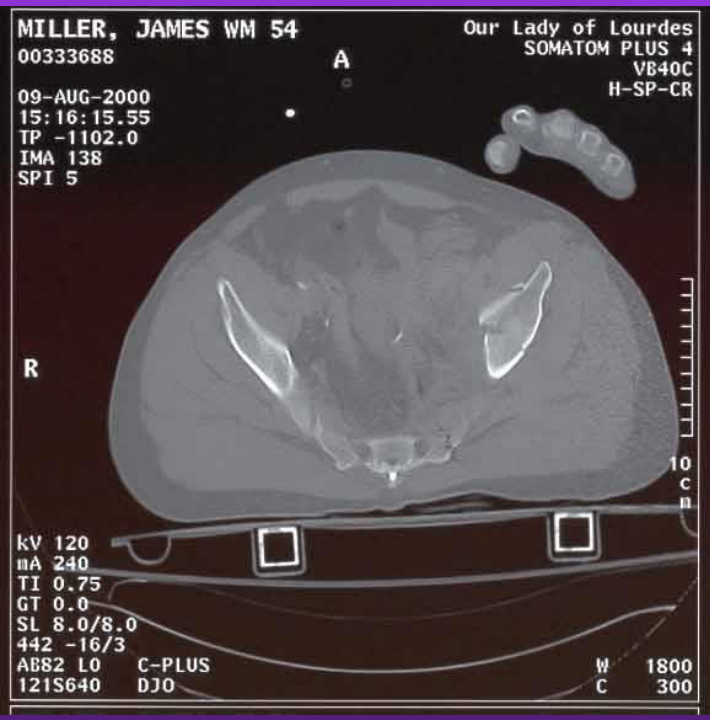
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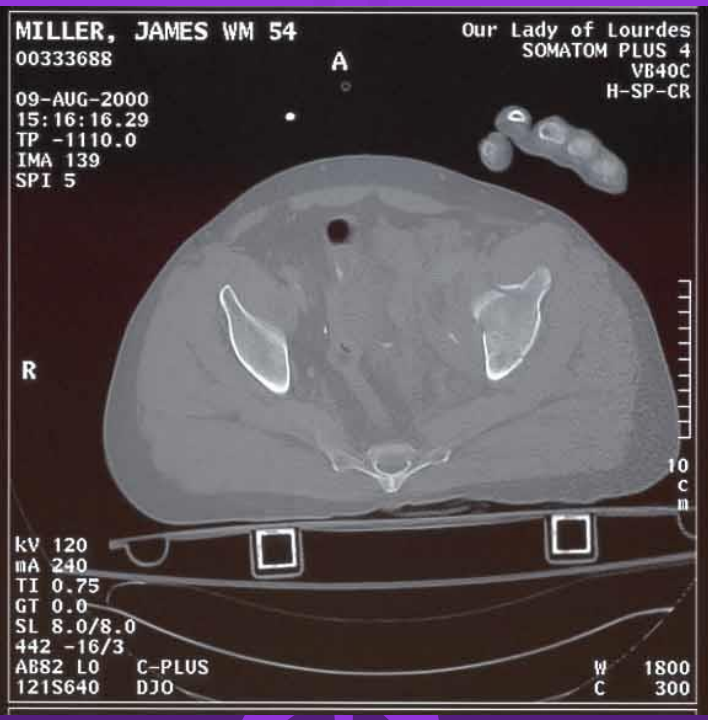
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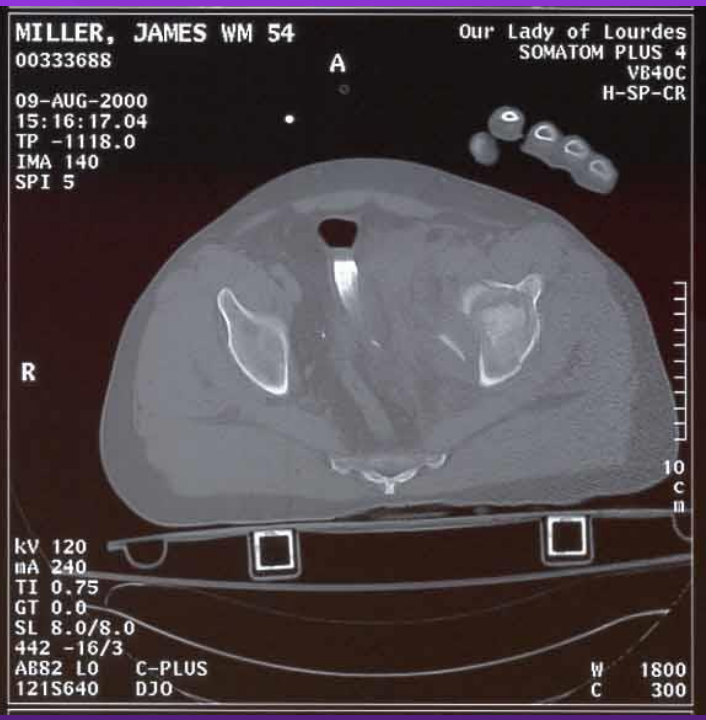
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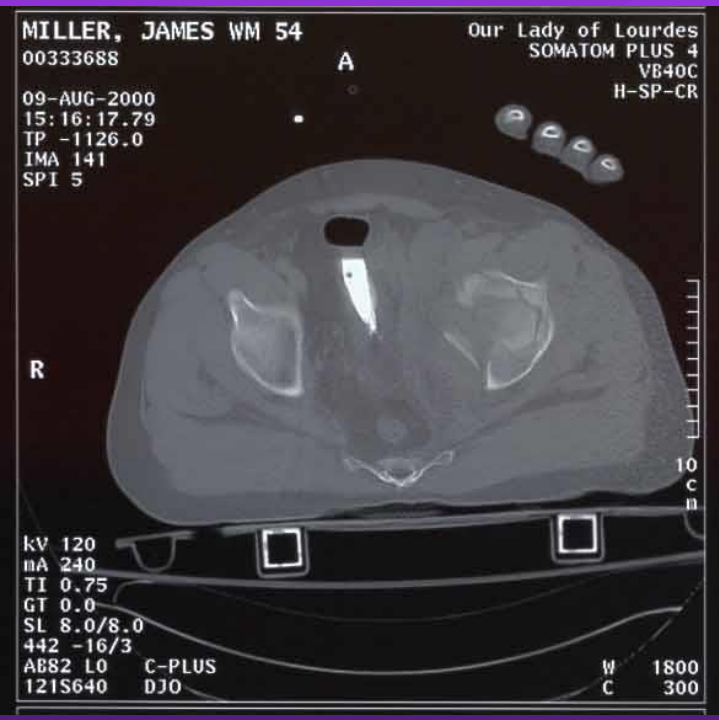
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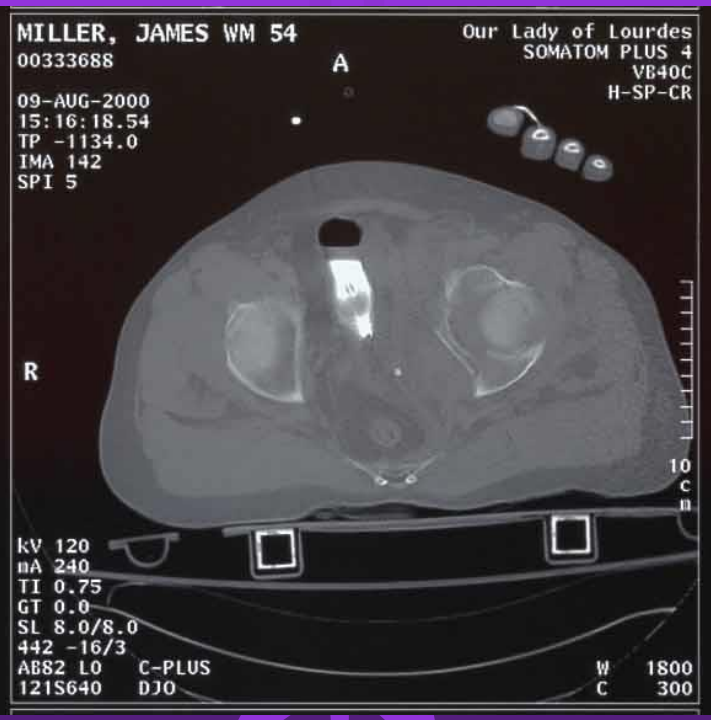
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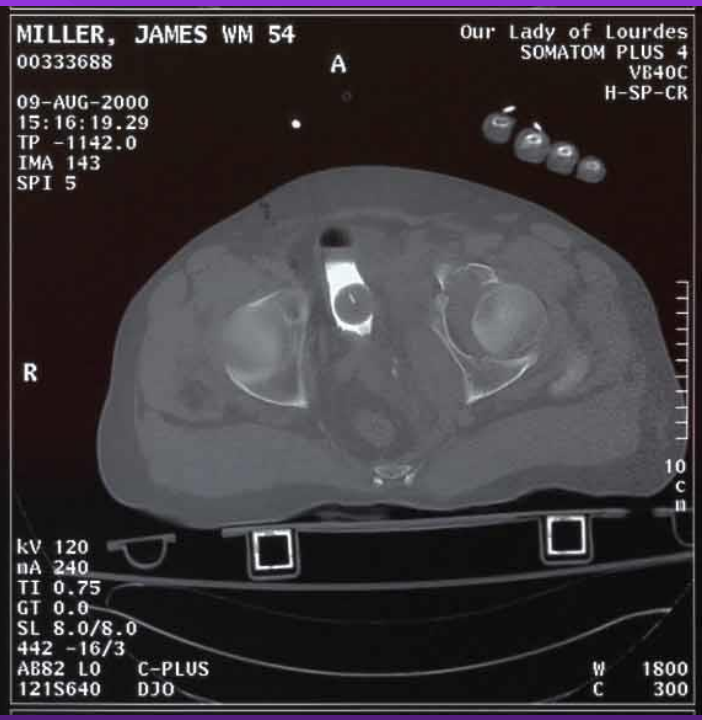
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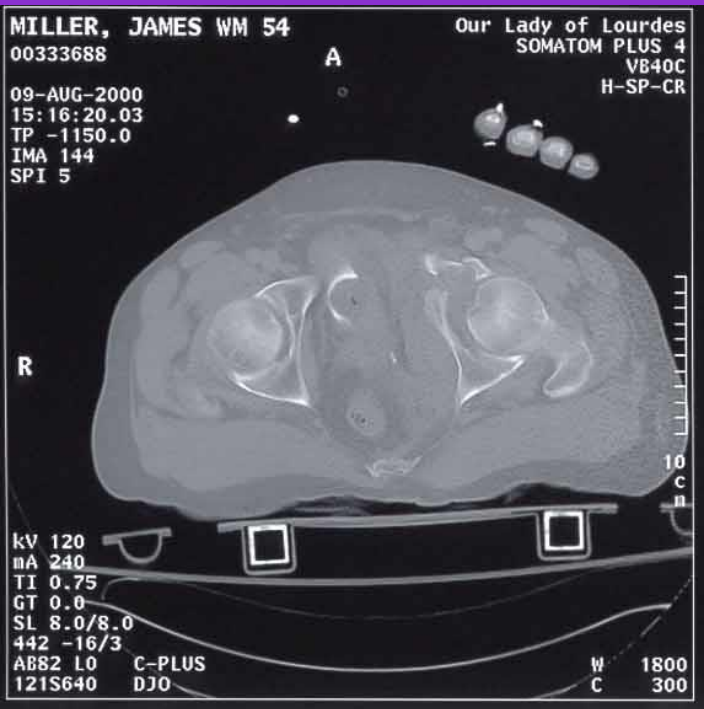
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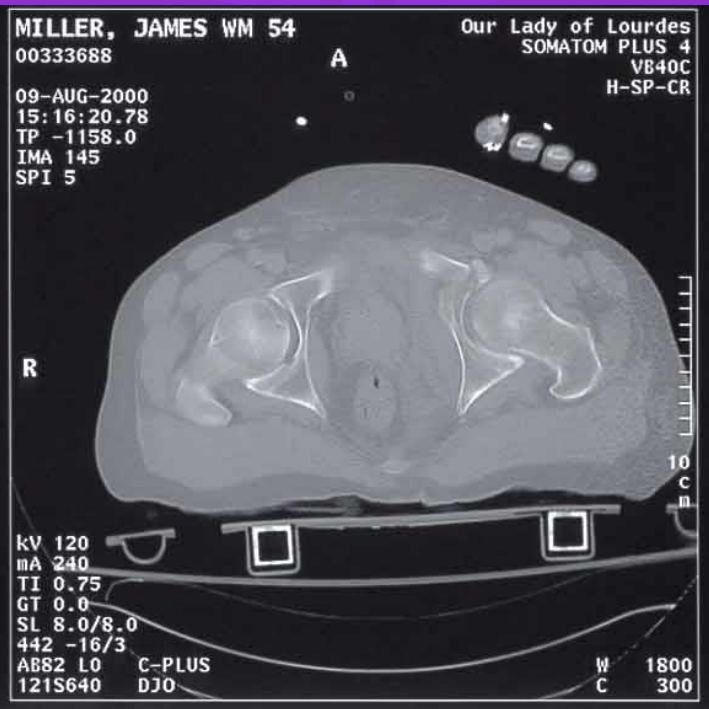
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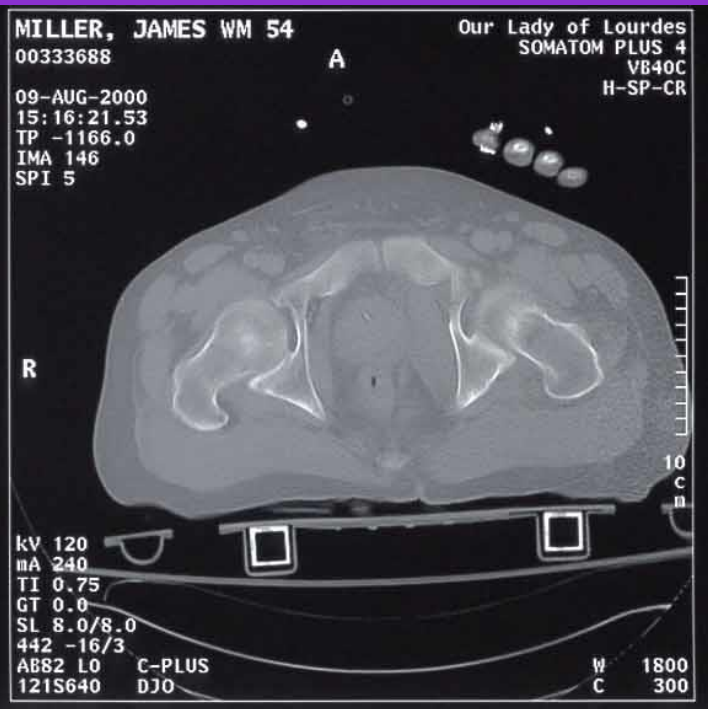
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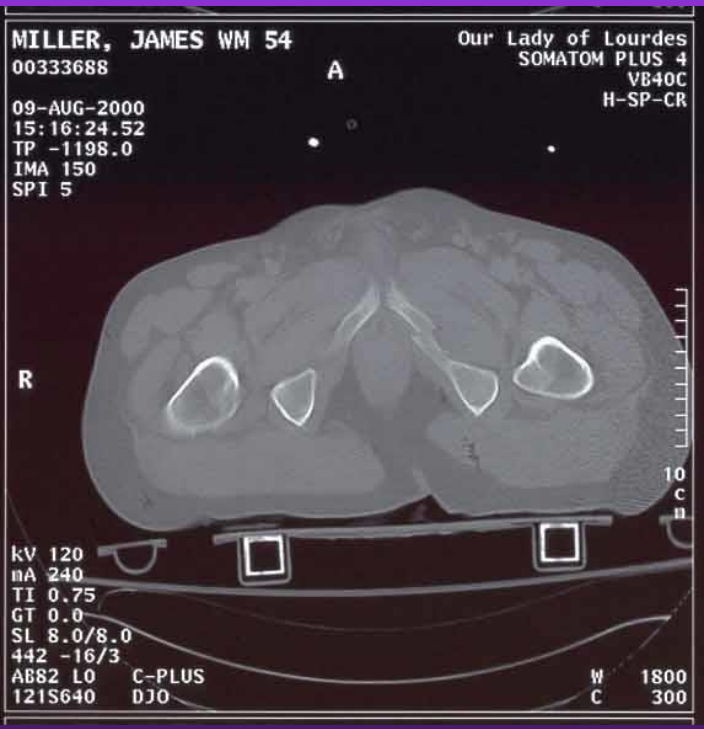
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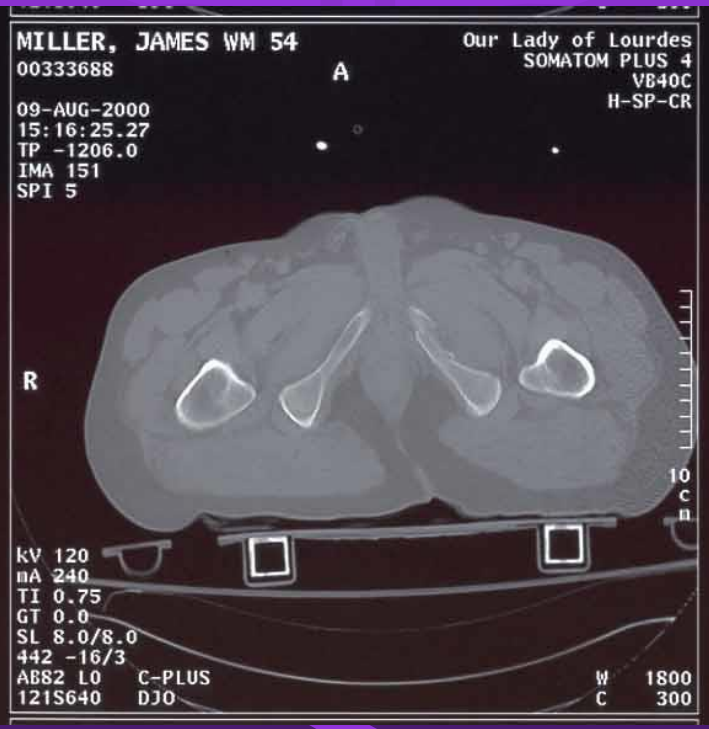
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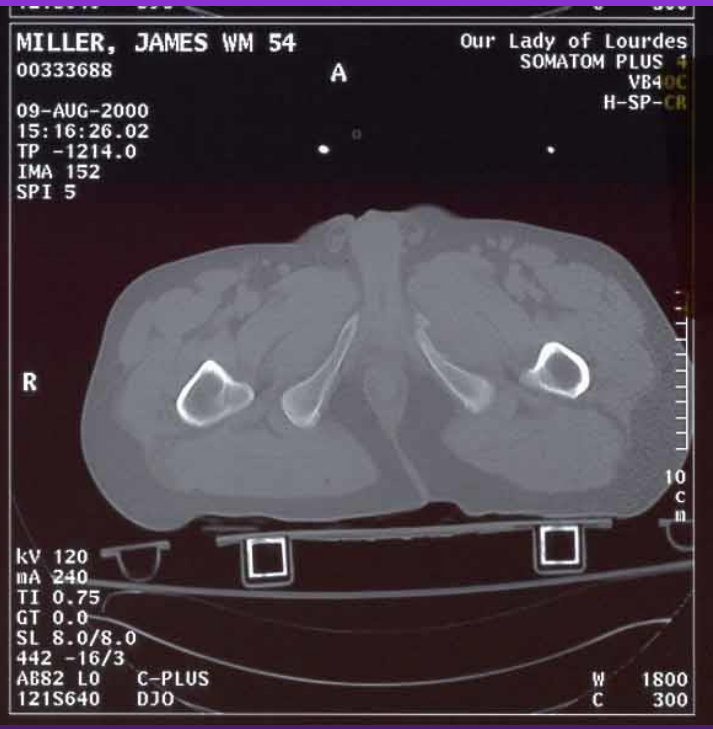
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Poor Results

- >1mm of displacement (reduction affected by fx complexity, age of patient, and delay of surgery)
- Femoral head damage
- Dome impaction

Letournel 1993, Mayo 1994, Matta 1996

ORIF Versus Total Hip Arthroplasty in Elderly

My Bias

- Surgeons are far too eager to abandon ORIF in favor of THA because they are not good at ORIF
- Besides better techniques for OPEN anatomical reduction and a better implant for ORIF is required – ?locked plate

Difficulties with ORIF

- Exposure more difficult with potentially increased complications
- Osteopenic bone holding fixation
- Anesthesia related risks

Difficulties with 1° Total hip Arthroplasty

- Requires same open reduction internal fixation
- Prolonged and technically difficult procedure
- Potential good results with ORIF only (i.e. which ones are going to fail?)

