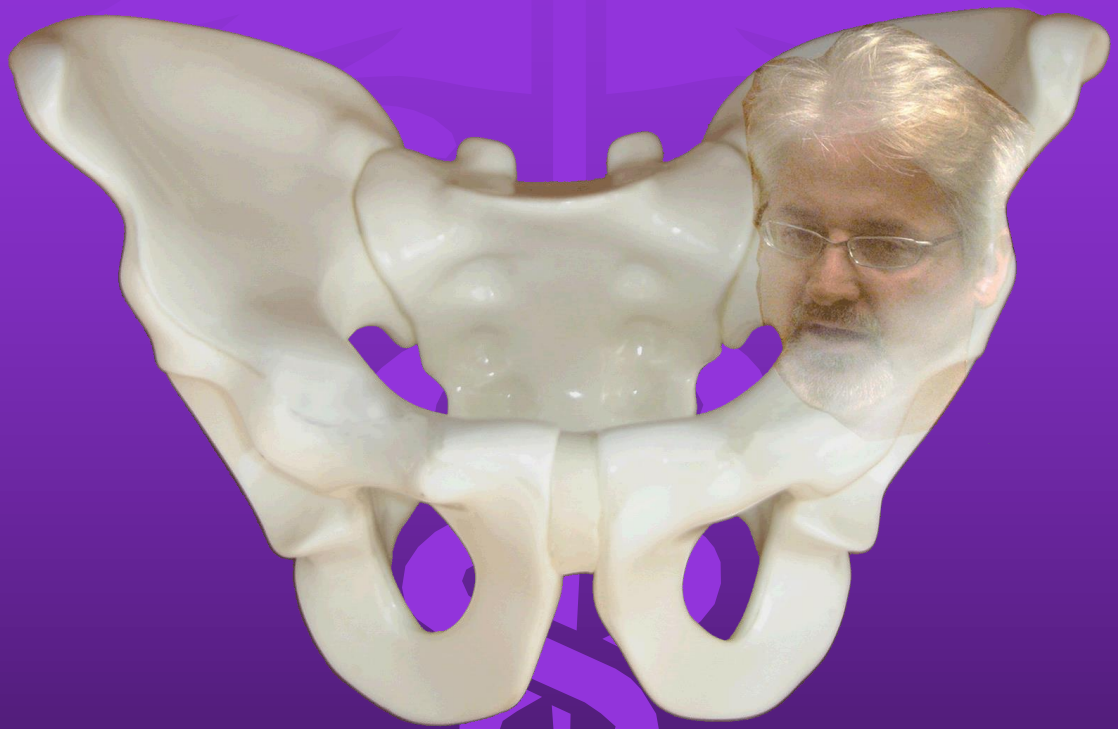
Kyle F. Dickson, M.D. M.B.A.



Professor Baylor College of Medicine
Southwest Orthopaedic Group, Houston, Texas
kyledickson99@gmail.com cell 713-208-4168

Minimizing Blood Loss: TXA, Cell Saver and other Strategies

Kyle Dickson MD, MBA
Southwest Orthopaedic Group, Houston Texas

Blood Transfusion

- Infectious risk (known versus unknown)
- ↑ site infection
- Transfusion reaction
- Lung injury, circulatory problems
- Jehovah Witness

How Much Blood Can We Lose?

- Difficult to know?
  - Physiologic rsponses beginning as high as Hgb 9-10g/dl depending on comorbidities, age, volume status and medications
  - Animal studies EKG changes with Hgb<5g/dl

Jehovah Witness

- Mortality ↑ Hgb <6
- 54% mortality Hgb 2.1-3.0
- 100% mortality Hgb 1.1-2
- Personal Pt blind at Hgb 6.?

Two Scenarios

- Trauma- Acute blood loss
- Surgery- ability to preoperatively plan

Hemostatic Resuscitation

Coagulopathy

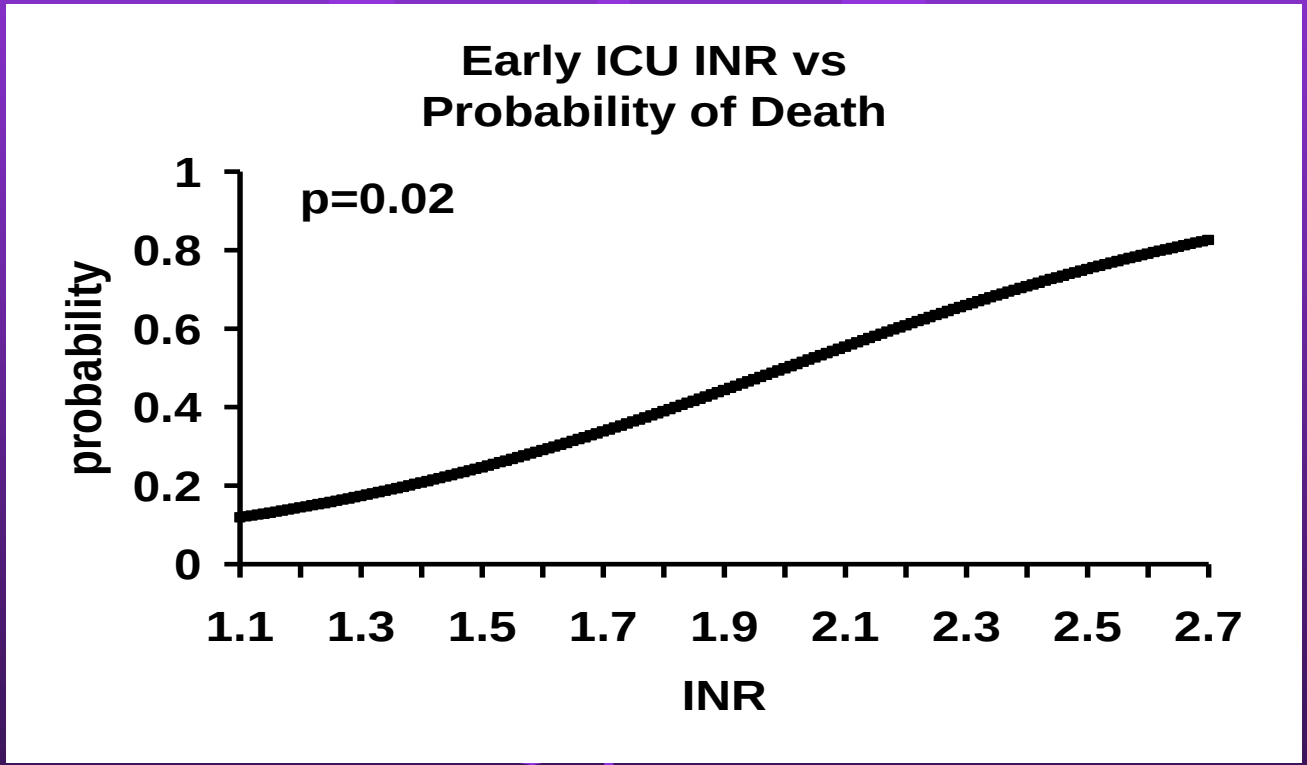
- Hypothermia
- ↓ Ca^{2} (blood citrate)
- Acidotic

Lethal Triad – hemorrhage, coagulopathy, inflamatory/metabolic

Coagulopathy & Trauma

By the time of arrival at the ED, 28% (2,994 of 10,790) of trauma patients had a detectable coagulopathy that was associated with poor outcome (MacLeod et al., 2003)