Primary Total Hip Arthroplasty

- Results poor (4-5x loosening of cup)
- Rarely needed after ORIF (1%-5%)
- Results better with ORIF even in elderly

Mears JBJS 2002

- Primary THA after reduction of acetabular fracture – 79% excellent or good results

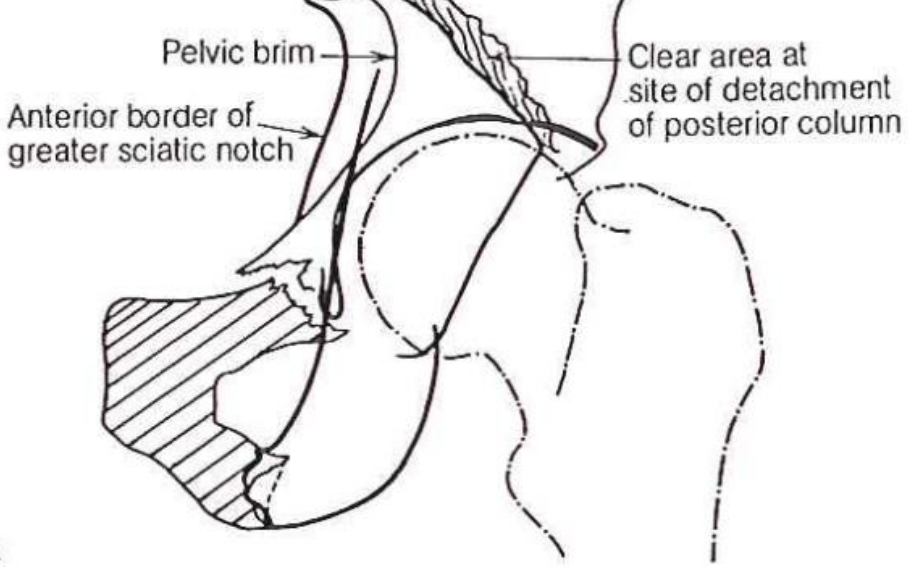
Mears JBJS 2002

- Indications – osteopenia, intra-articular comminution, full-thickness abrasive loss of cartilage, impaction of the femoral head, impaction of the acetabulum involving >40% of the joint including the weight-bearing region
- Romness 1990 5X increase in cemented cups loosening over DJD

Anglen 2003 JOT

- 2/3 of the failures in patients with acetabular fractures >60yo had the medial dome impaction “gull sign”

the ilio-ischial surface (delimited by the dotted lines in Fig. 6.11 A). The two separate parts of the ilio-ischial surface as displaced in a parallel fashion produce two ilio-ischial lines on the antero-posterior view. The reduplication of the outline of the roof, of which the posterior segment has accompanied the displaced fragment and has hinged inwards, creates with the undisturbed segment an image like a gull in flight (Fig. 6.11 B). Below, the inferior angle of the detached fragment appears in the superoexternal quadrant of the obturator foramen.



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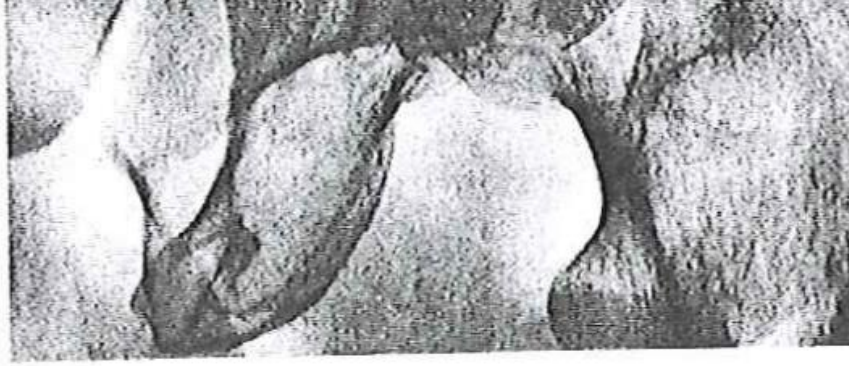

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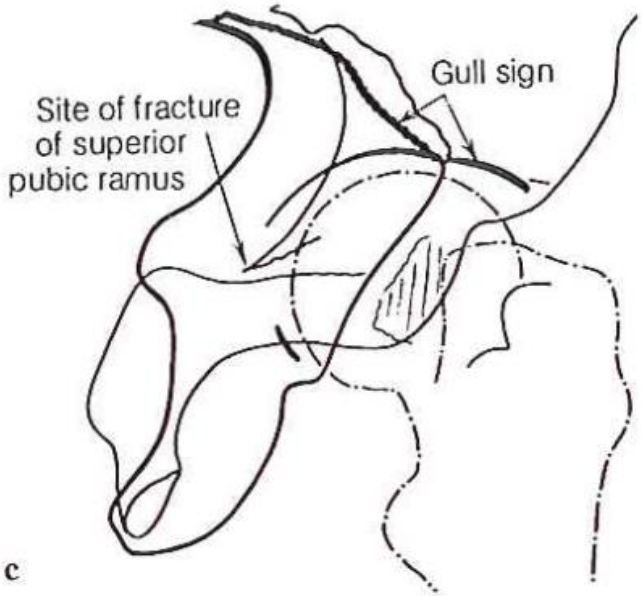
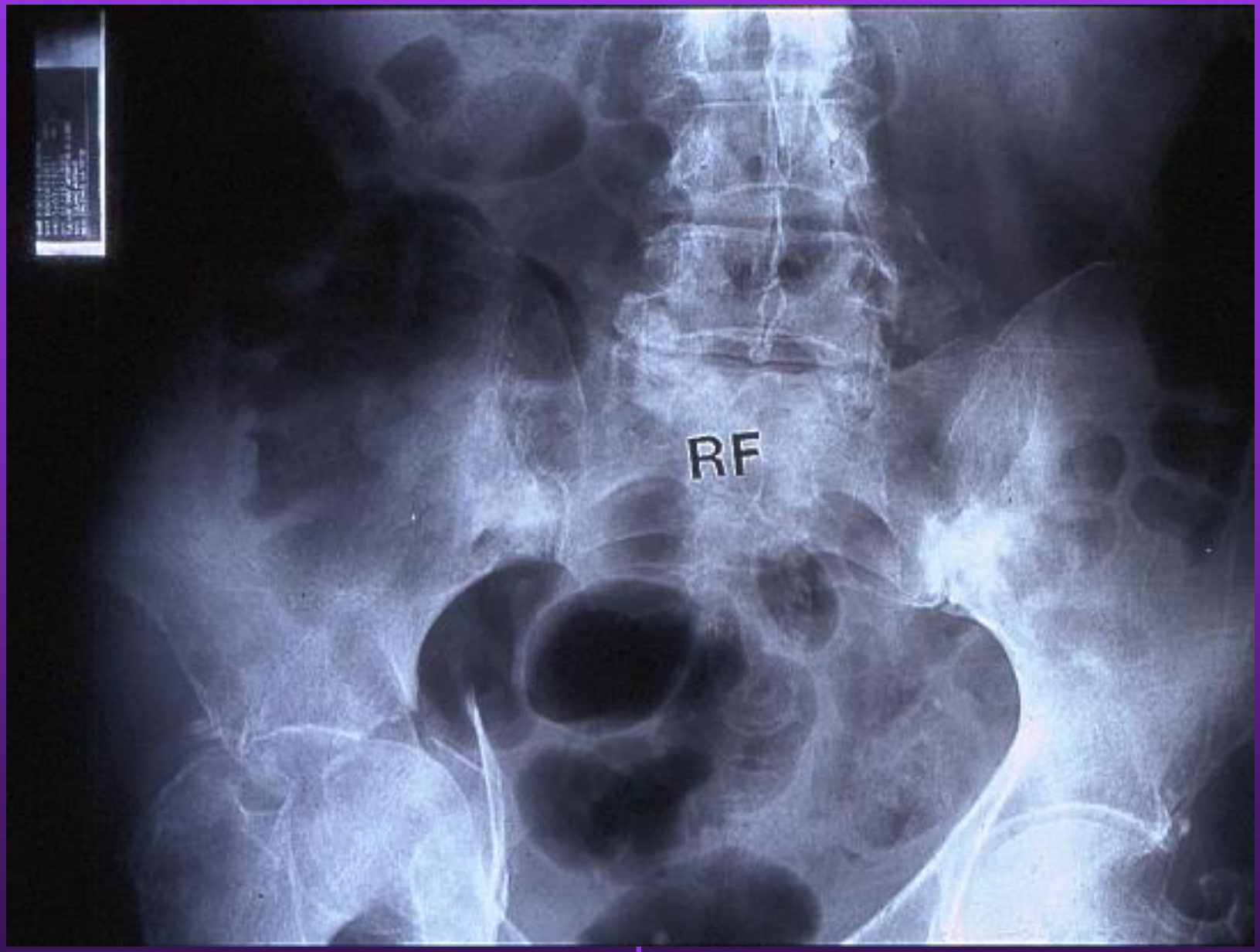


c

Fig. 6.9A–C. Extended fracture of the posterior column. **A** Antero-posterior radiograph, **a** diagram, **B** obturator oblique radiograph, **C** iliac-oblique radiograph, **c** diagram. In this case there is an associated fracture of the superior pubic ramus which could cause difficulty in interpretation; with the fracture of the inferior ramus, an essential component of the posterior column fracture, it resembles a vertical fracture through the obturator ring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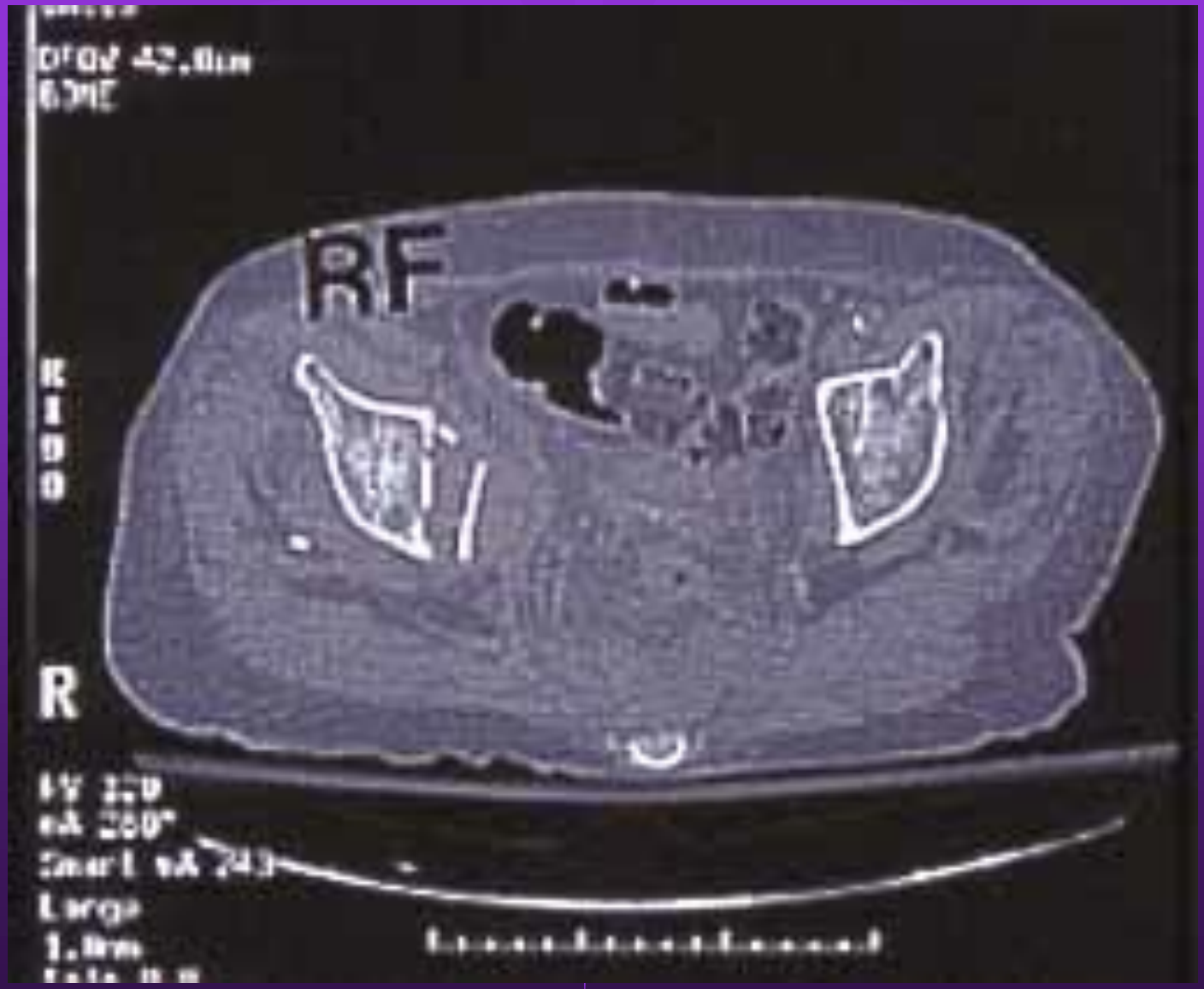
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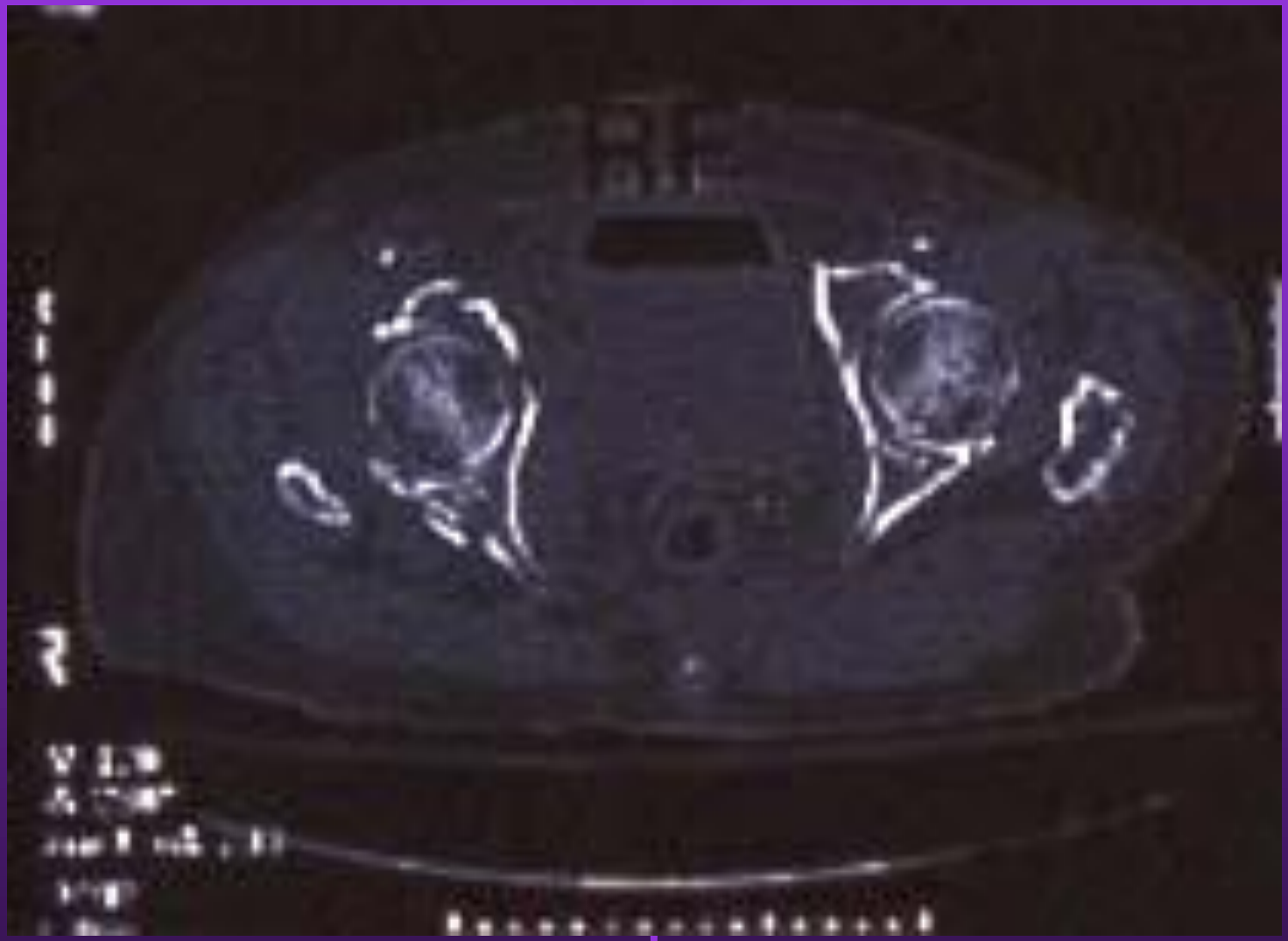


Anterior or Posterior Approach?