INR vs Mortality
1st 24 hrs in STICU



P = 0.02, ROC = 0.71

Patients > 10 U PRBCs

97 Patients over 51 Months ending January 03 (2:1 ratio)

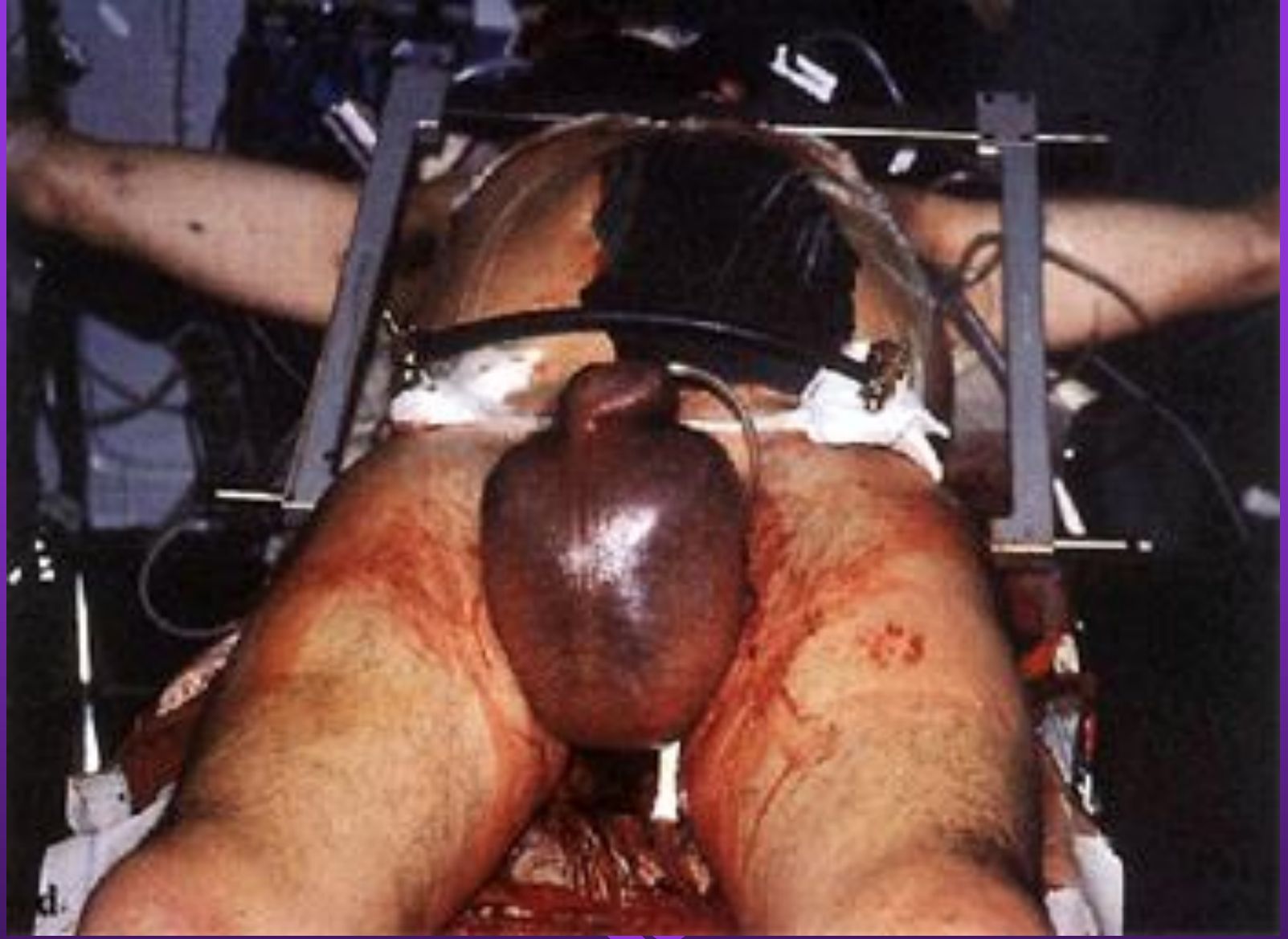
Age = 39 ± 2 , 61% Male Gender

ISS = 28 ± 1 , 73 % Blunt Mechanism

ED Base Deficit = 10 ± 0.3

ED INR = 1.8 ± 0.2

67 % Survival , ICU Stay = 13 ± 1 days



Blood/FFP/Cryo/Plts 1:1 ratio !

TEG

- Thromboelastography – measures the profile of clotting
- Used to transfuse what is needed vs just 1:1 ratio

Methods (3)

- 1) Reduce further loss- pressure, embolization, acute hypervolumetric hemodilution (ie fluids)
- 2) Correct coagulopathy – enhance hemostasis based on labs
  - Txa Tranexamic Acid – antifibrinolytic that competively binds to lysine sites on fibrin clots impairing fibrin lysis 1gr iv q6

Correct Coagulopathy cont.

- TXA side effects-nausea diarrhea, stomach pain or discomfort, chills, fevers, severe headaches, back or joint pain-↓blood loss and bleeding mortality
- Vit K 10mg po/iv (warfarin pts, ↑INR can take 4-8 hrs to reverse)

Correct Coagulopathy cont.

- rFVIIa 40-65 µg/kg iv-JW hamster cells ↑Thrombolic emboli events
- Prothrombin Complex Concentrate (PCC) – multiple products unactivated 4 factor 25-50U/kg with Vit K
  - Octaplex – no human alb JW

Methods cont.

- 3) Improve RBC product
  - Iron dextran 1gr iv
  - Folate 1mg po/iv/im/sq daily
  - Cyanocobalamin 1000µg iv/im/sq depending on the etiology B12 deficiency
  - EPO – epoetin alfa 300U/kg
  - HBOC- Hgb oxygen carriers ?myocardial ischemia

Intraoperative Techniques

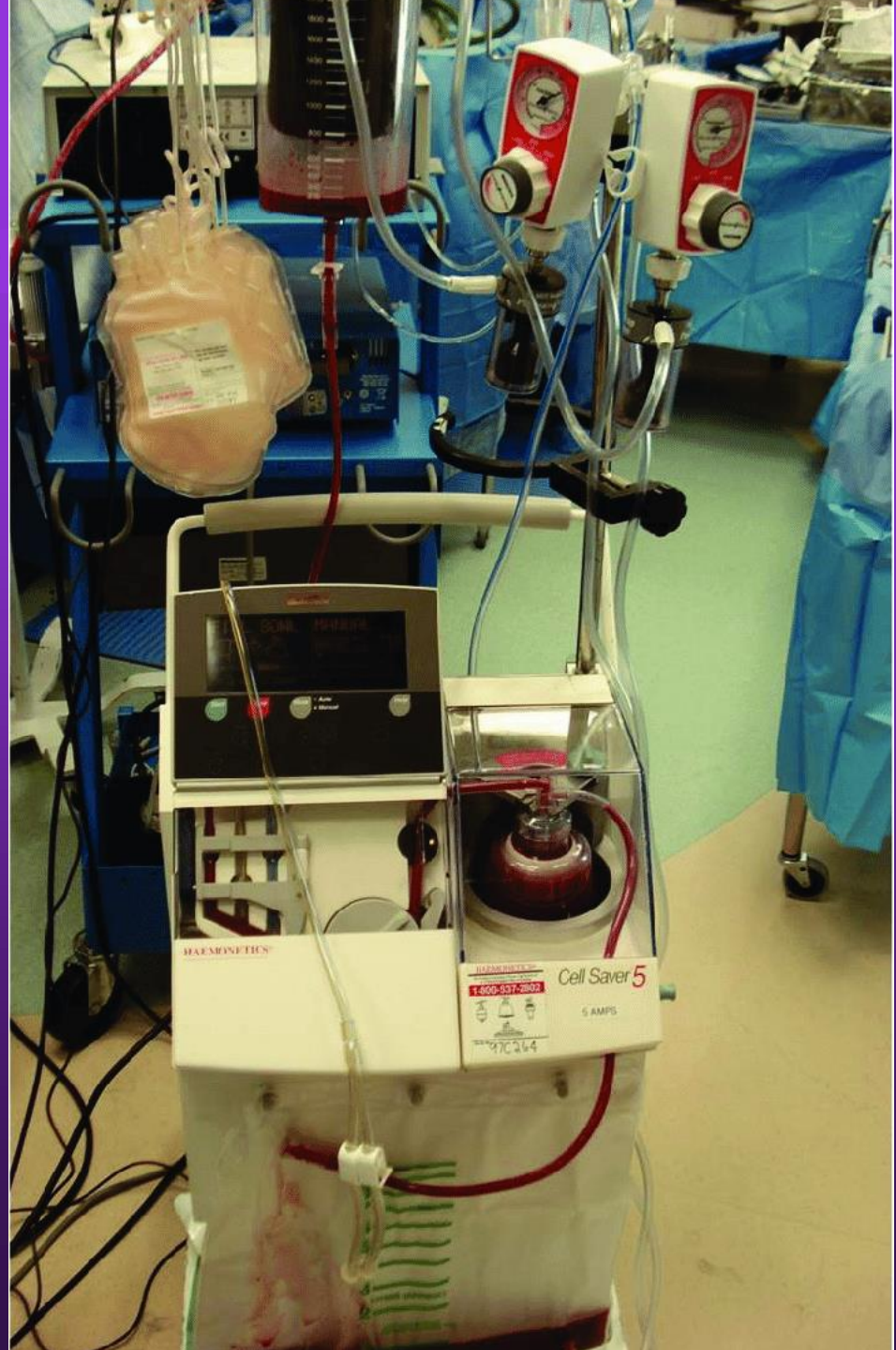
- Positioning- elevation of extremity or free belly prone
- Hemodilution
- Hypotensive anesthesia SBP 80-90 MAP50-65- 30% reduction in blood loss
- Ventilation- hypercapnia and ↑intrathoracic pressure- ↑ blood loss

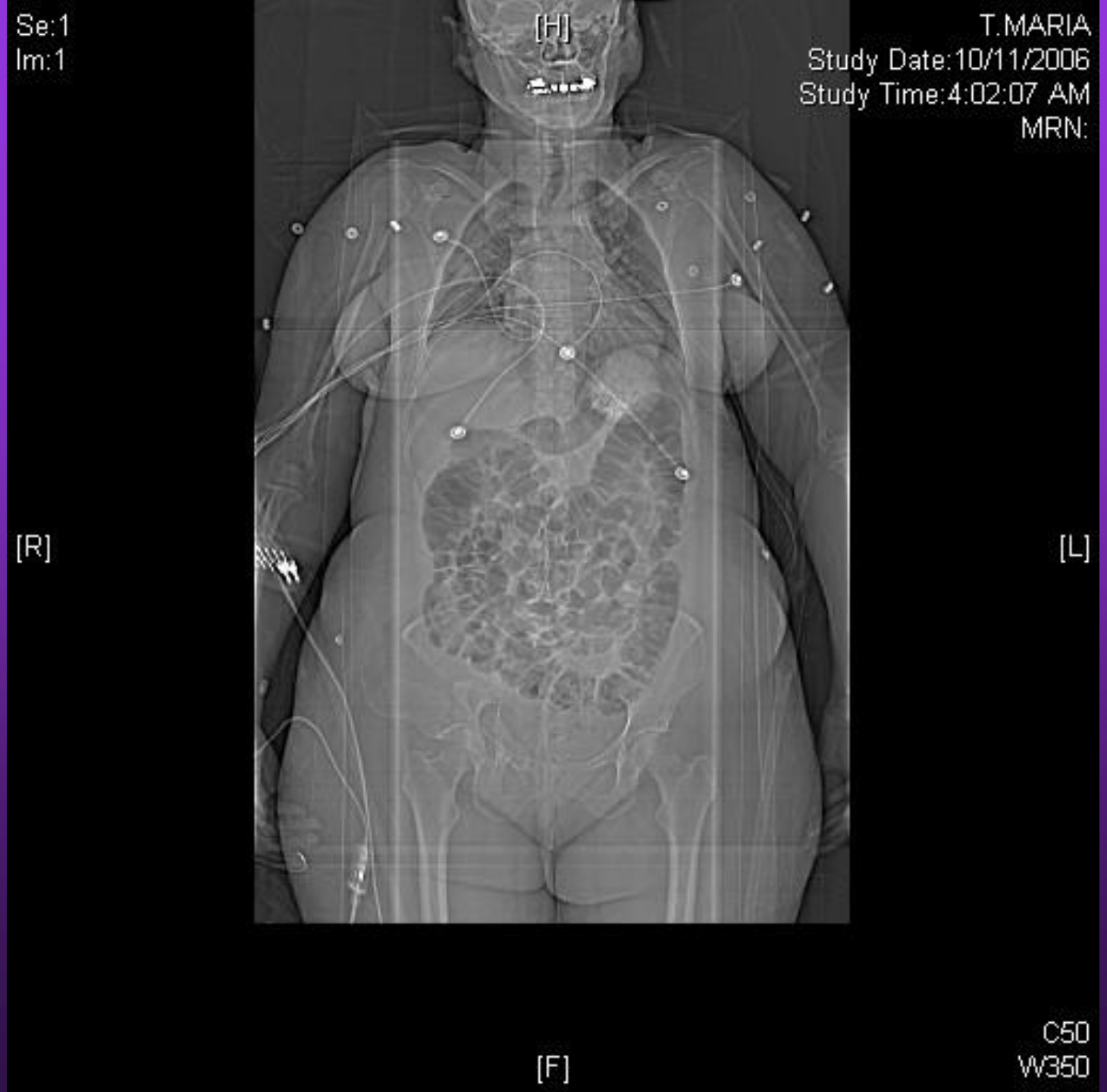
Intraoperative Techniques cont

- Neuroaxial or local anesthesia- blocks
- Cell saver (expected 500cc blood loss) morbid obesity, revisions, liver disease (cryprecipitate)
- Hemostatic products (fibrin glue, thrombin sealants, etc)– rarely ?infections

Intraoperative Techniques cont

- Aquamantys- Bipolar, anterior THA $50 for the hospital $3200 for patient
- Total Blood Volume = actual body weight x 70ml/kg, gender differences, ideal body weight
- No proof but don't want to lose more than a blood volume