-Dependent on the type of fracture and what approach gives the easiest fixation (direction of the head migration)

-II and or IF – quadrilateral surface comminution

-KL – posterior wall


RF

Beaule et al JOT 2004

- 10 cases with >50% of acetabular roof involvement (all with anterior wall/column and two with posterior hemitransverse)

Beaule et al JOT 2004

- Anterior approach with fixation of the acetabular fracture followed by THA
- Minimum 2 year follow up - 1 case of anterior dislocation treated by a spica cast and 1 case of Brooker II HO

Tidermark et al JOT 2003

- 10 cases with osteoporosis, >55 yo, >1 cm in weightbearing dome and or protrusion >1 cm excluding both columns

Tidermark et al JOT 2003

- "No attempts were made to reduce the fracture fragments… four cases stability was enhanced with separate 3.5mm screws"
- Antiprotrusion Cage with 1 dislocation

Helfet, 1992 JBJS

"Stabilization of Acetabular Fractures in Elderly Patients"

Helfet (cont.)

- 17/18 follow-up > 2 years
- 1/17 failed – 1/17 poor
- 4/18 gap 3 mm with concentric reduction
- 1 loss of reduction
- 83% success (76% Judet JBJS 1964)

Helfet Unpublished Data

- 45 patients > 50 yo
- 3/45 THA 1°
- 11/45 THA after ORIF

Helfet (cont.)

- 51% complications (foot drop, intraarticular hardware loss of reduction, hernia, wound problems)
- Recommend THA only when femoral head damage (23% THA after ORIF)

Geriatric Acetabular Surgery: Letournel's Contraindications Then and Now – Data From the German Pelvic Registry

Pohleman et al, JOT 2019 Feb

Findings

- Letournel's initial 129 pts 30 years ago – no patients over 60 yo
- Registry 50% > than 60 yo

ArthroplastyVersus Open Reduction Internal Fixation for Posterior Wall Aetabular Fractures in Middle-aged Patients

- Templeman et al, Feb JOT 2019

Methods

- 45-65 yo posterior wall
- Matched controls 2:1 32 ORIF vs 16 THA
- Marginal impaction, >3 fragments, osteoarthritis (narrowing, cysts, osteophytes)

Findings

- Similar Oxford Hip Score 44 vs 40 THA vs ORIF
- ORIF 37% conversion to THA (8%-24%)
- THA 13% revision rate (4x ↑ in loosening of cup over OA)
- Better Kaplan- Meier Survival with THA

Does Total Hip Arthroplasty Reduce the Risk of Secondary Surgery Following the Treatment of Displaced Acetabular Fracture in the Elderly Compared to ORIF

Vrahas et al

Findings

- 30% reoperation rate with ORIF
- 14% THA
- SF – 36 – 39 vs 48

Summary

- Consider 1º THA – Femoral head damage, dome impaction (medial or lateral), pre existing osteoarthritis, ?severe osteoporosis, stable fixation of acetabular fracture
- ORIF is still the gold standard even in the elderly
- Results of 1° THA with acetabular fracture not as good as THA alone

Difficulties with 1° Total hip Arthroplasty

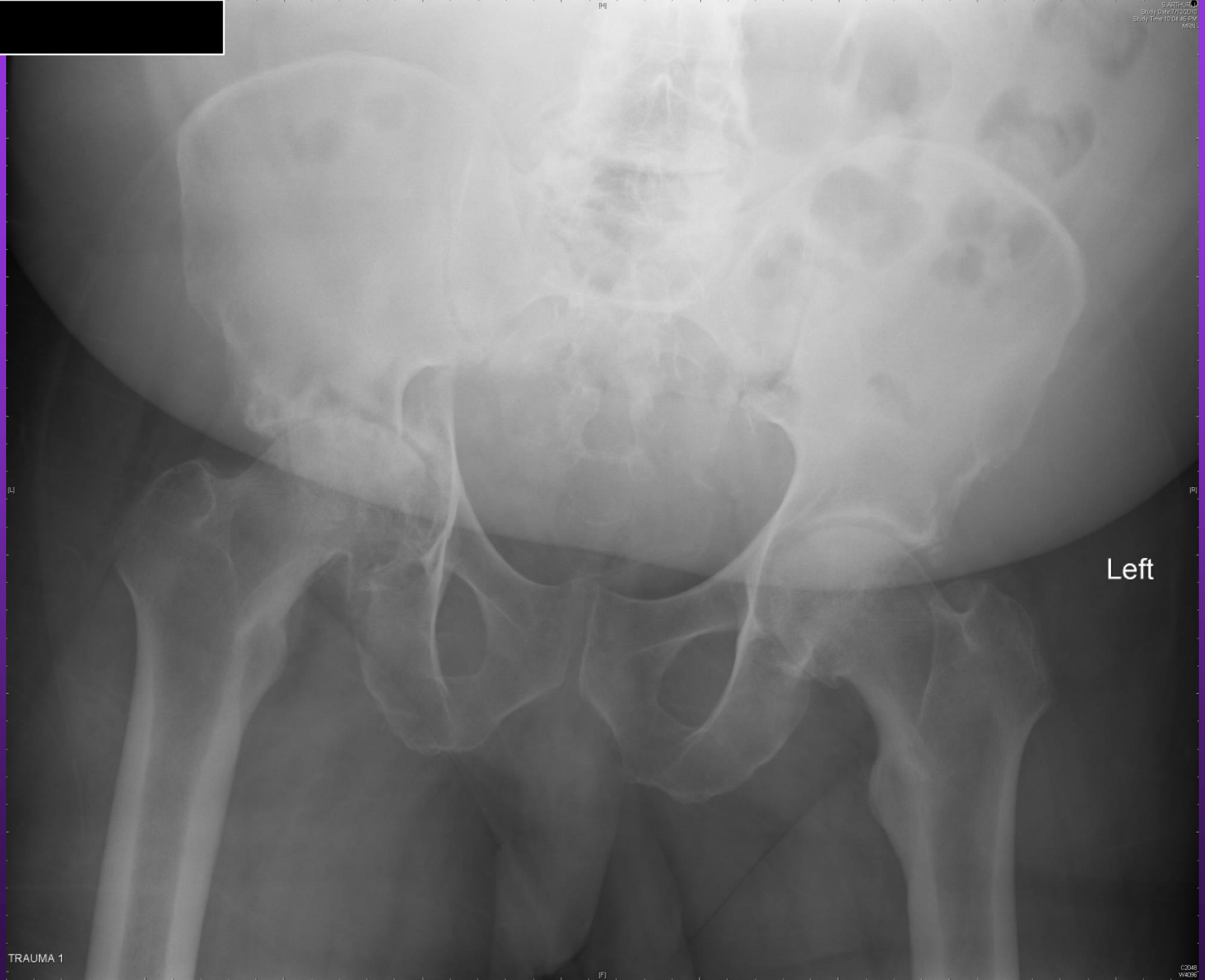
- Requires same open reduction internal fixation
- Prolonged and technically difficult procedure
- Potential good results with ORIF only (i.e. which ones are going to fail?)

1° THA

- Impaction of dome (medially)- elderly
- Femoral head damage
- Pre existing osteoarthritis

AS

- 62 yo with “T” type acetabulum from wall crushing him
- Preexisting OA (Appt with orthopedist)
- Preop MI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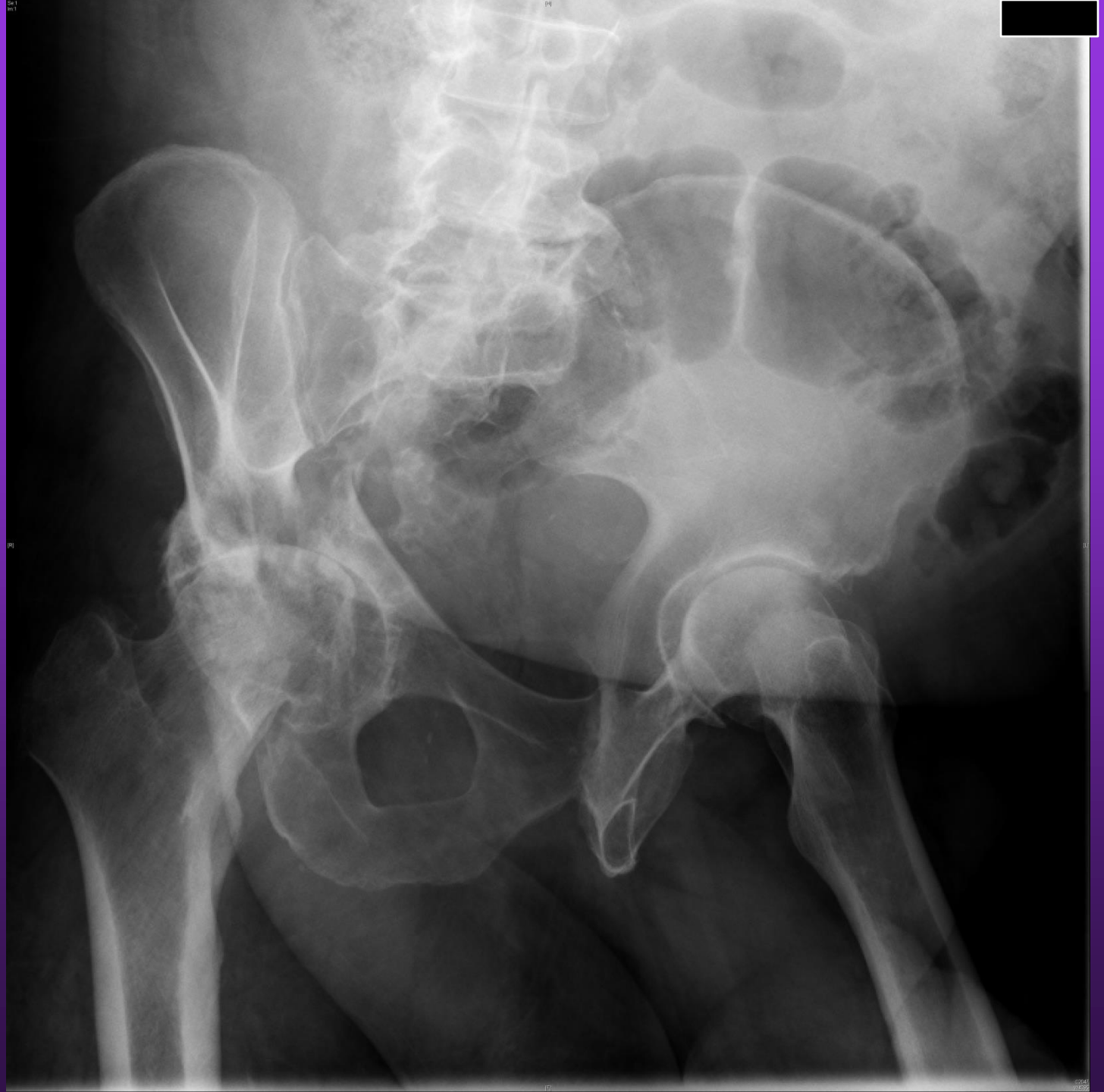


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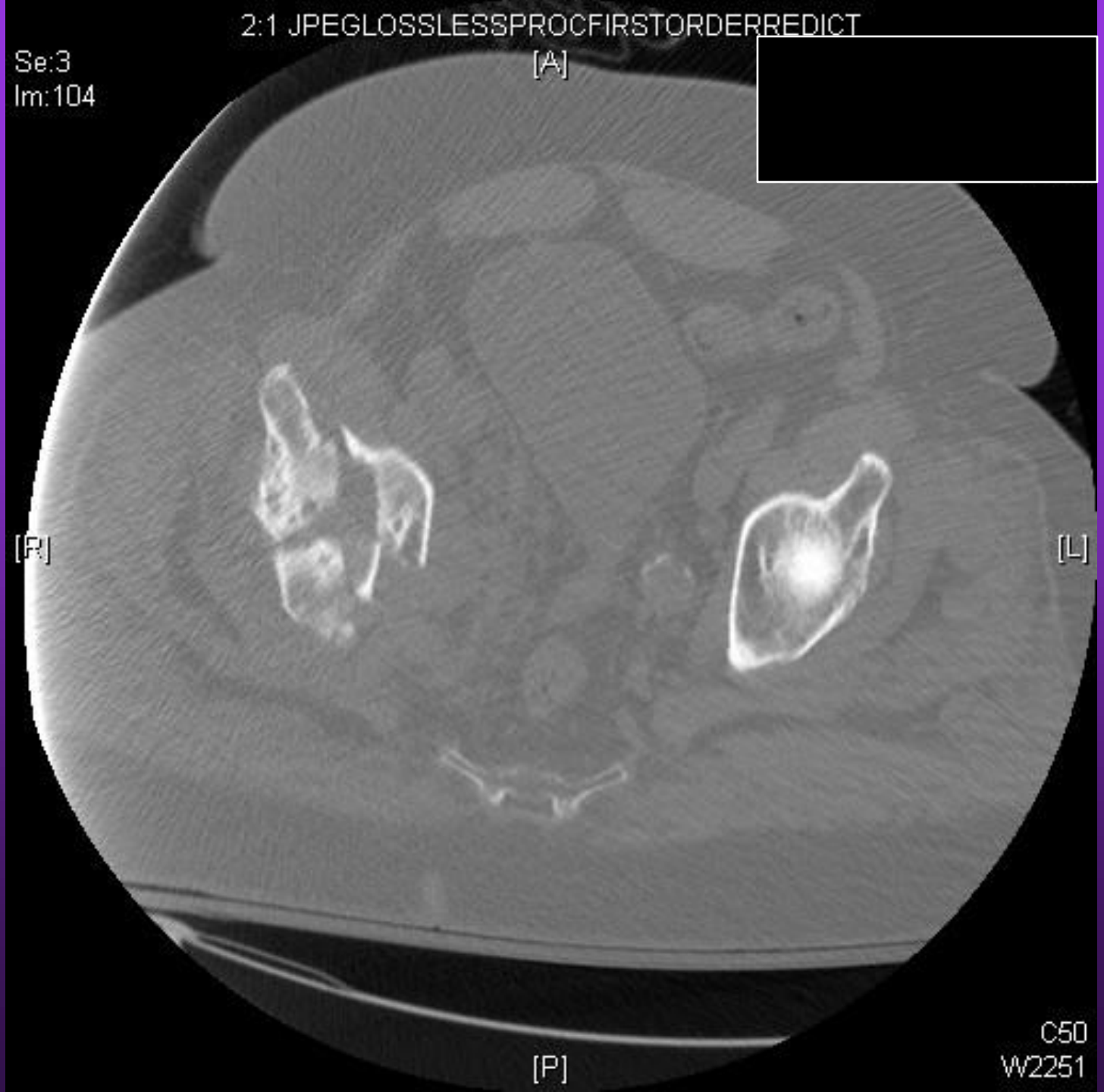
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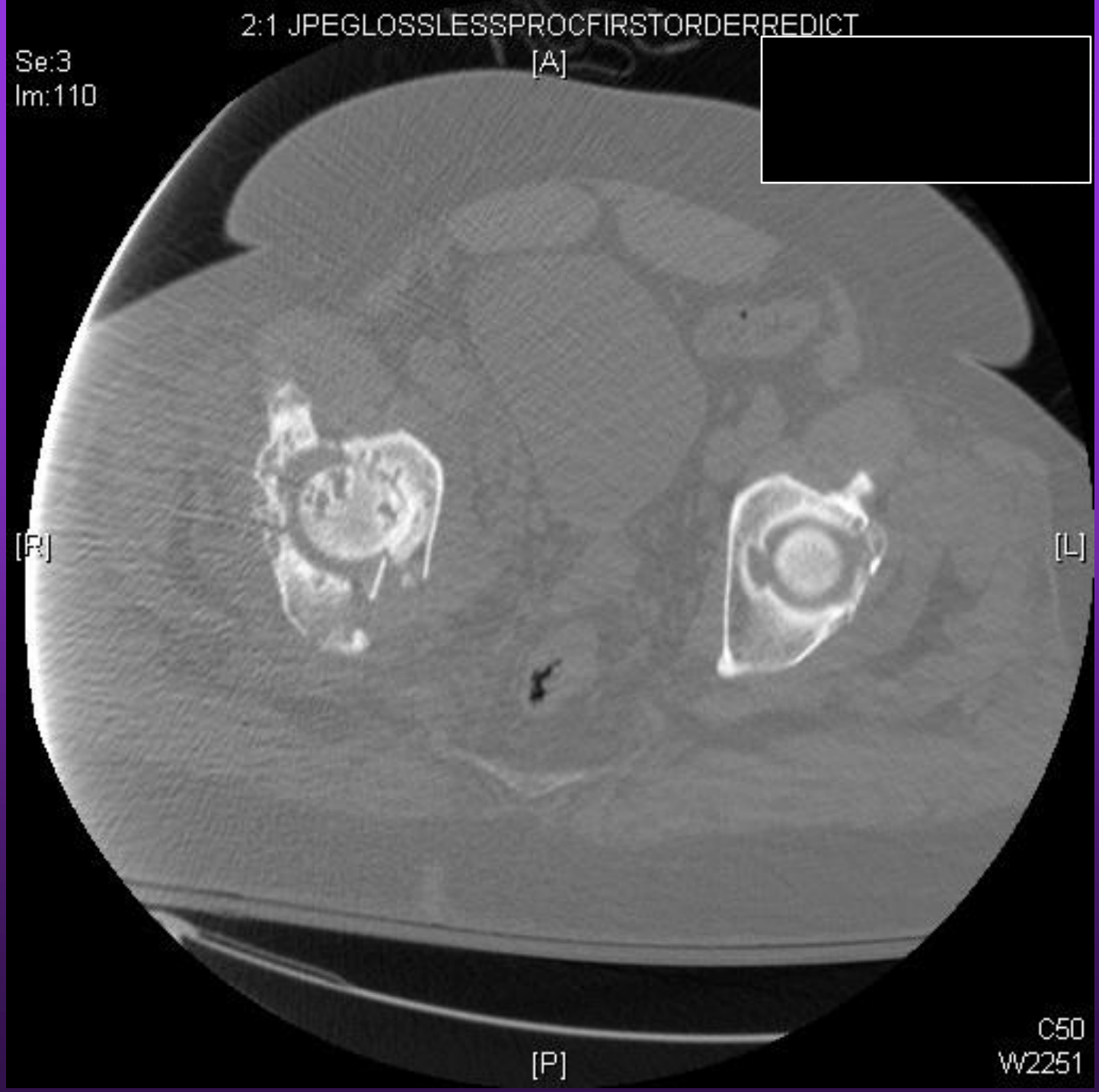
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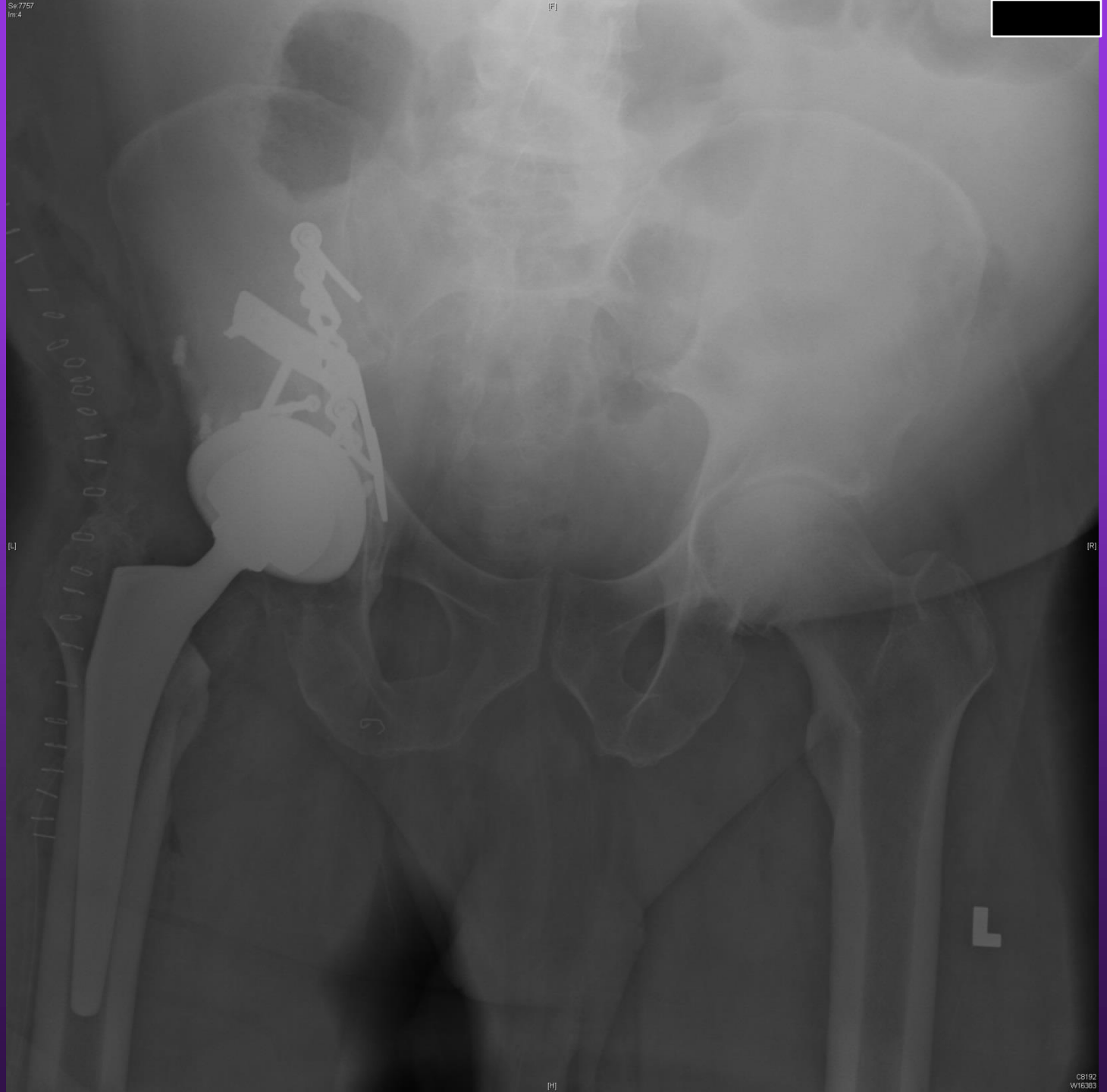
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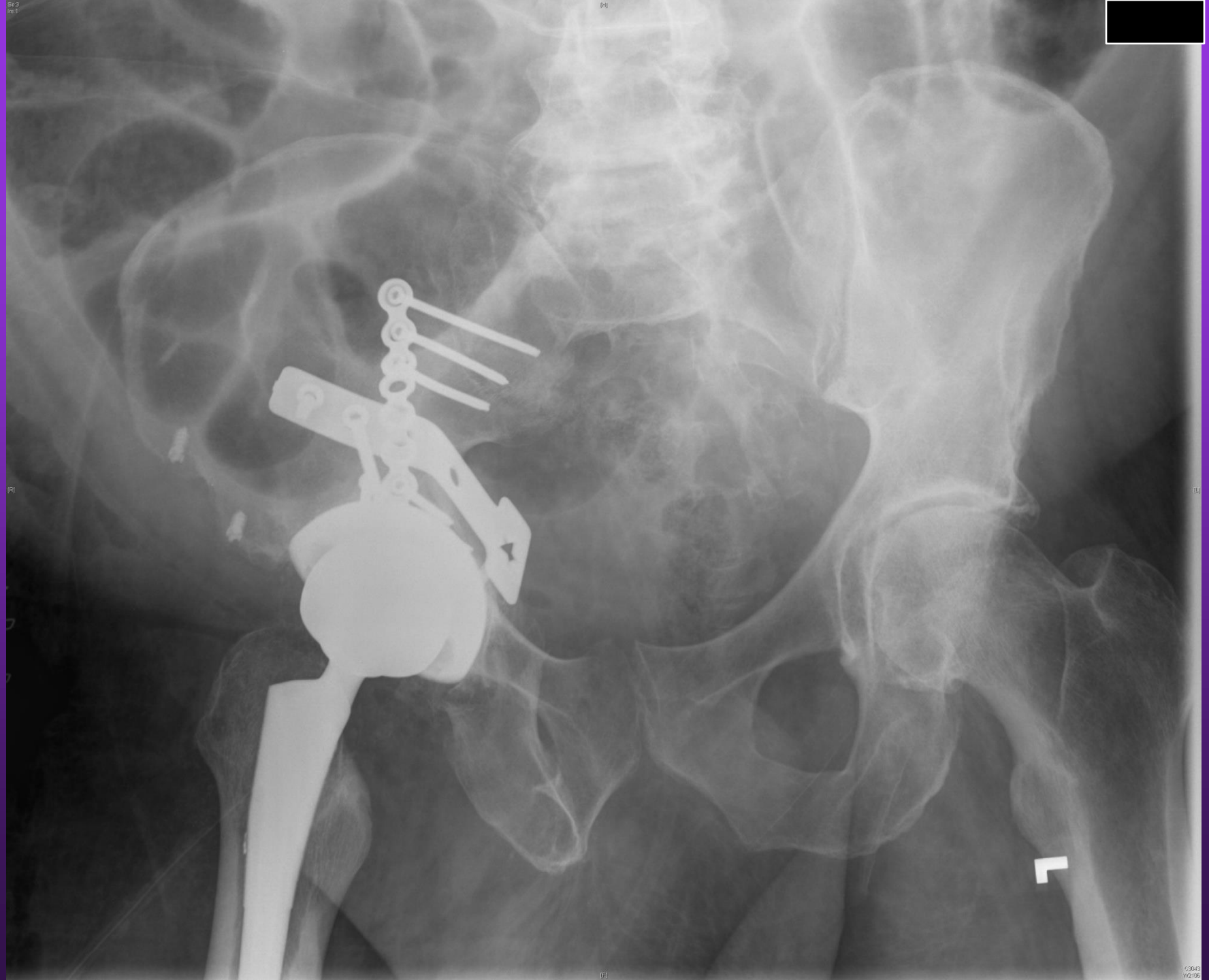