HAEMONETICS
1-800-537-2802
Cell Saver 5
5 AMPS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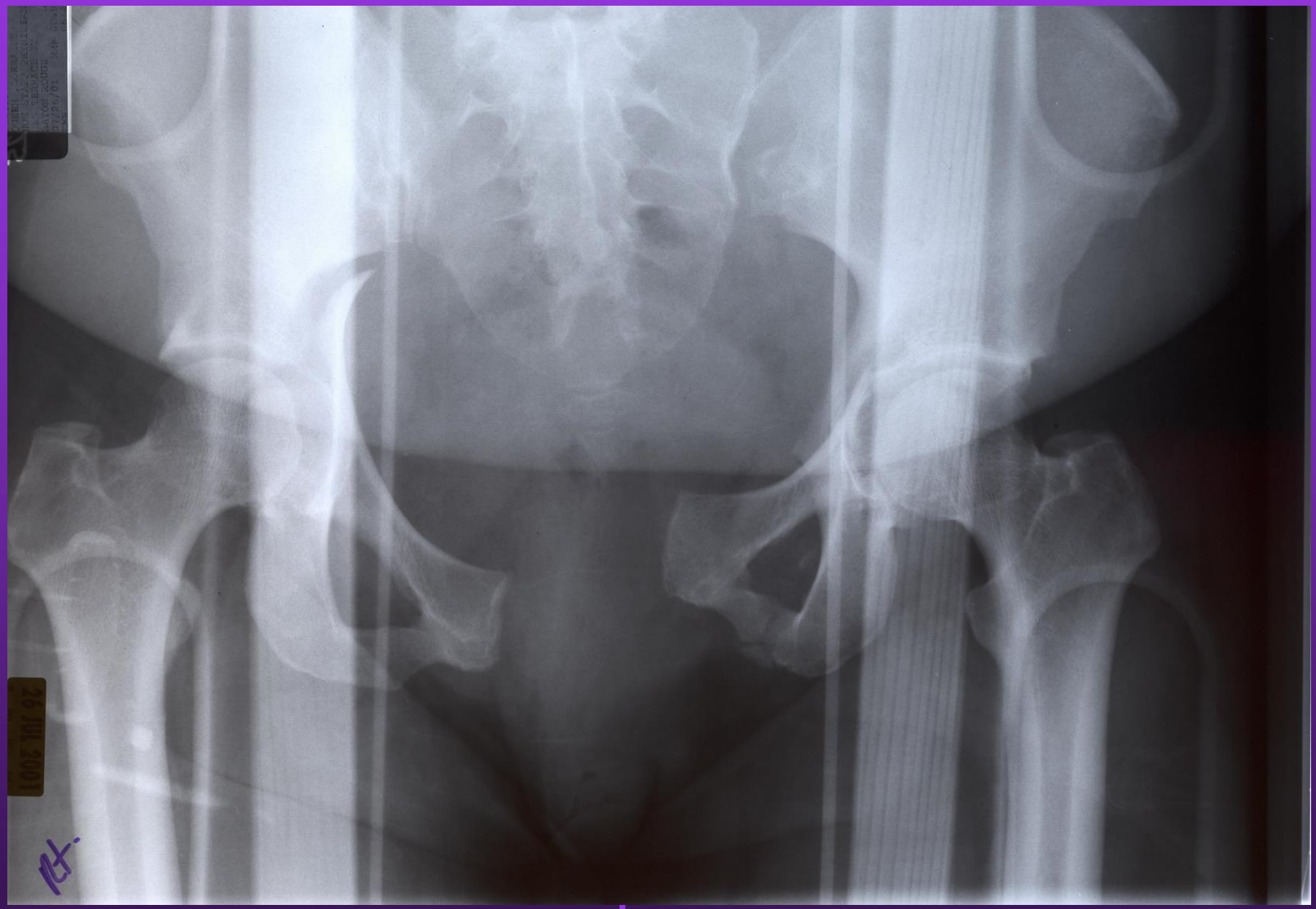
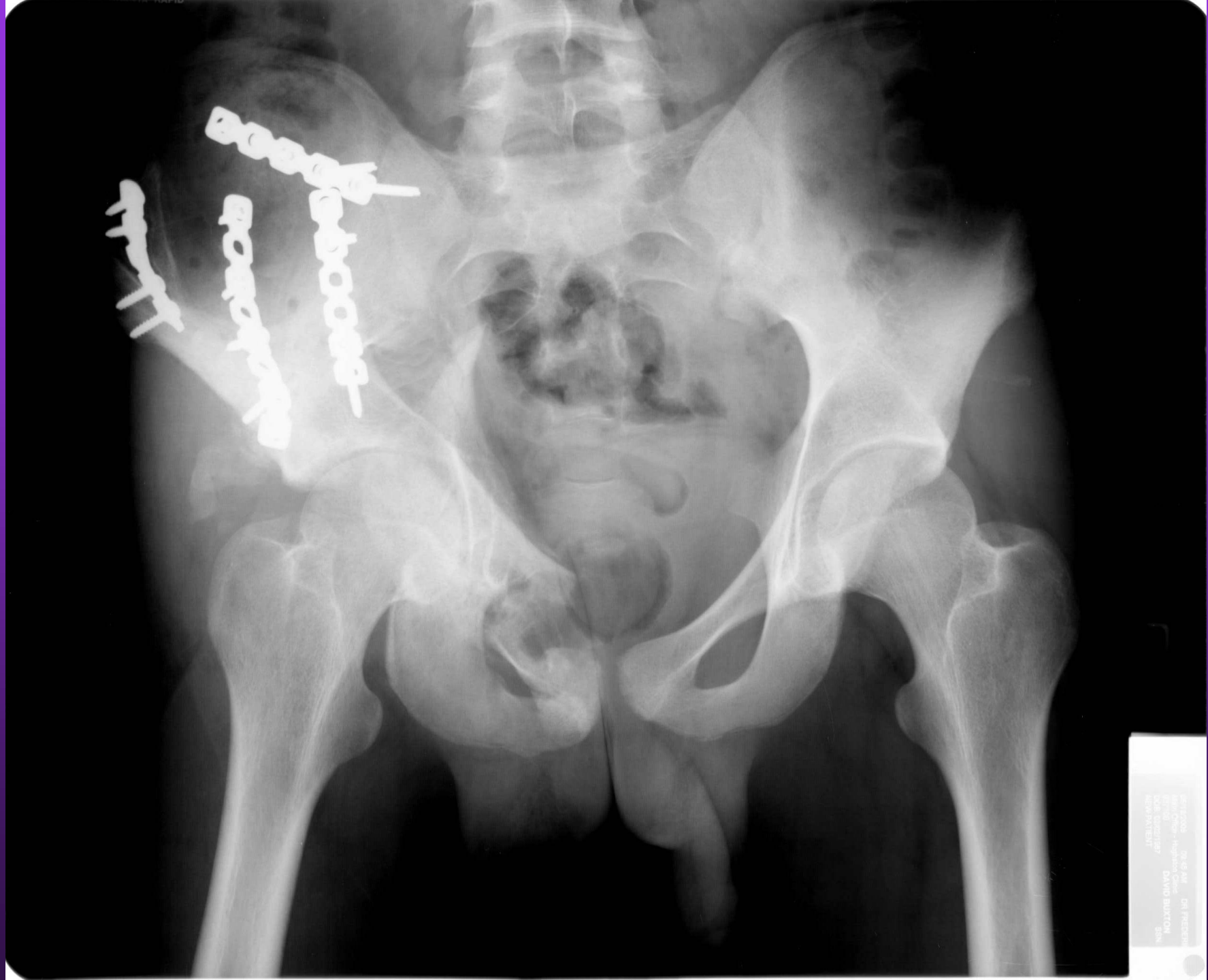
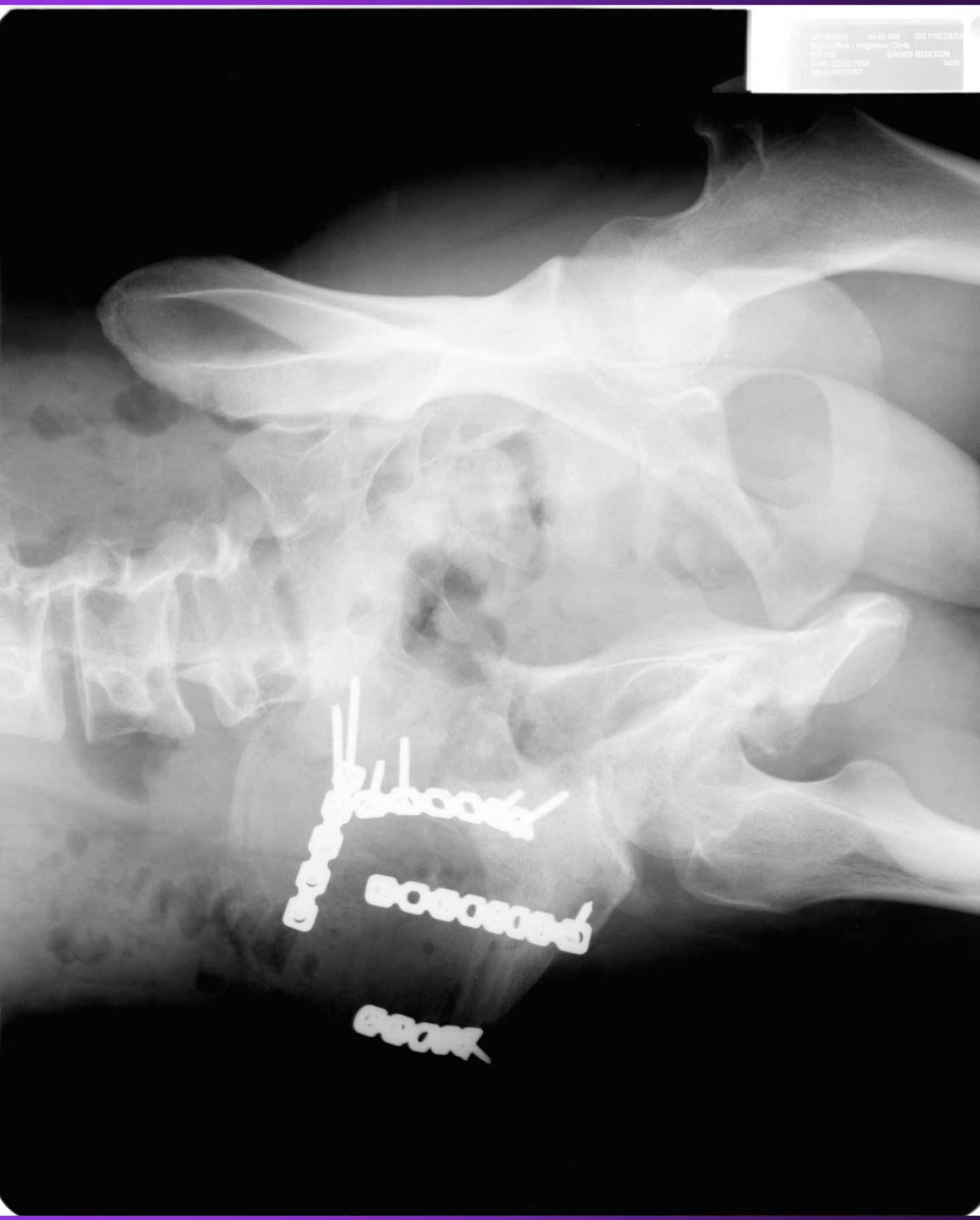
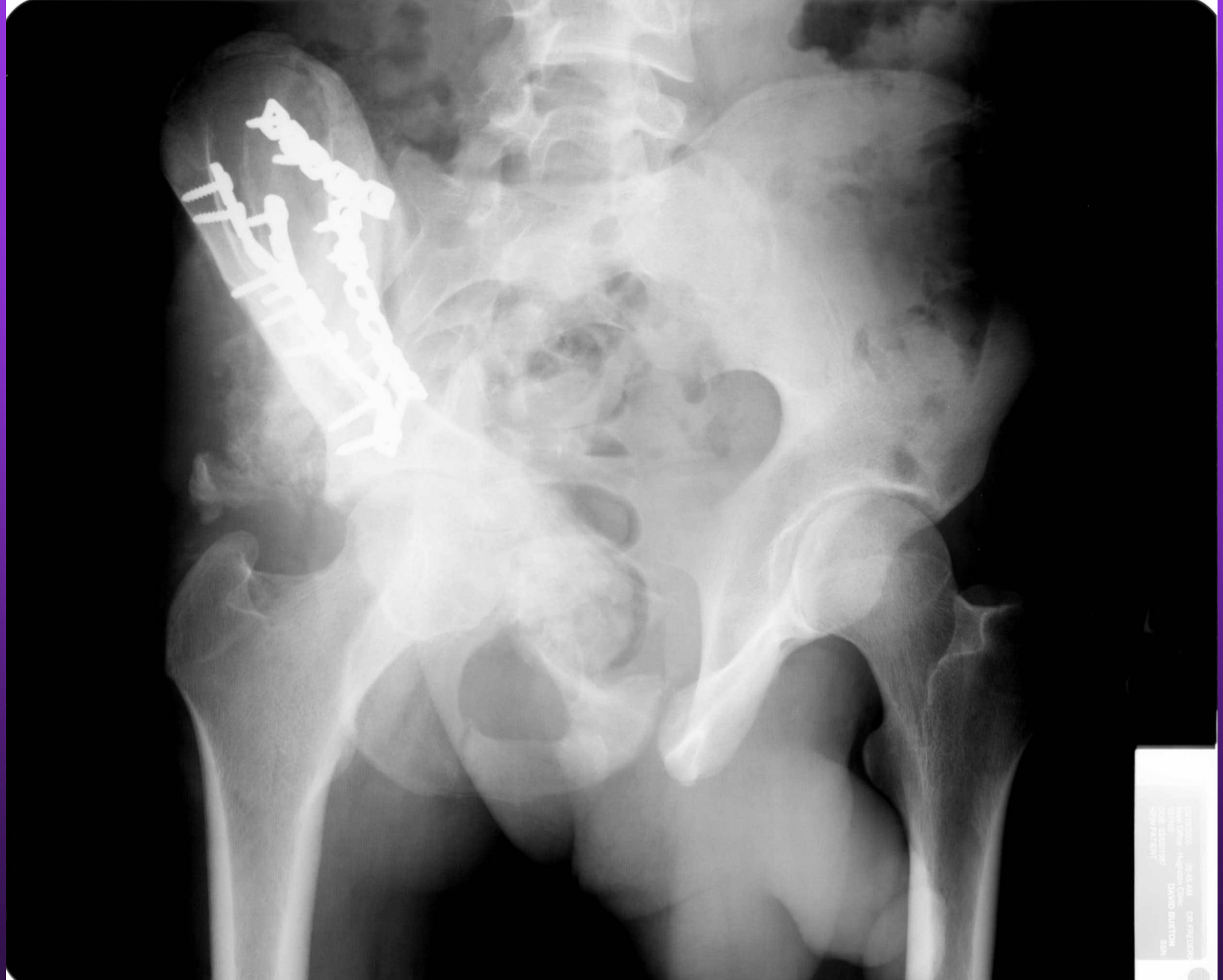