R
63/27


L 2-3V 73502

Total Hip After Failed ORIF of Acetabulum Fractures


L

One Stage vs Two Stage

- Normal ESR, Crp, WBC with no history of infection and healthy (diabetes, smoking…etc.) - one stage
- Surprise culture positive may be as high as 10% - two stage may be safer


LEFT
LJ / 21

Weber JBJS 1998

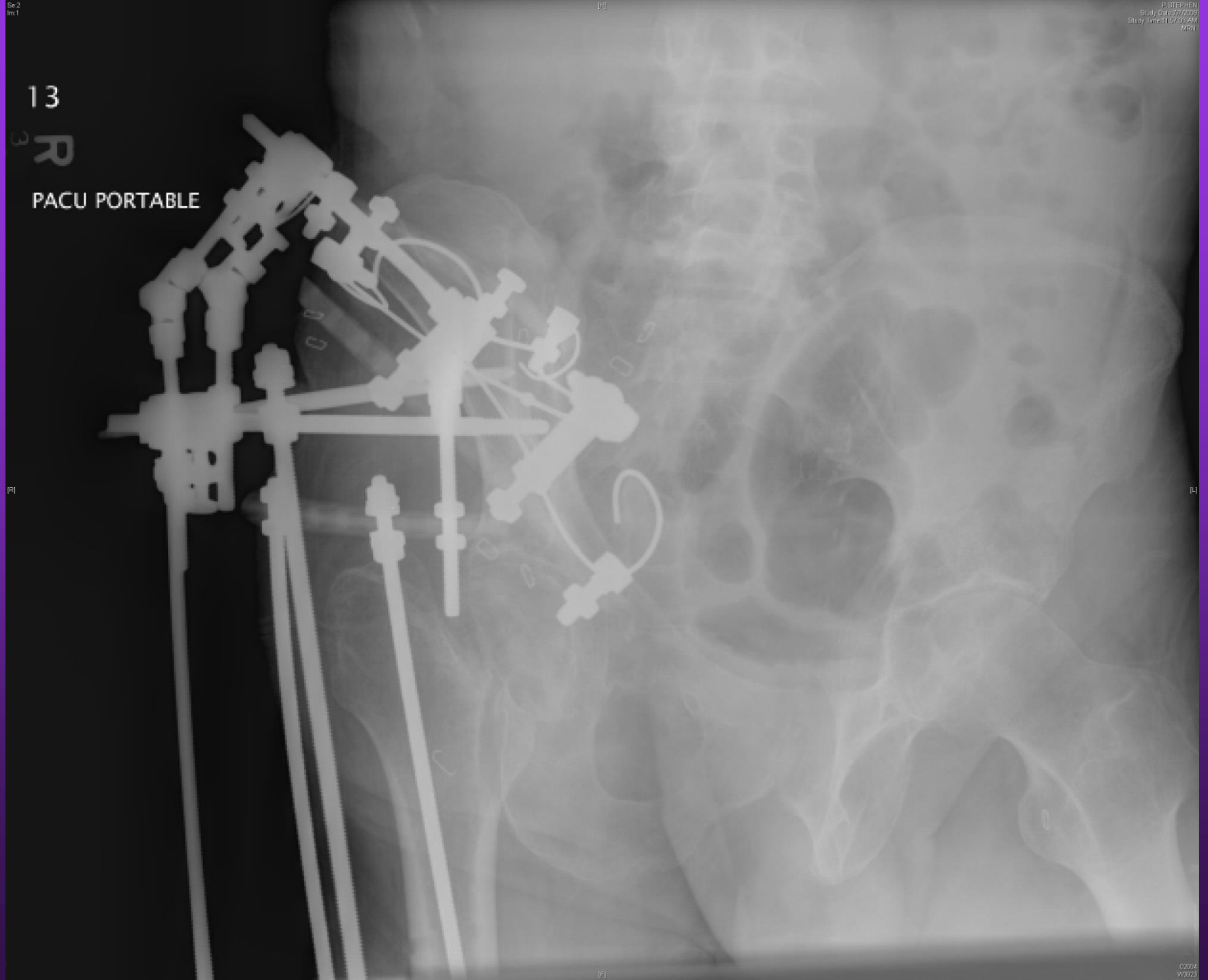
- 66 THA s/p orif of the acetabulum with post traumatic arthrosis
- 10 year survival 78% overall, 87% acetabulum and 84% femoral many (most femoral and acetabular components cemented)
- ? Younger patients greater aseptic loosening

Dificulty of THA after Acetabulum Fracture

- HO, scar tissue, obstructive or broken hardware, occult infection
- Bone defects, nonunions, malunions (CT scan)
- Know the anatomy – difficult exposure
- Uncemented – cup with screws, high friction (8wks TDWB)

Concerns

- Shortening (sciatic nerve palsy)
- Missing posterior wall/column (allograft, cage)
- Staged approach with removal of hardware (ESR, CRP, WBC)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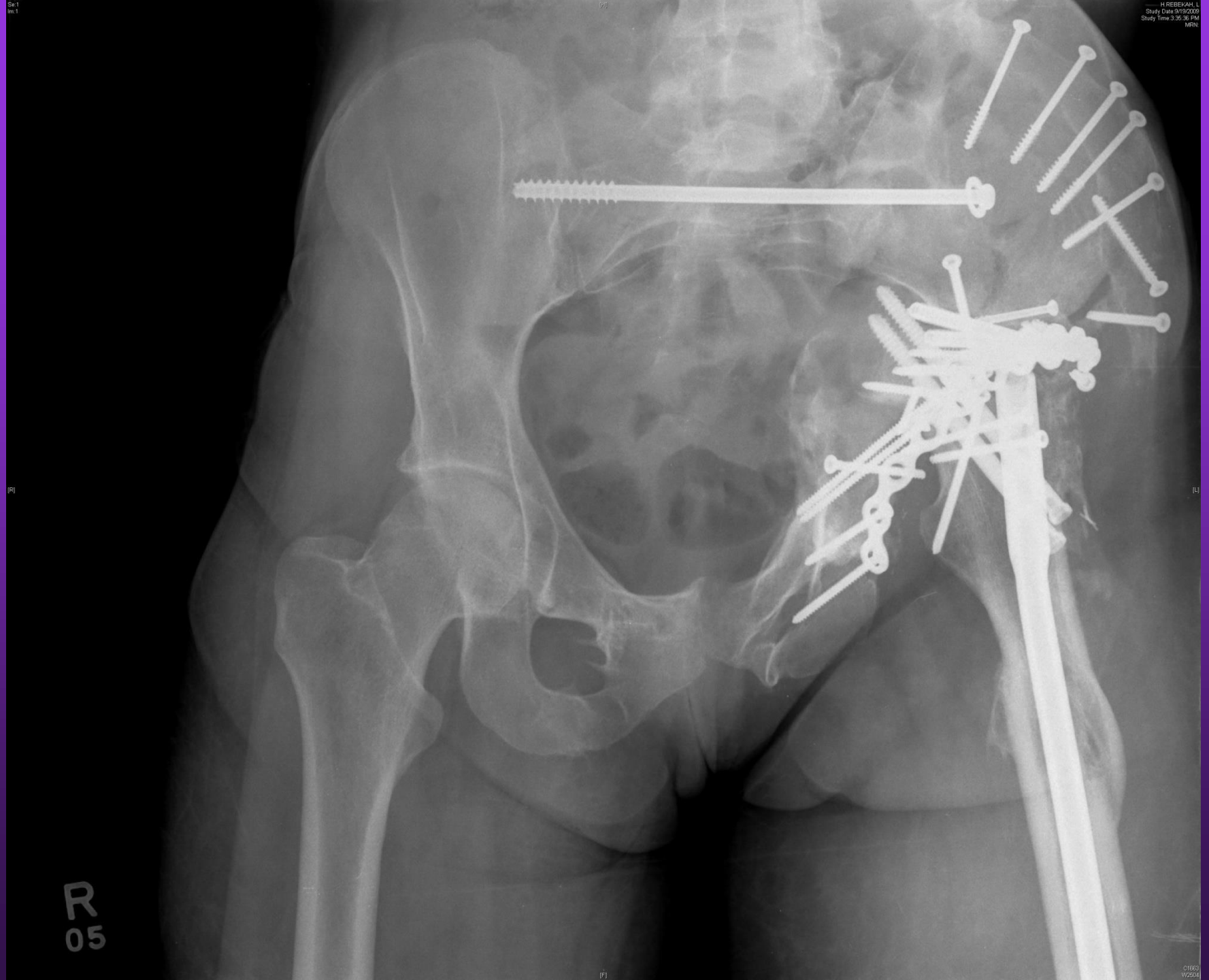

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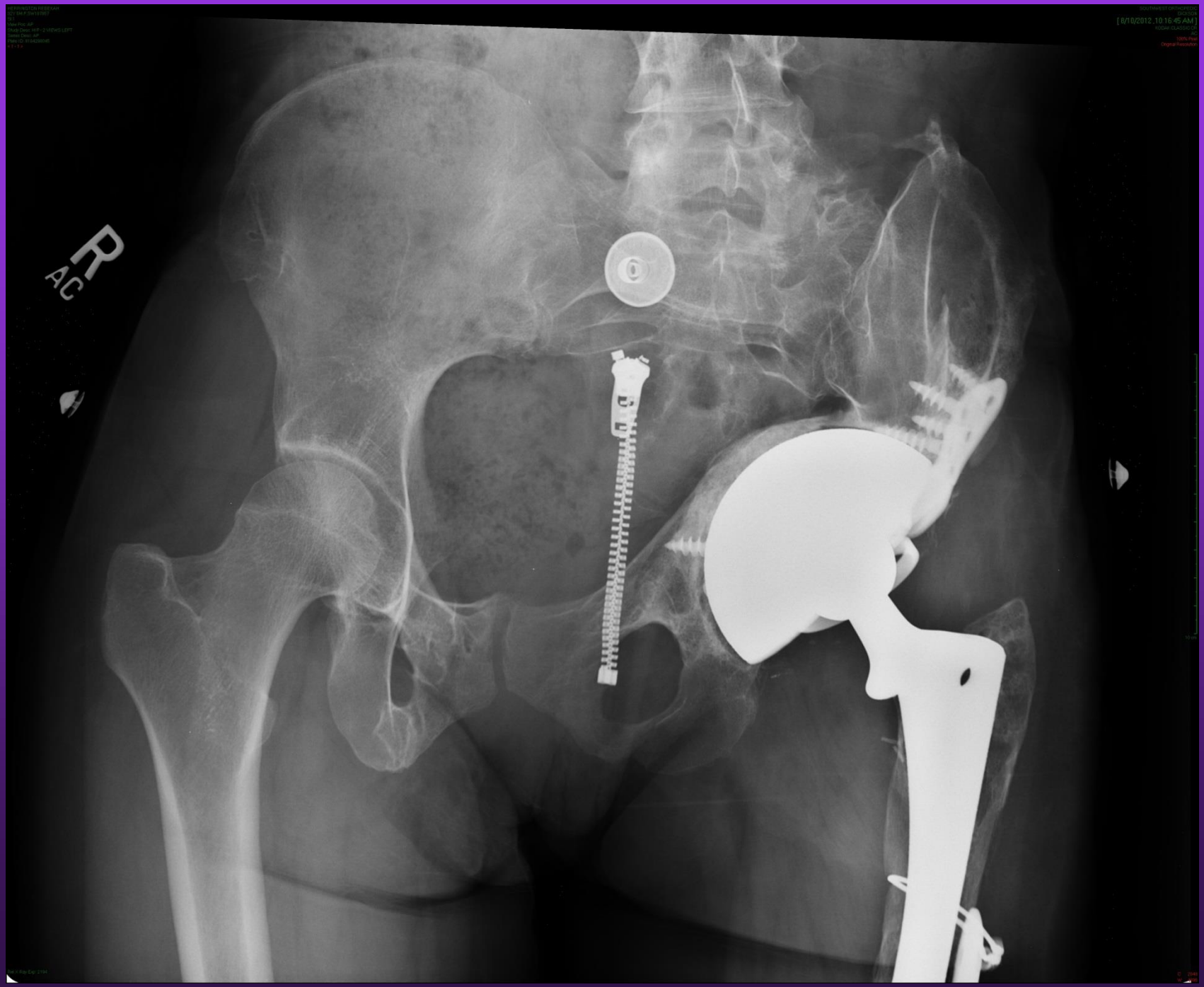
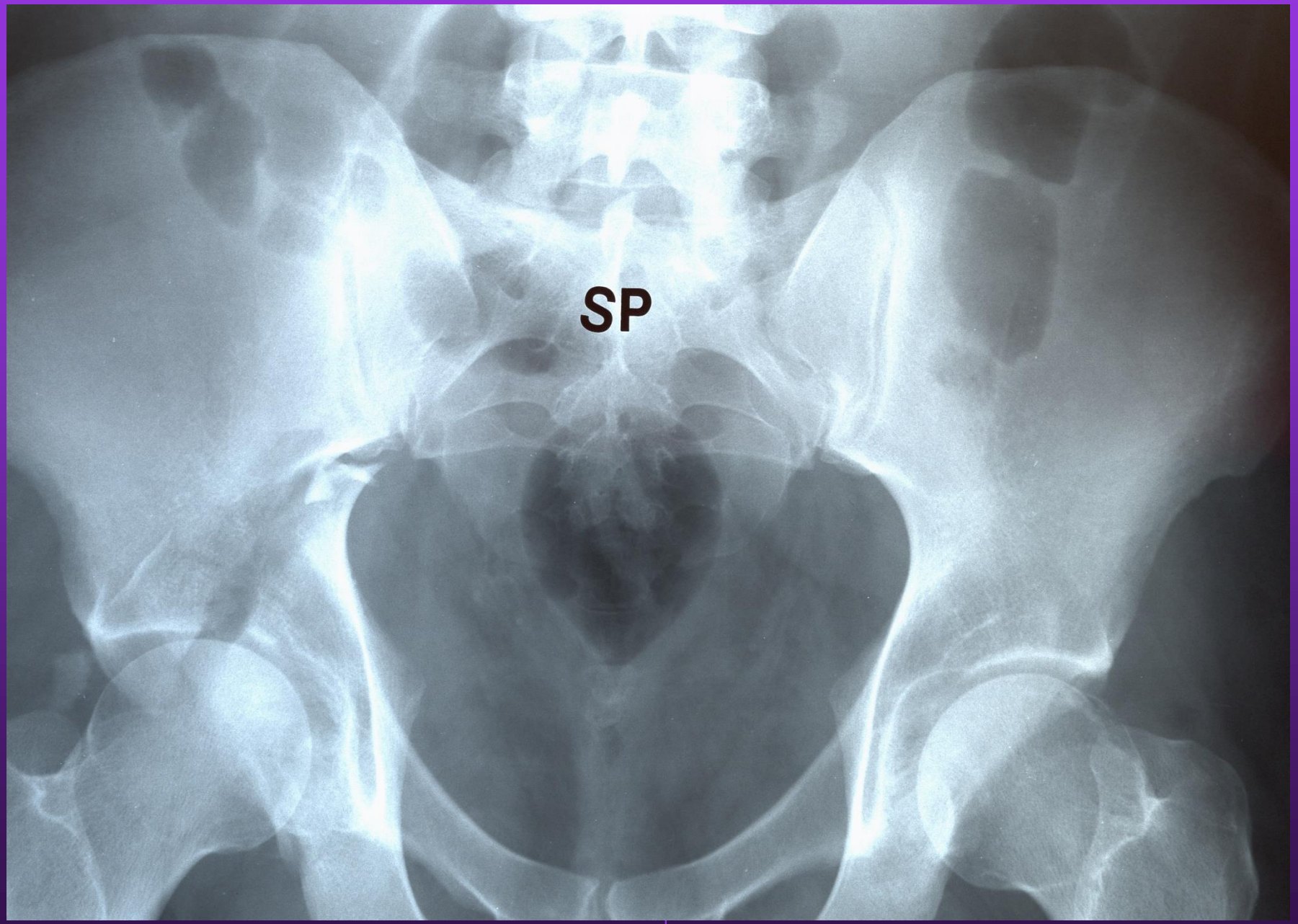


Prevention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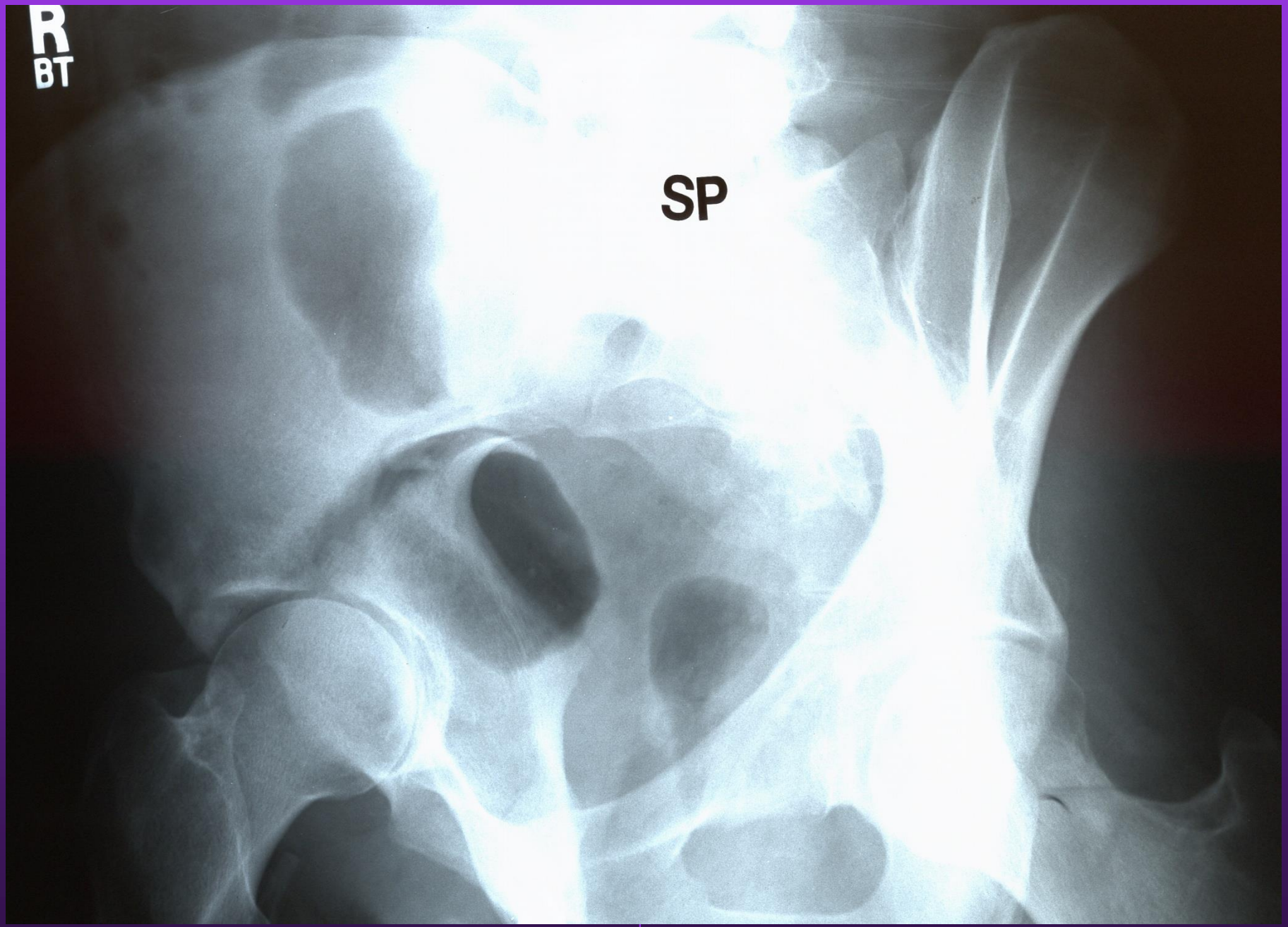
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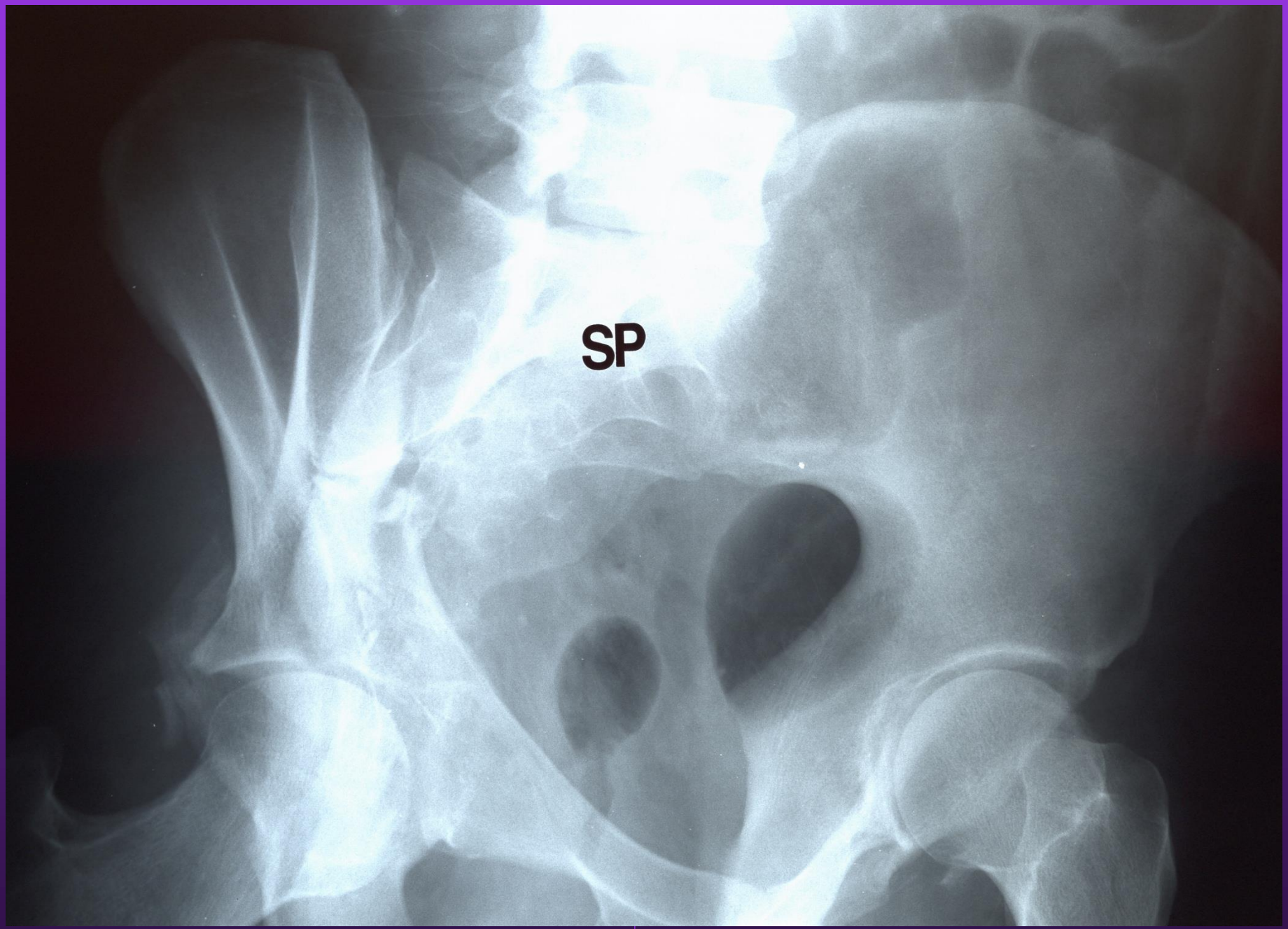
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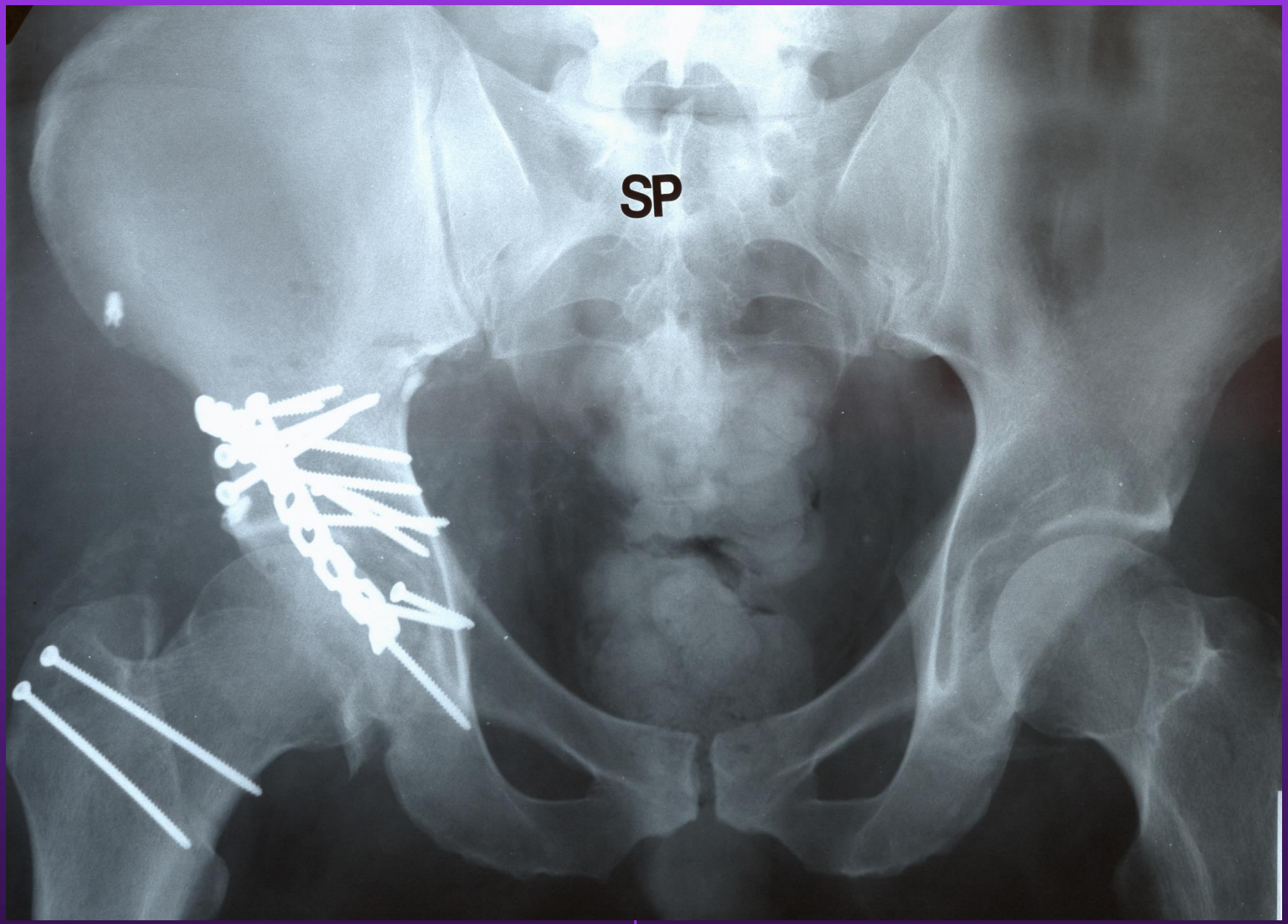
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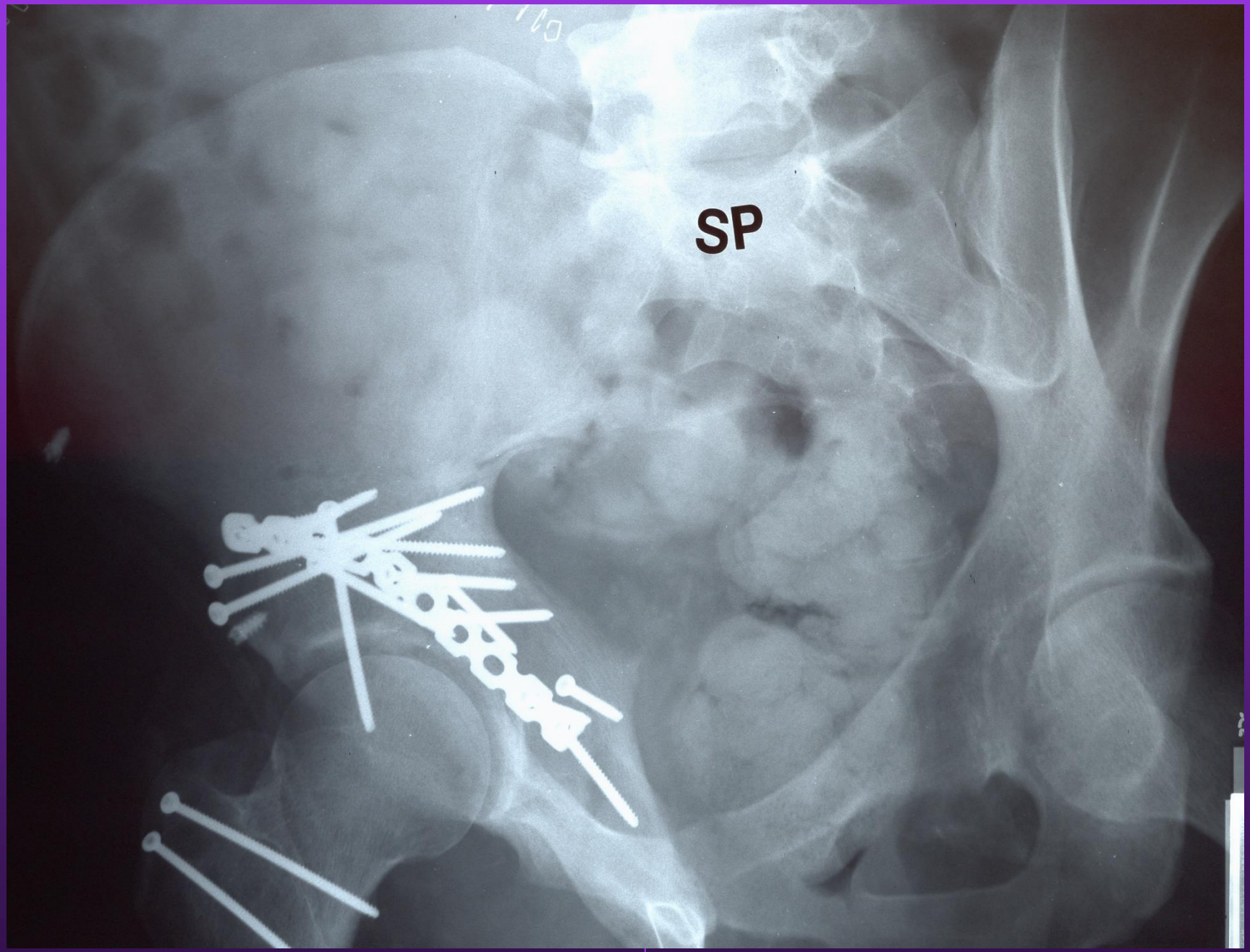
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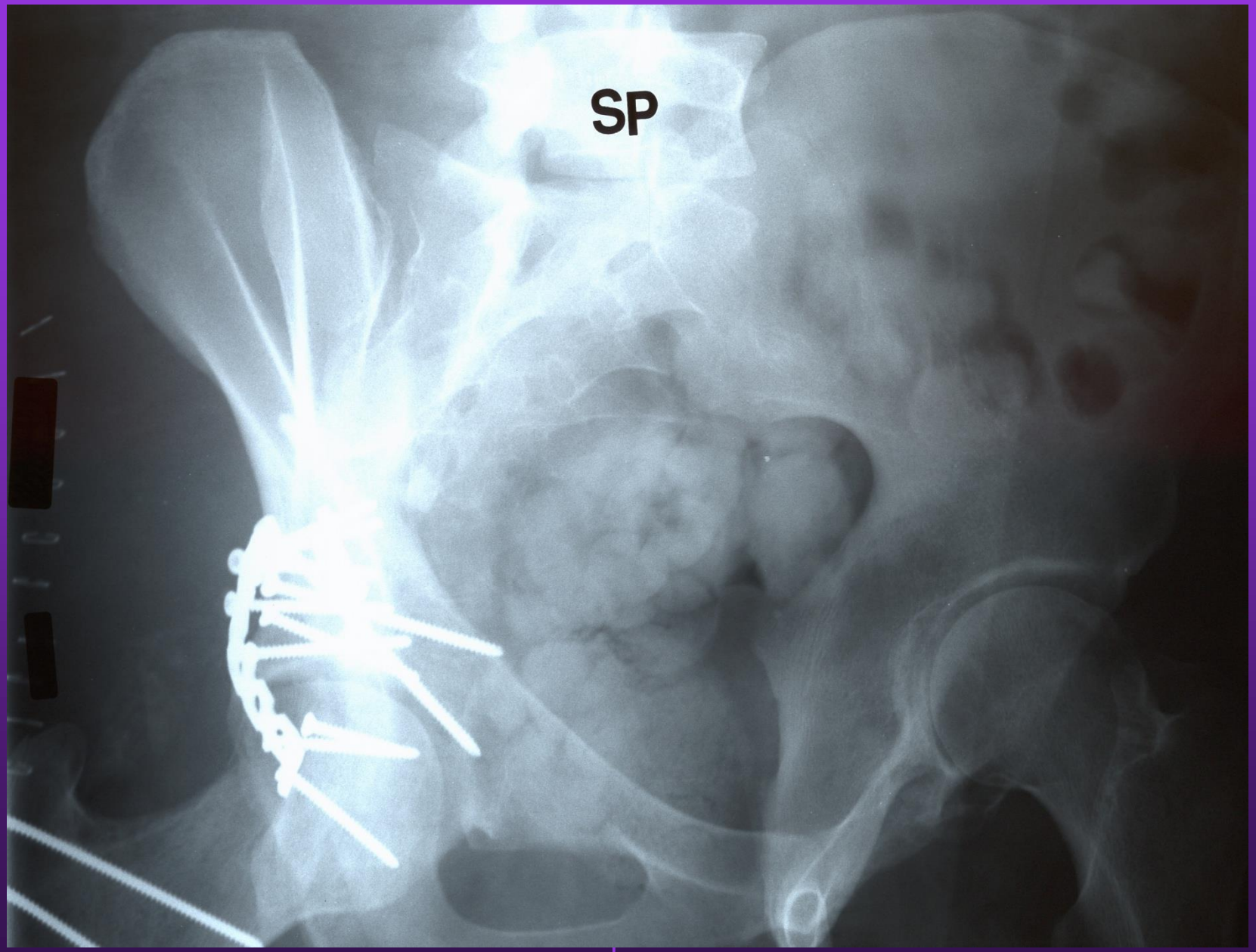
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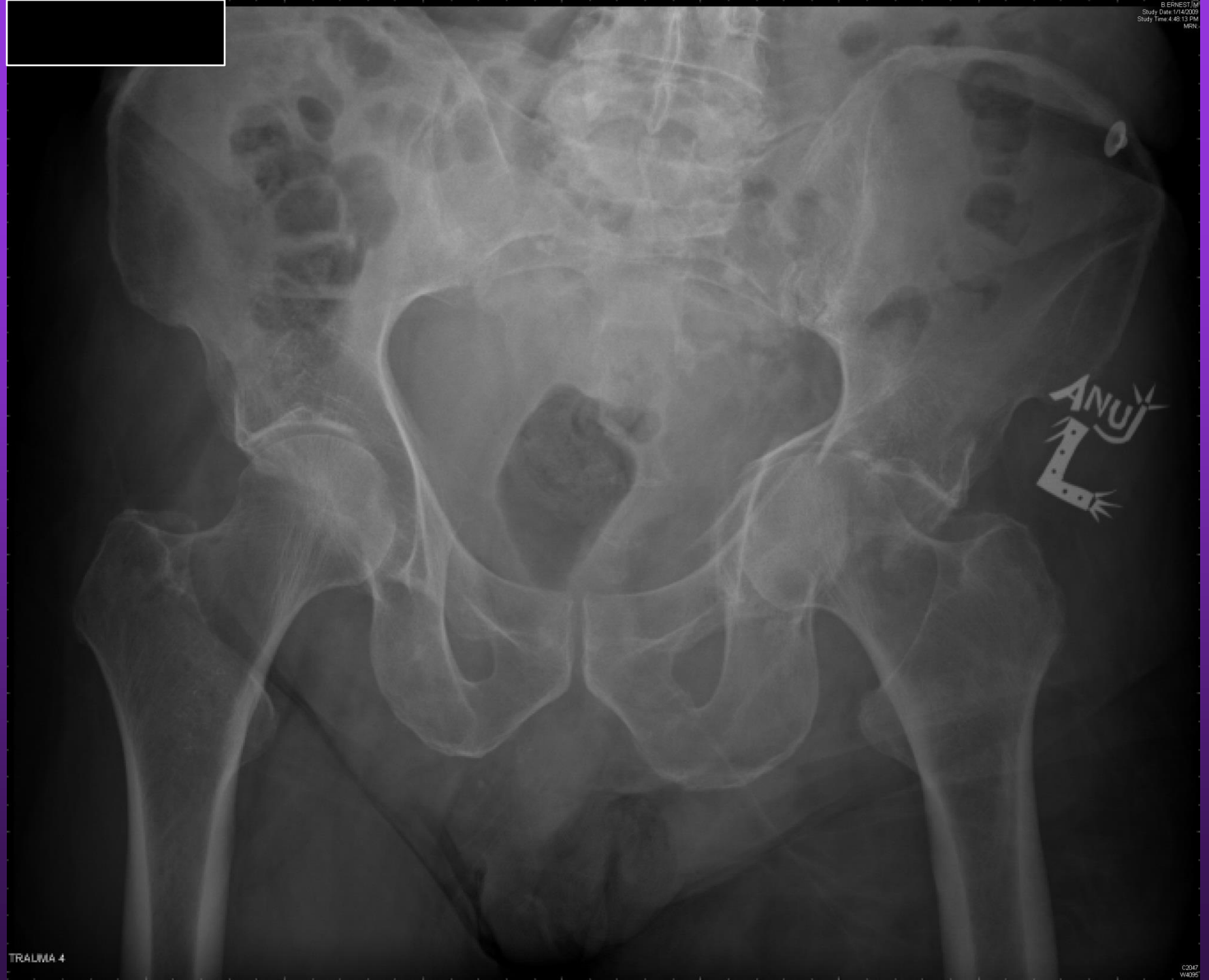
EB