Case

- 33yo MVA
- Fixed >3 months ago my well known trauma surgeon trained at shock trauma and in Atlanta
- Both column fixed through an II
- Poorly reduced anterior and posterior column

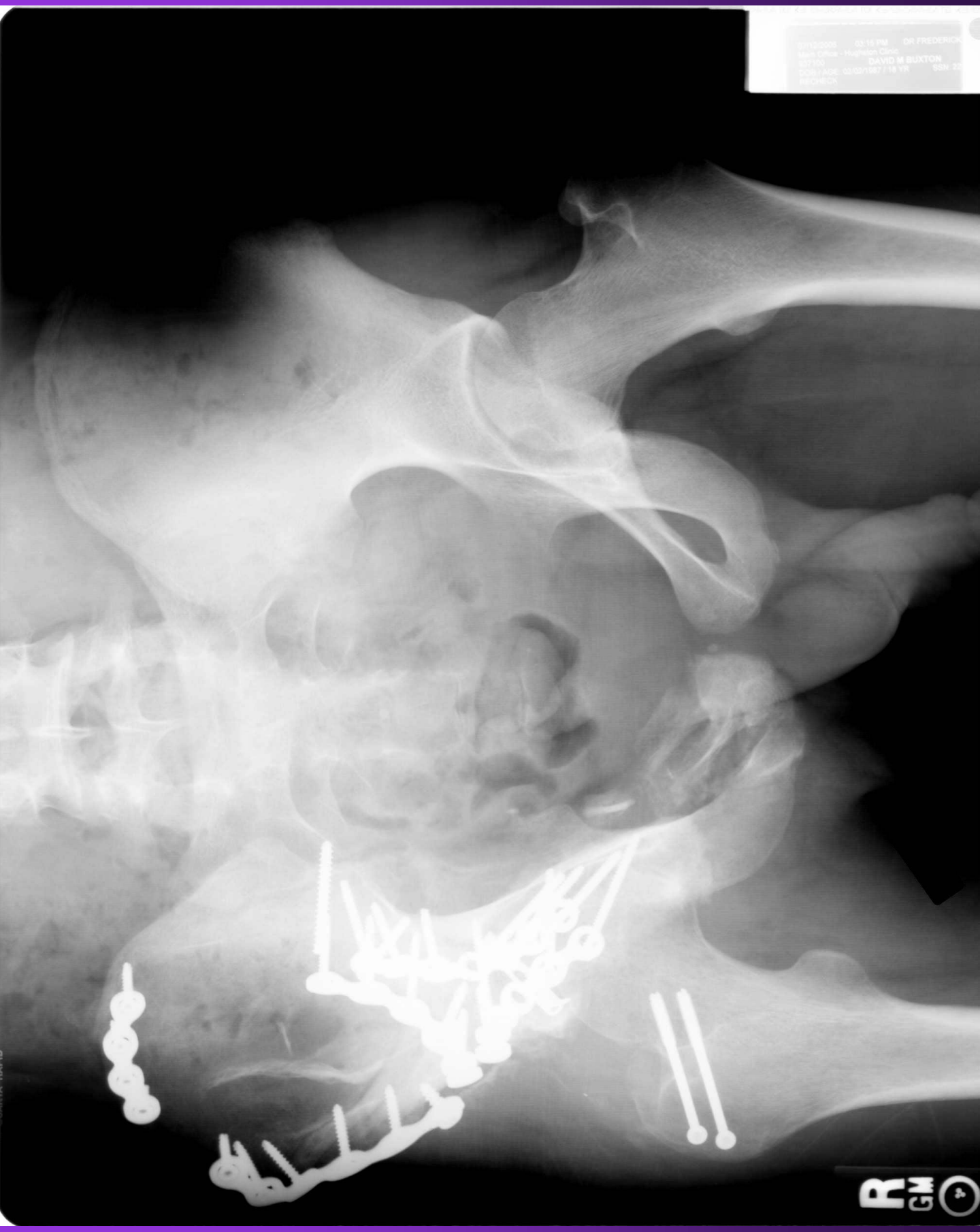


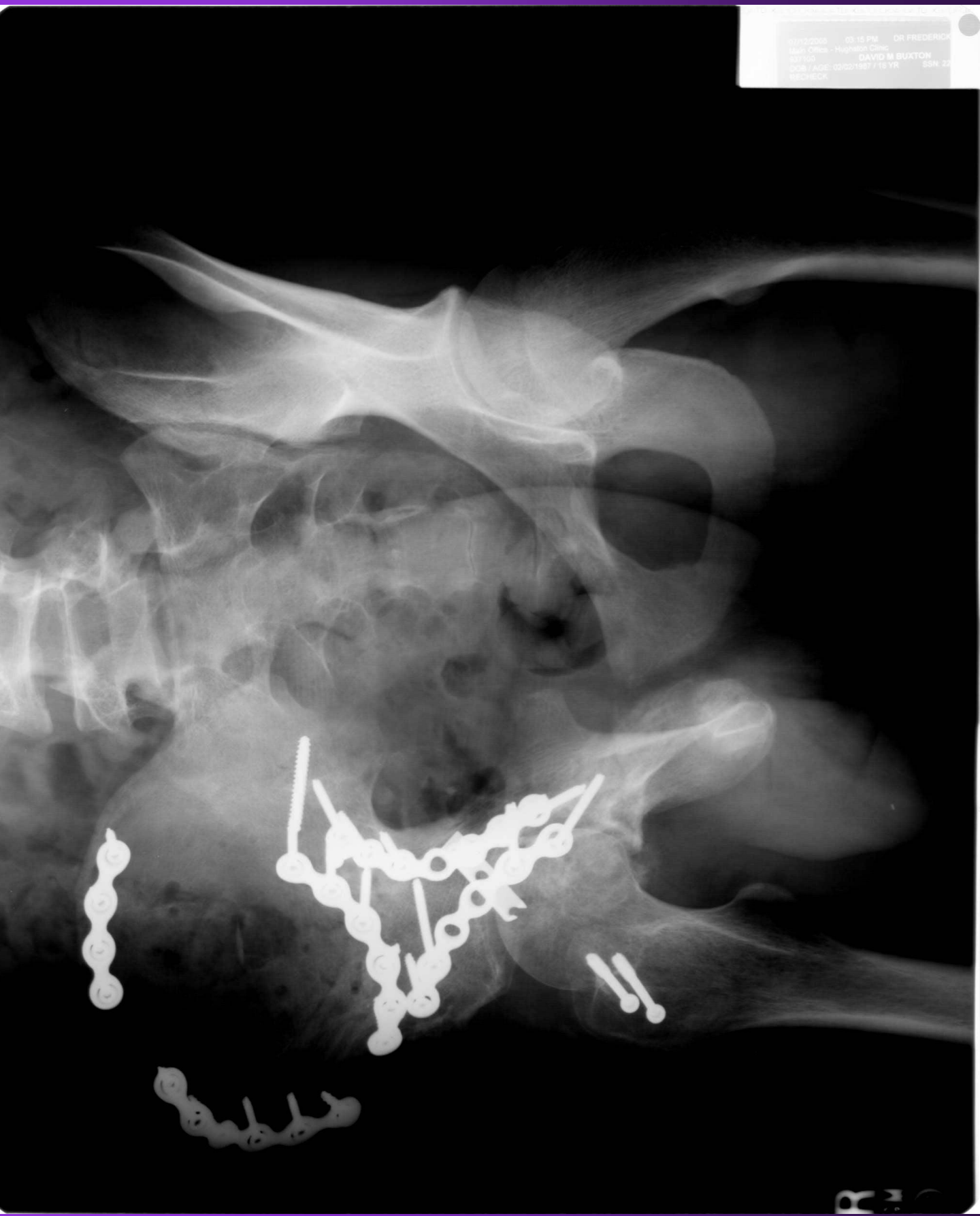

DAVID SUXTON



Approach

- II – remove hardware, osteotomy of anterior column, and release anterior column
- EIF – posterior column ostotomy and release, anatomical reduction of the joint and fixation