- 72 yo with “T” type acetabulum with central dome impaction
- Poorly reduced with post op subluxation
- Anterior THA using the femoral head as medial bone graft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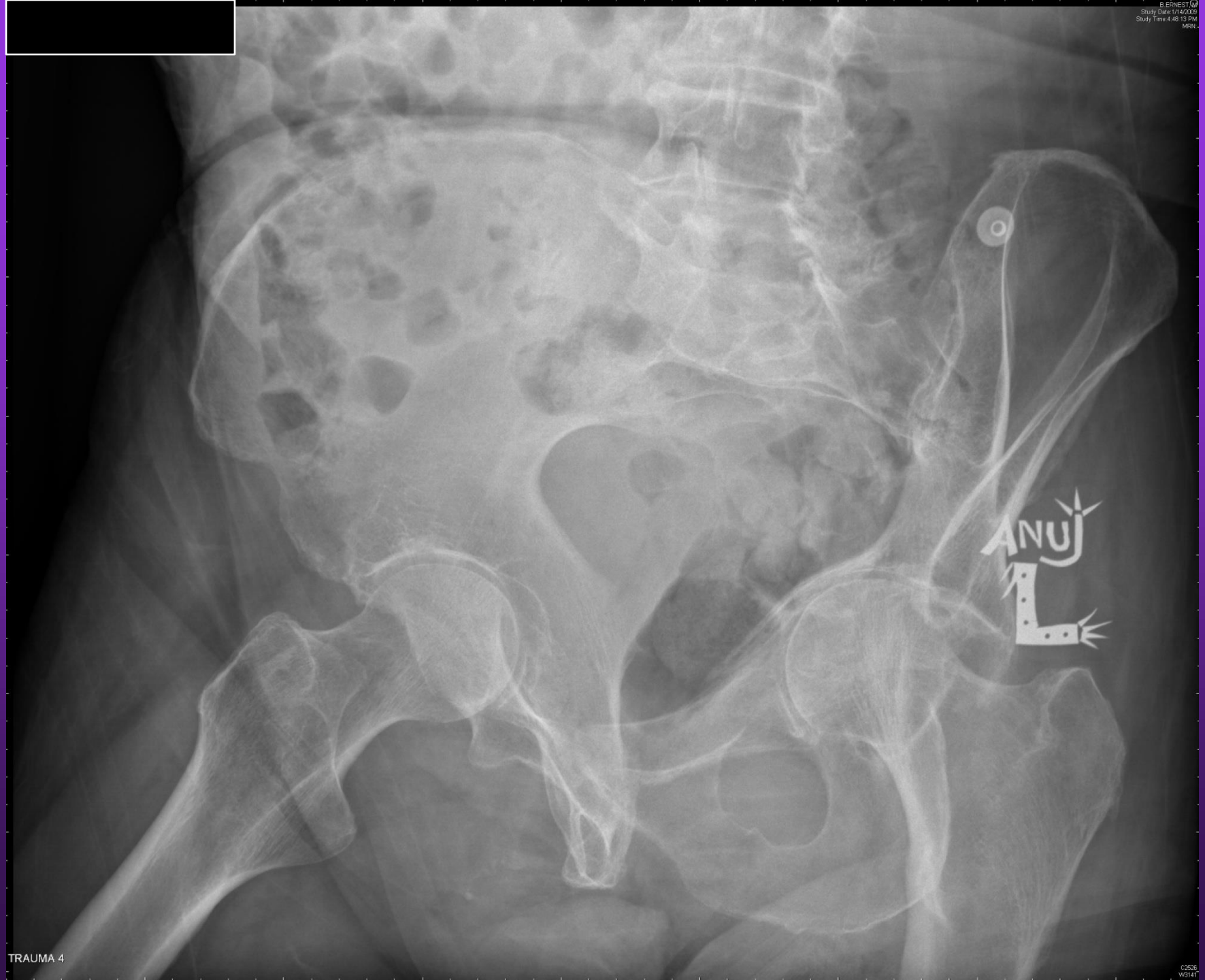
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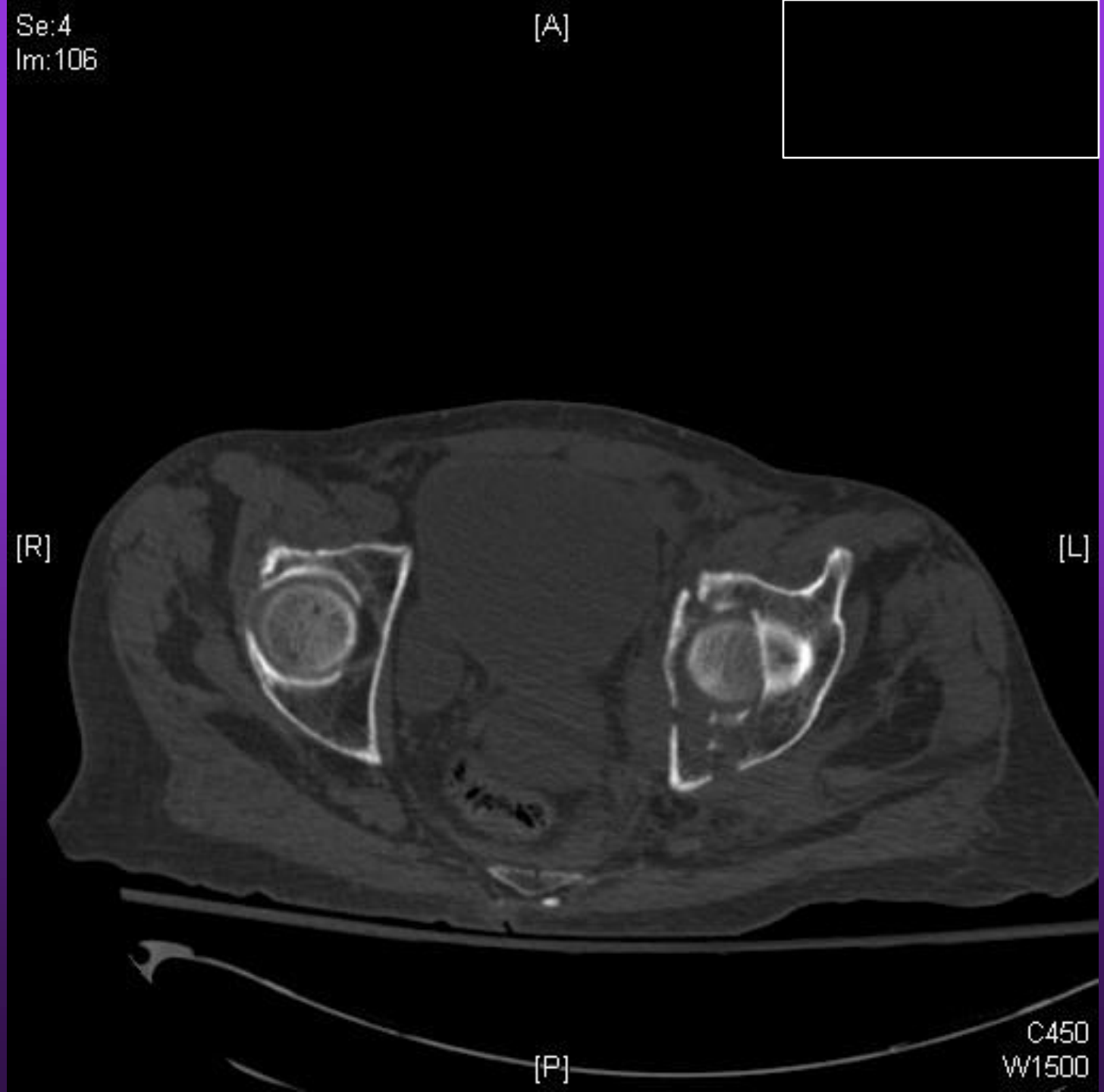
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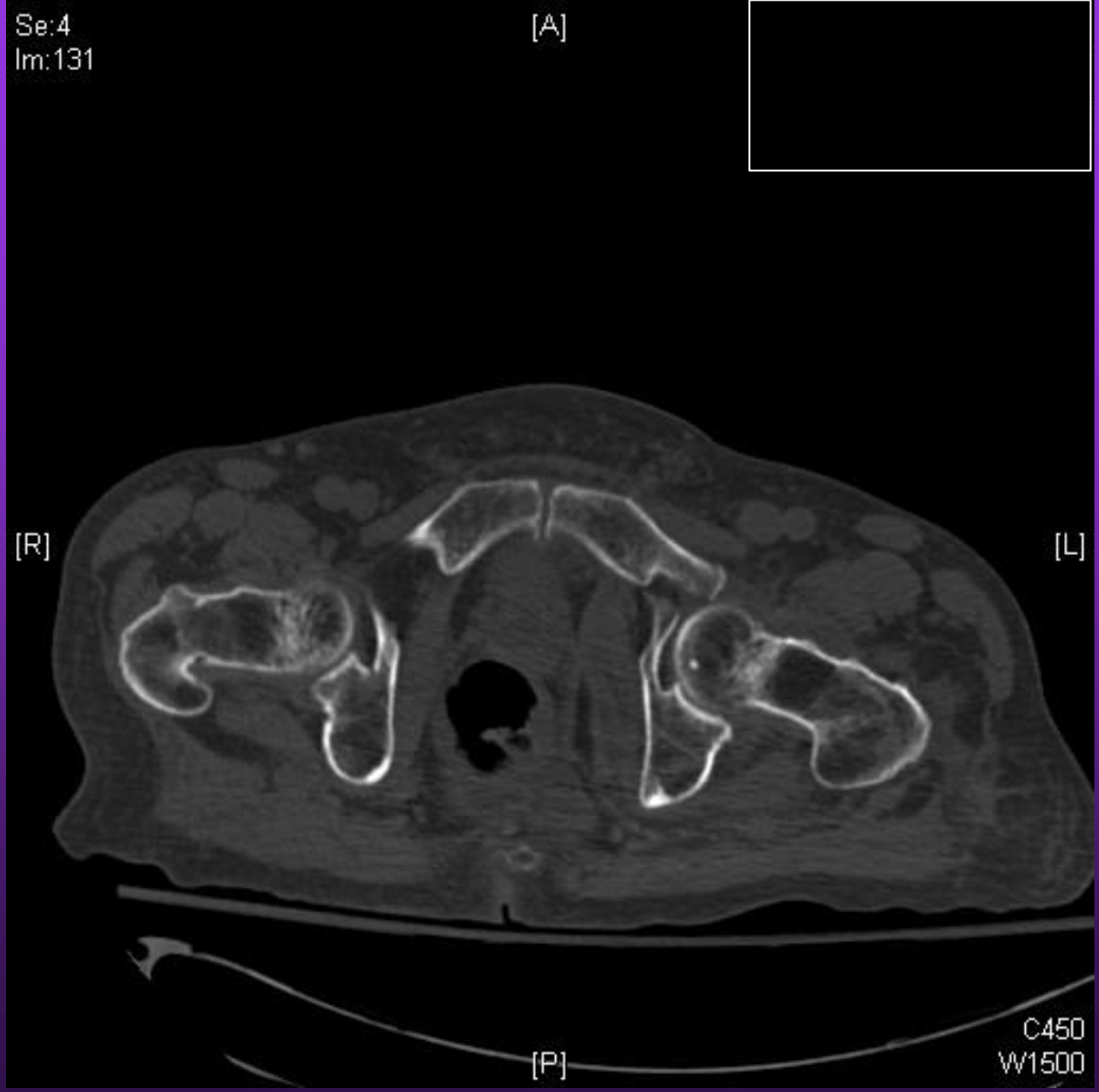
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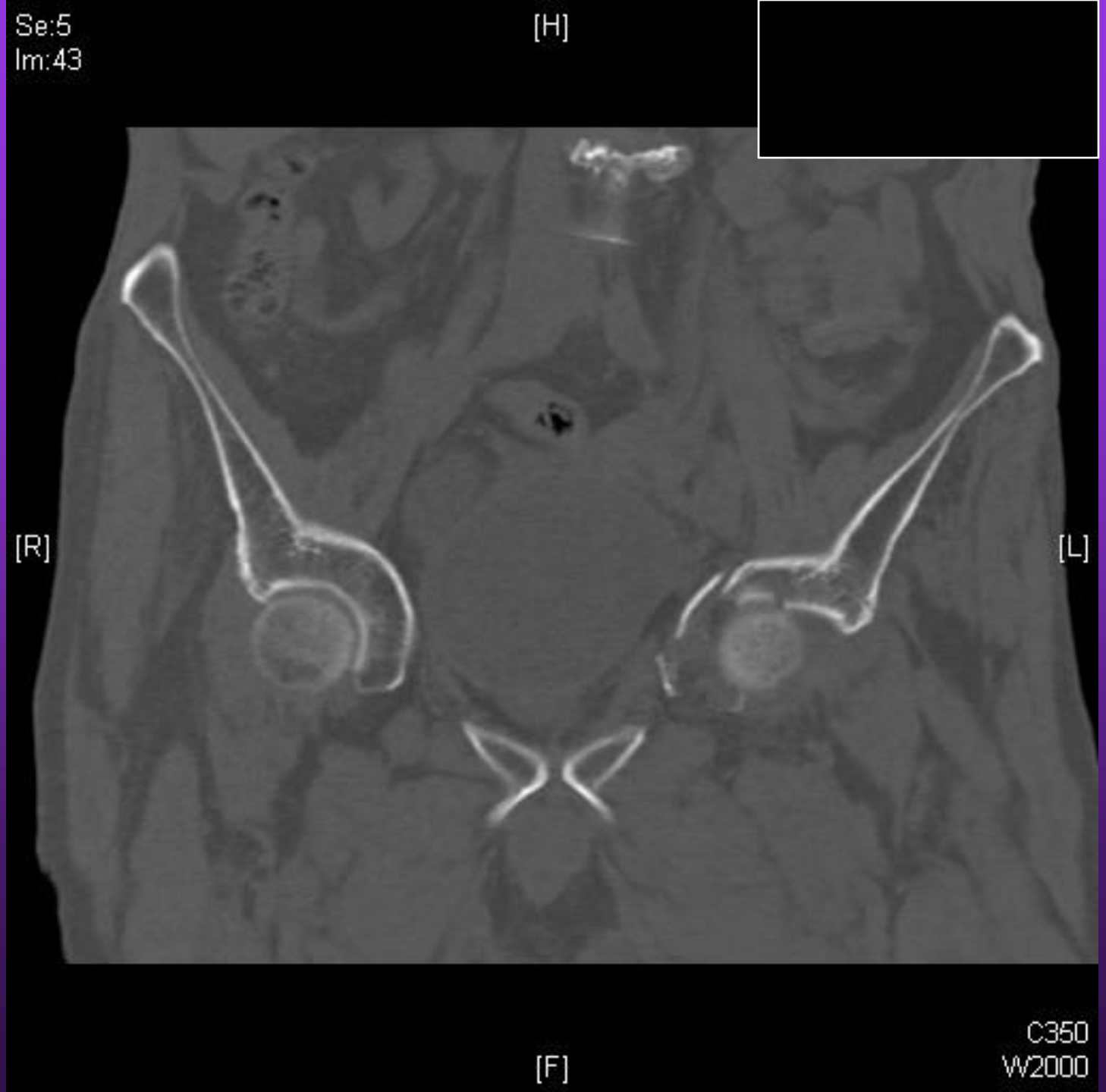
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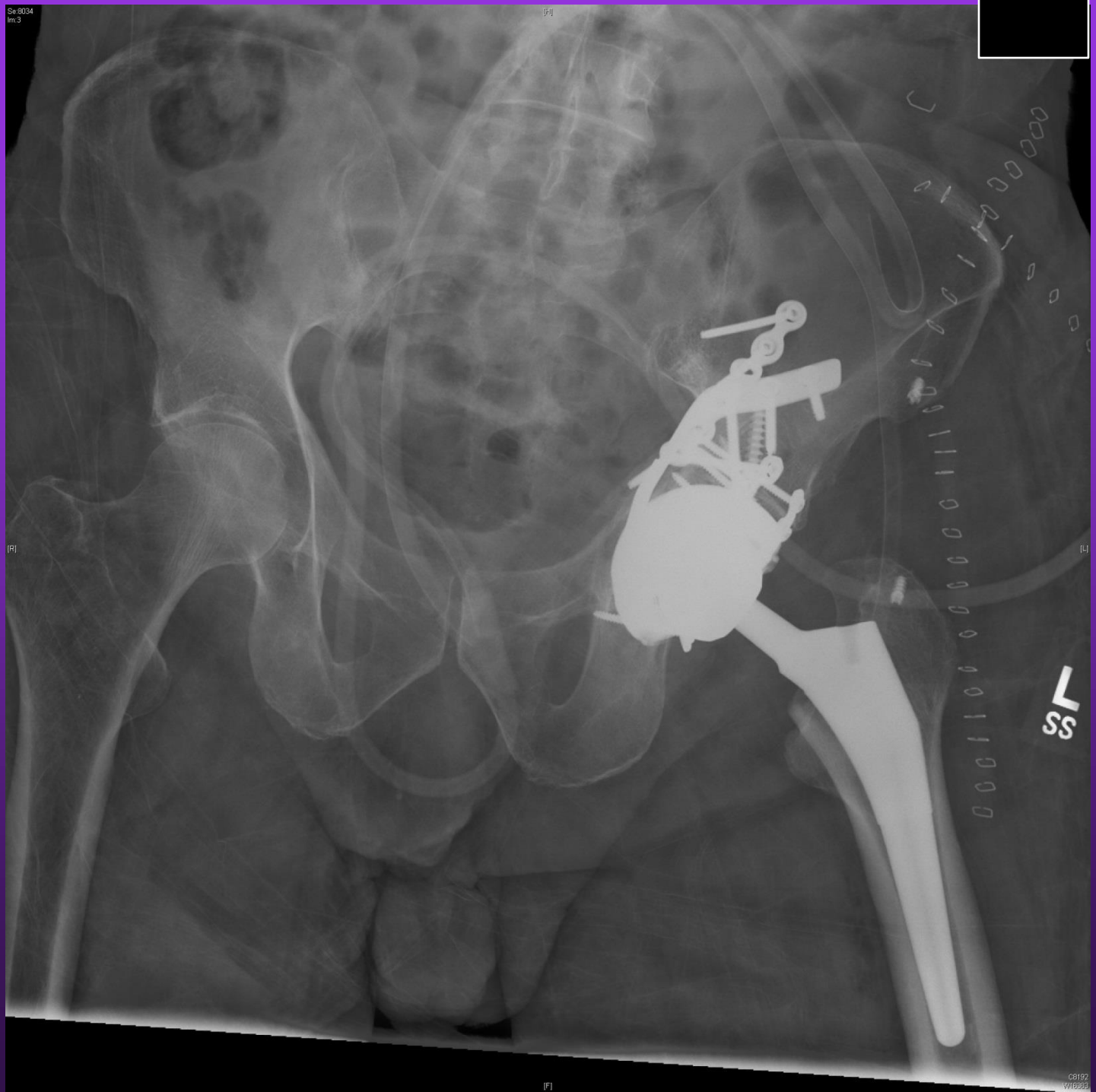
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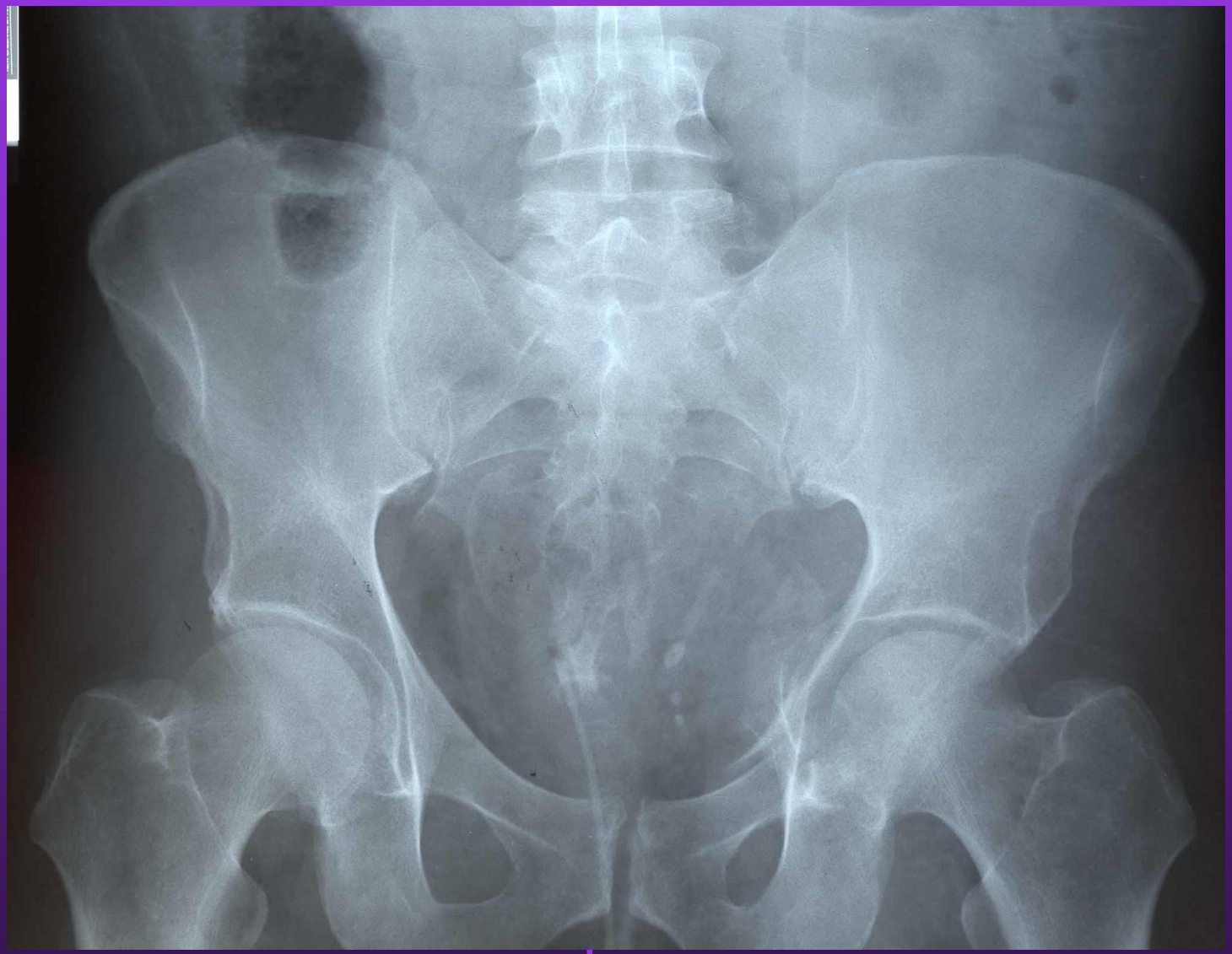
JM – 8/10/00



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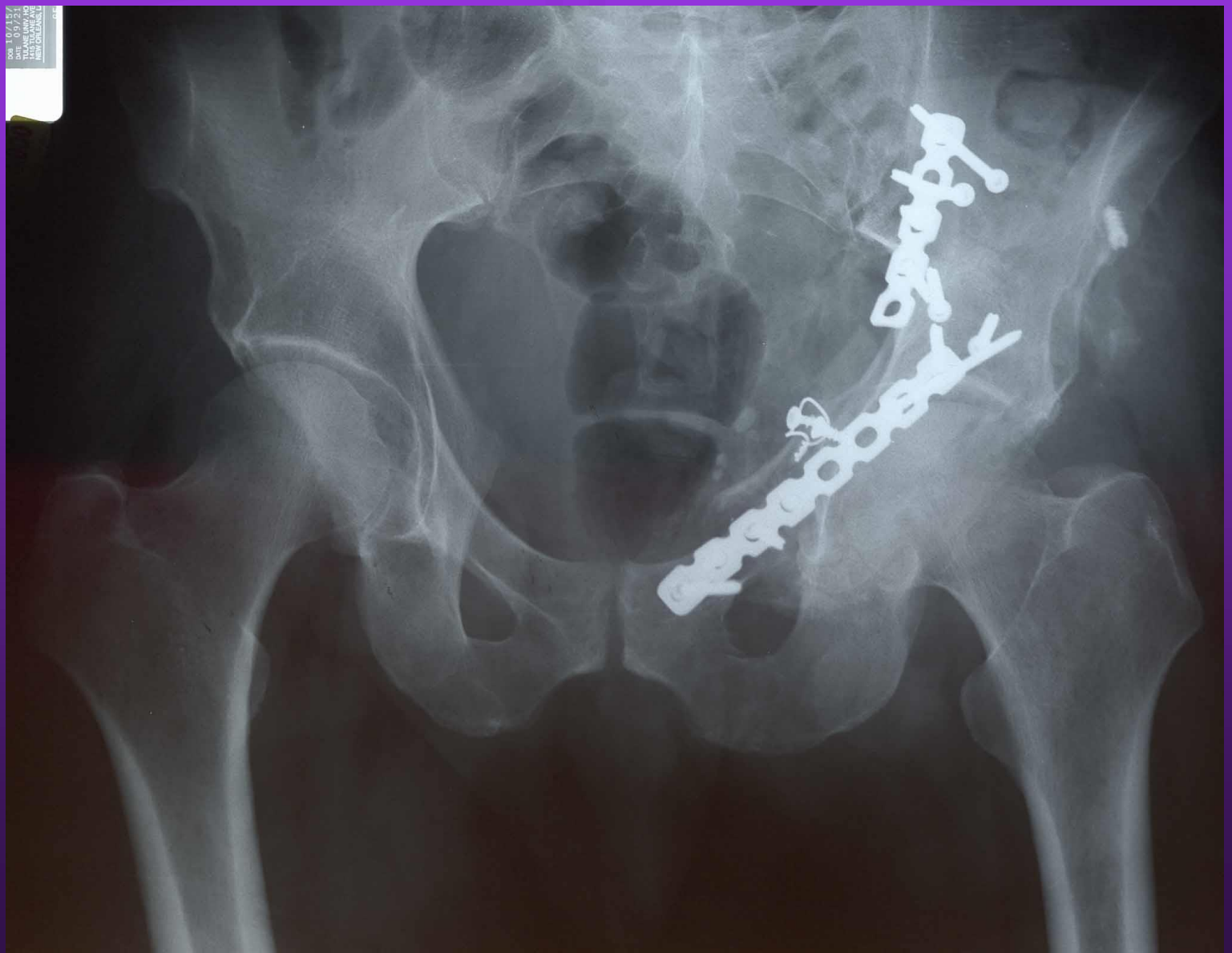

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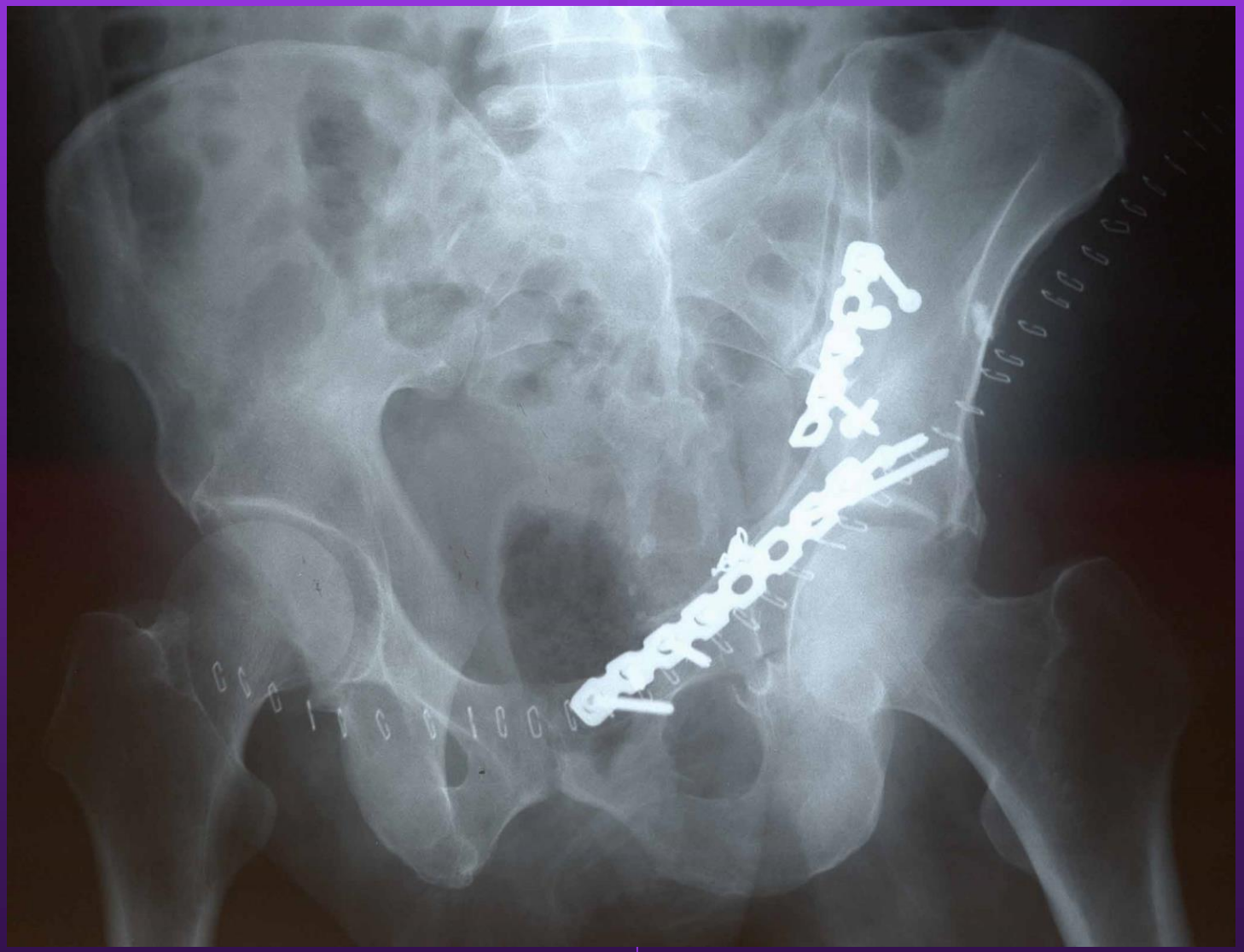