DAVID M BUXTON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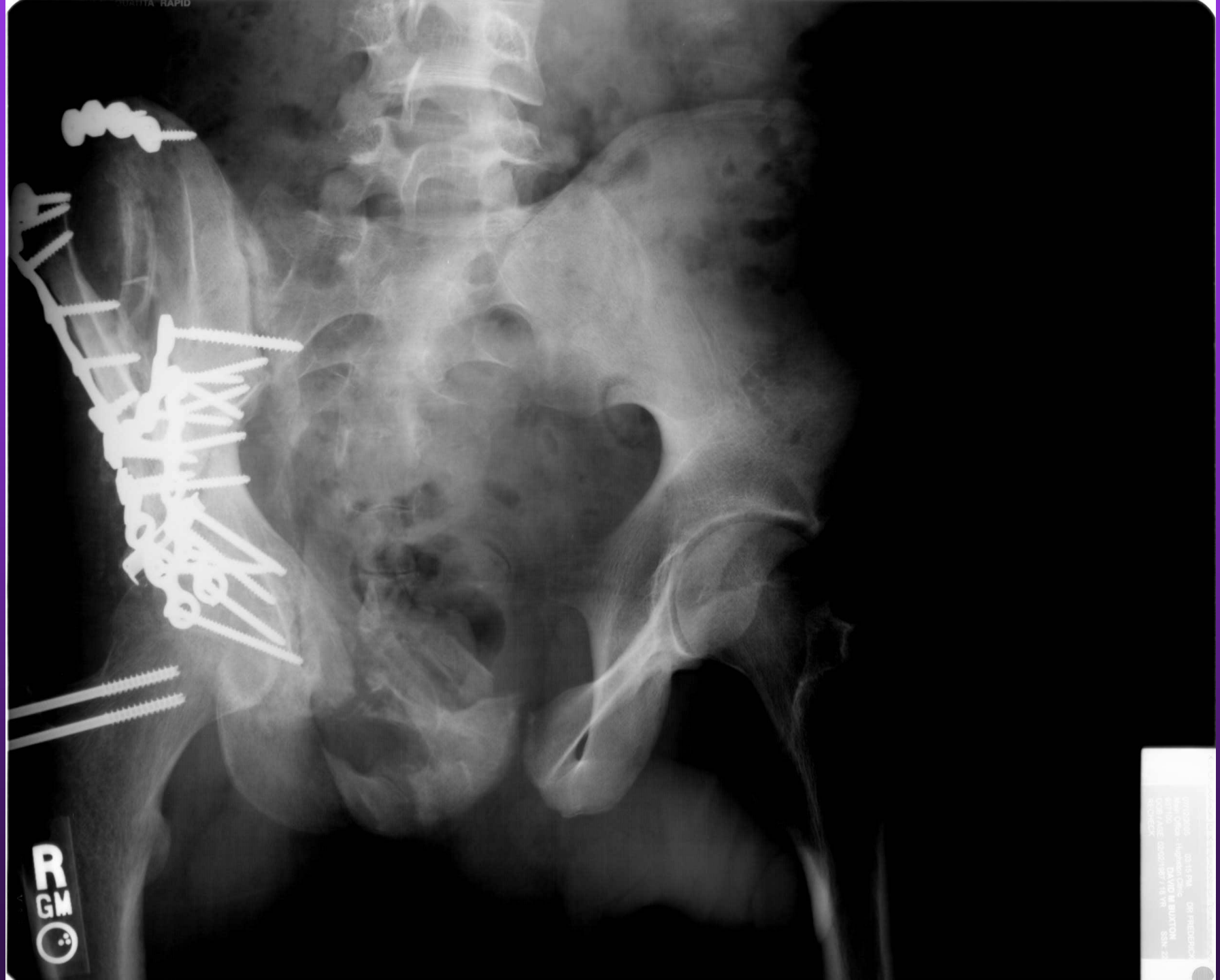
Main Office - Hughston Clinic
DAVID M BUXTON
DOB / AGE: 02/02/1987 / 18 YR SSN: 23
RECHECK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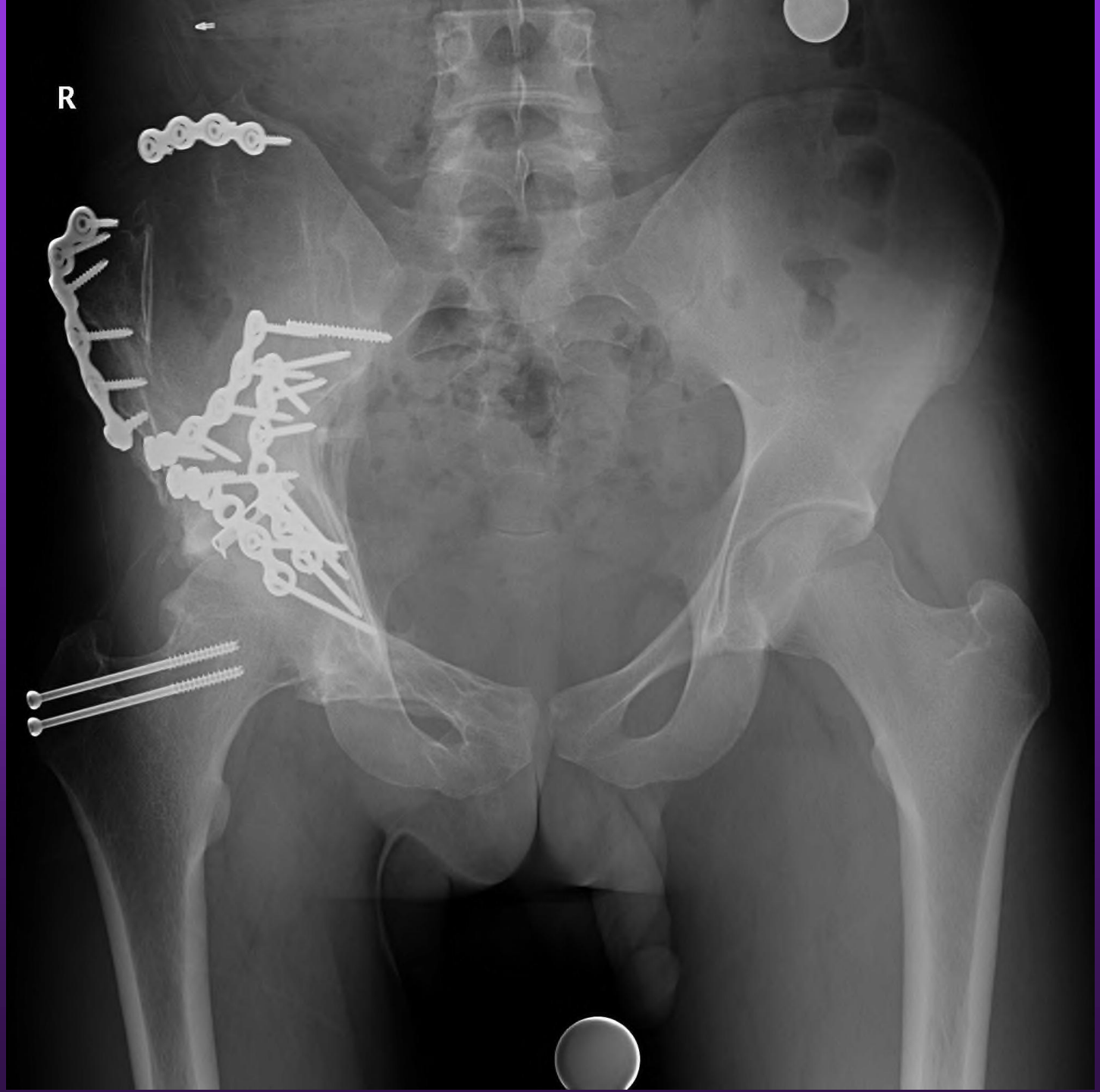