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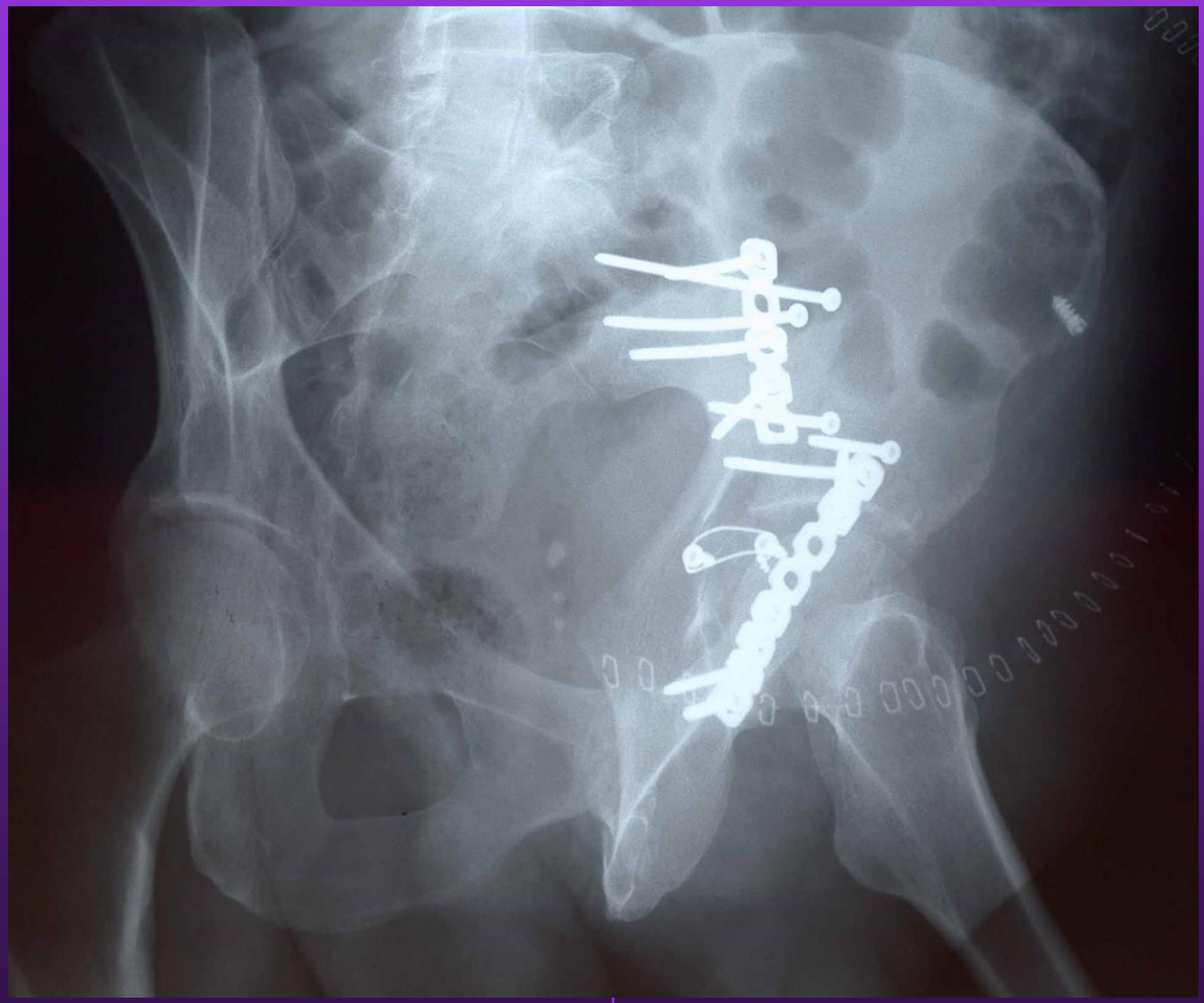

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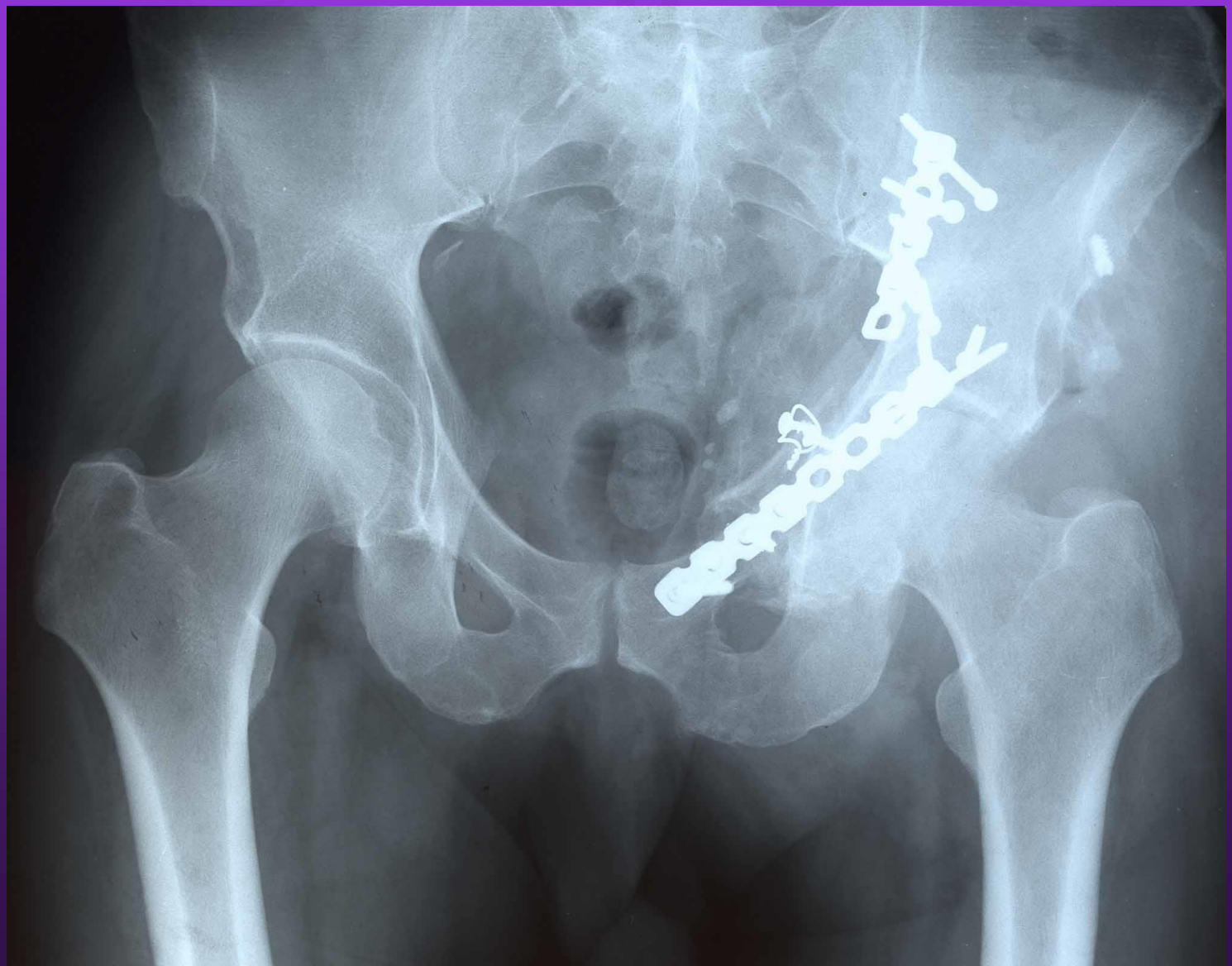
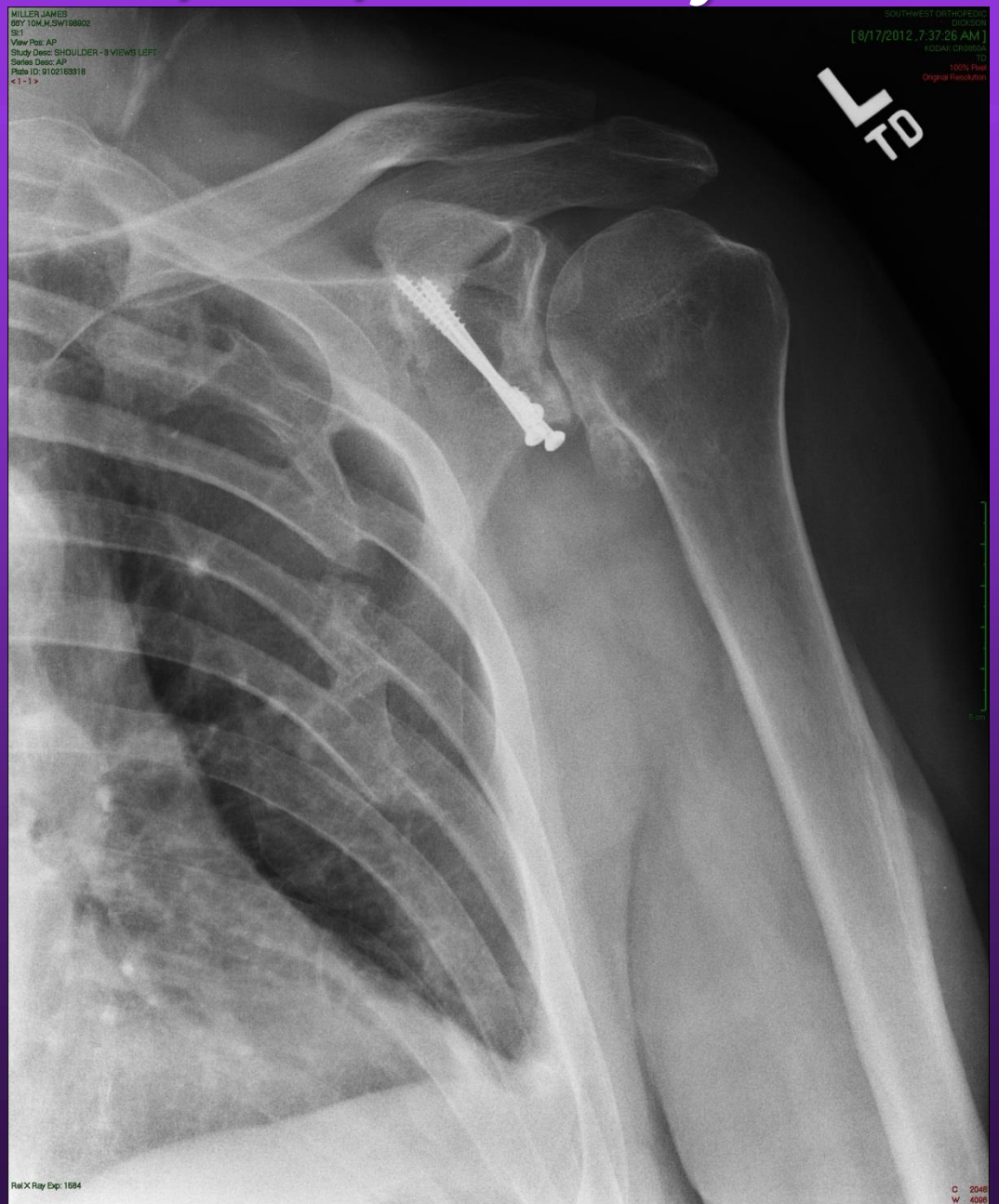
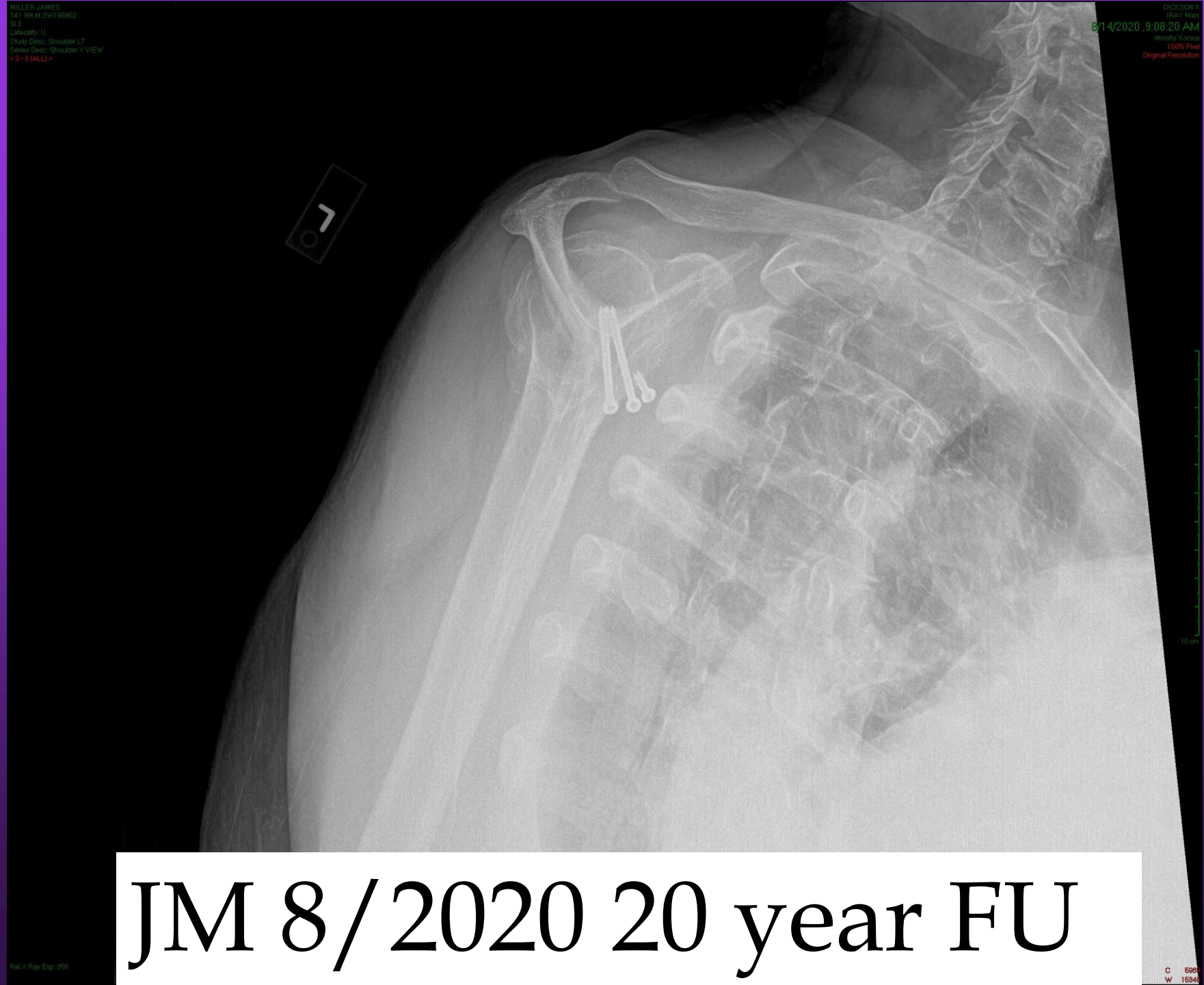


JM 8/17/2012 10 year FU

JM 8/17/12 10 year FU





JM 8/2020 20 year FU

JM 8/2020 20 year FU

Summary

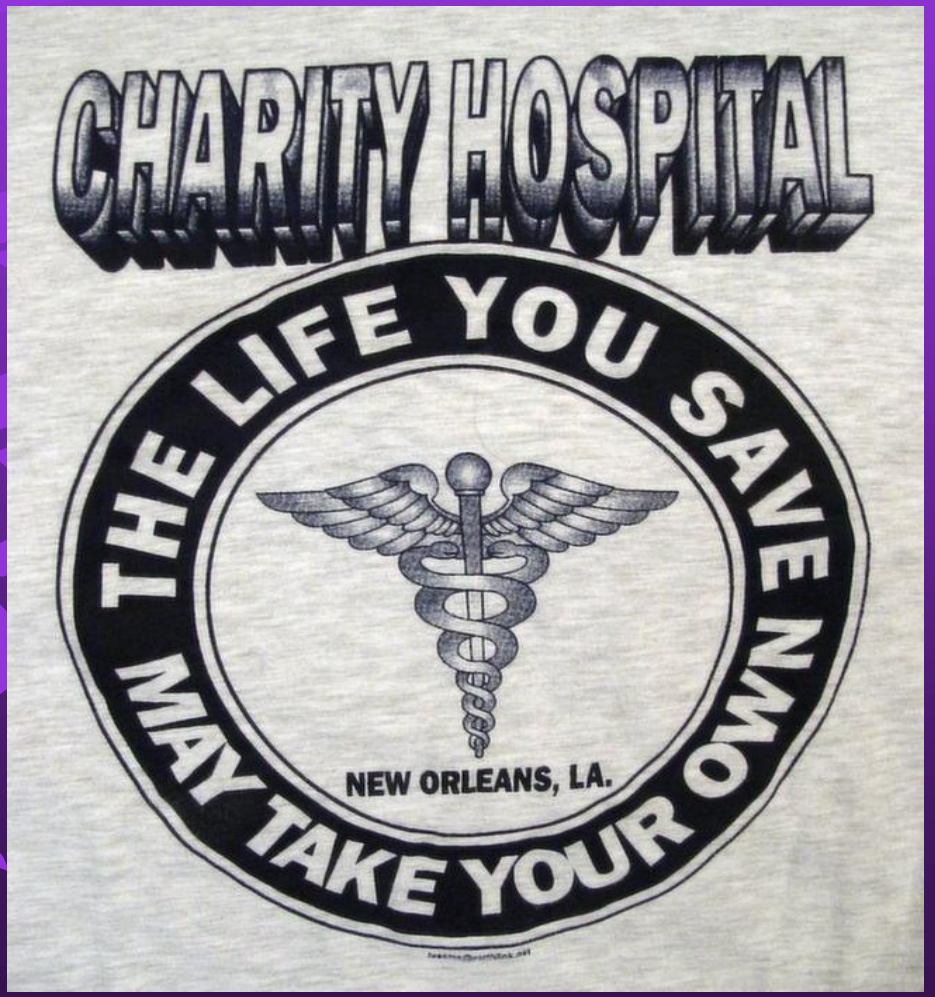
- Consider 1º THA – Femoral head damage, dome impaction, stable fixation of acetabular fractue, ?severe osteoporosis- not a staged approach
- ORIF is still the gold standard even in the elderly

Summary

- PREVENTION
- 2º THA – know the anatomy (sciatic nerve), remove HO, culture, remove hardware as needed, bone defects (CT)
- Staged Approach- elevated wbc, esr or crp or positive alpha defensin or positive aspiration, wbc/hpf>5
- Results of either 1º or 2º THA not as good as those without an acetabulum fracture

Thank You


Charity Hospital, New Orleans


CHARITY HOSPITAL
THE LIFE YOU SAVE MAY TAKE YOUR OWN
NEW ORLEANS, LA.