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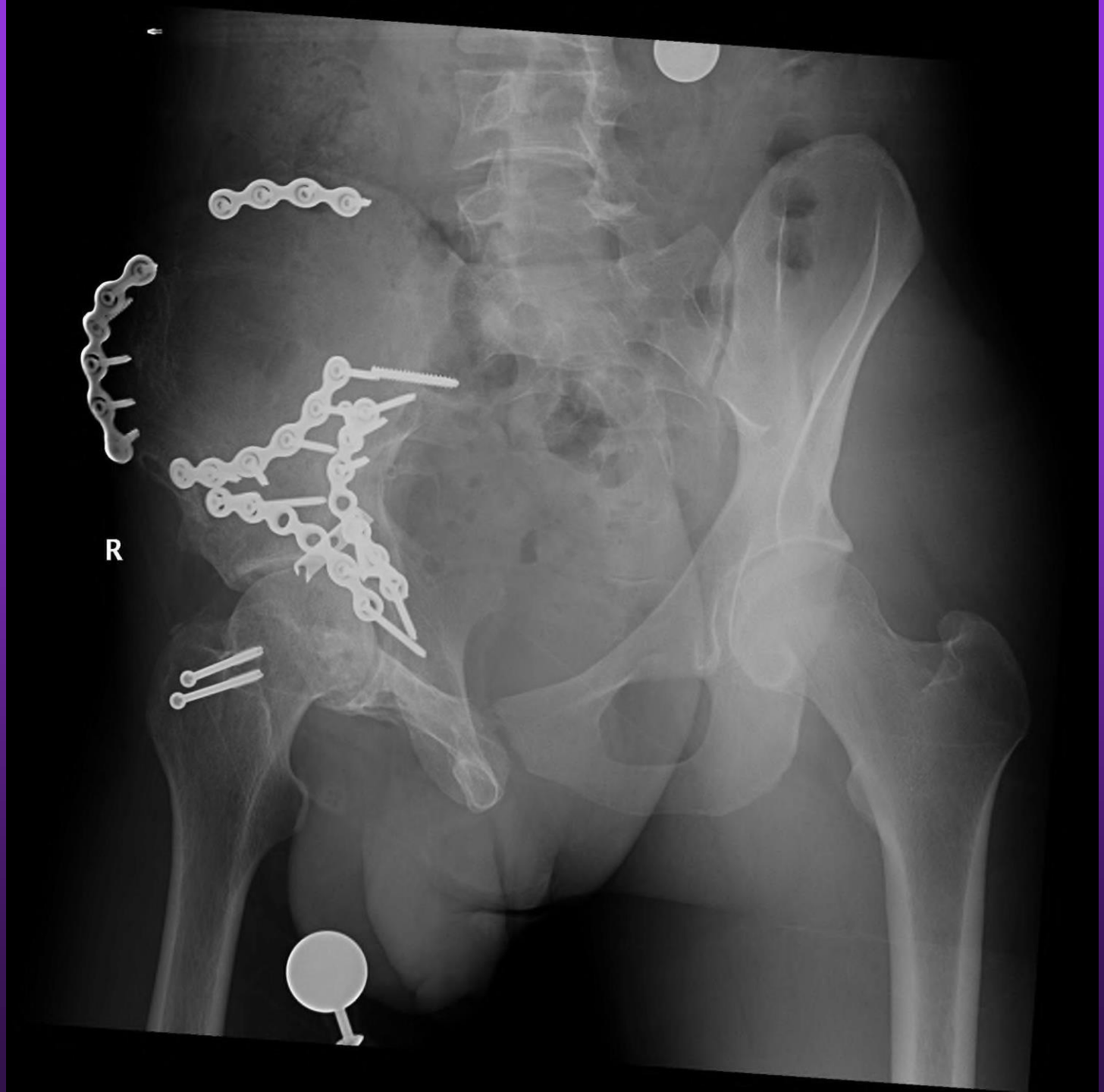
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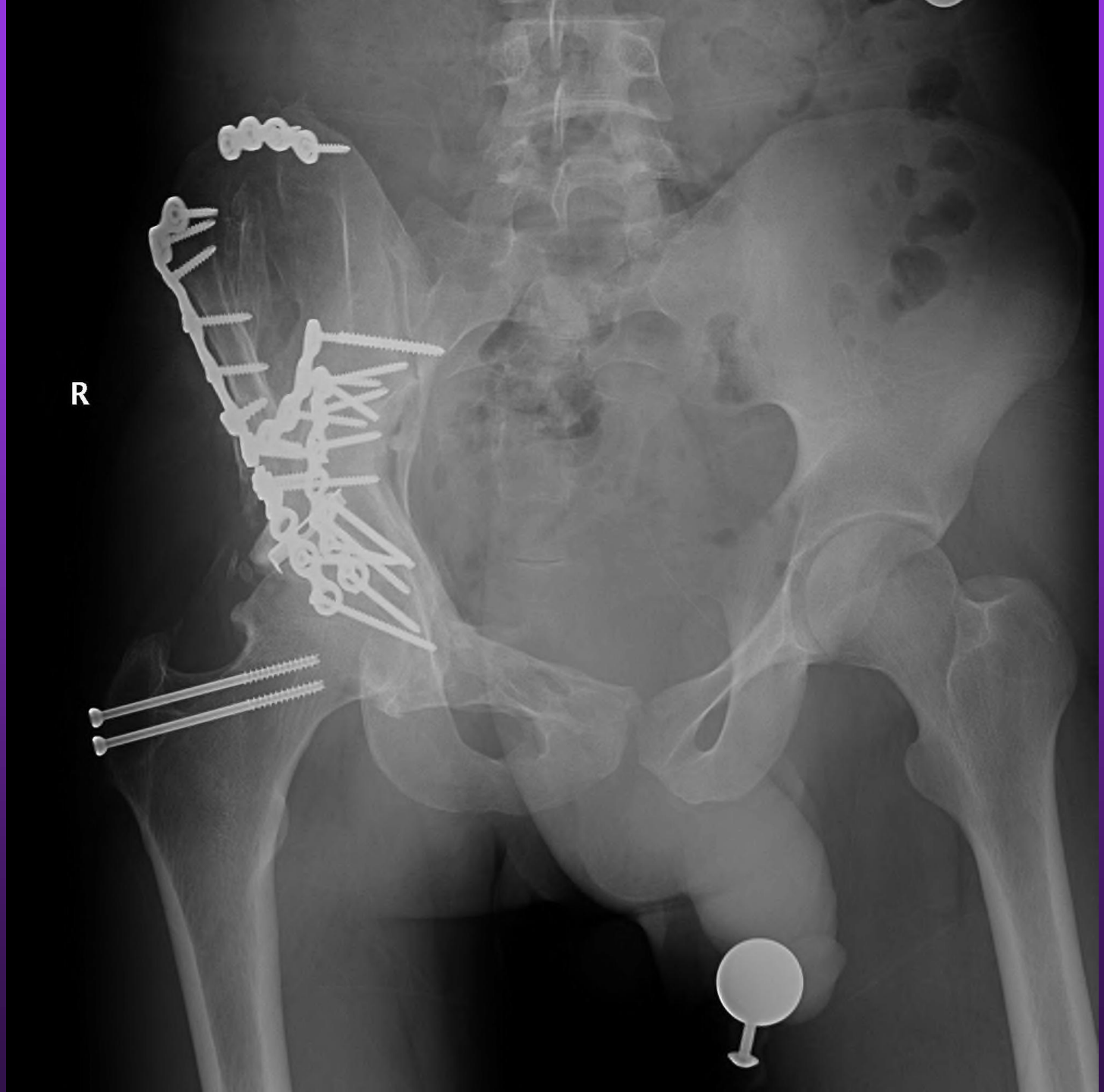
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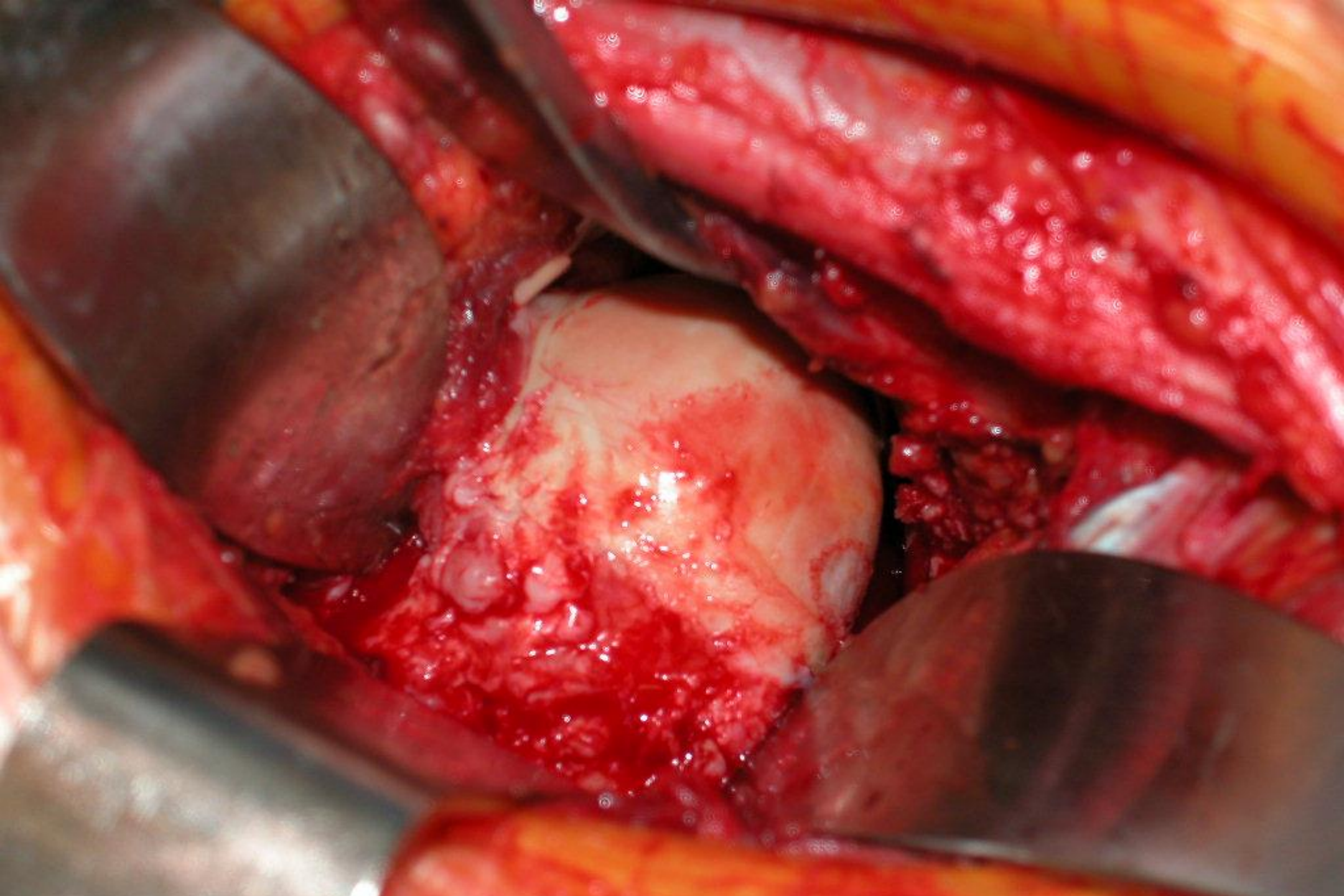
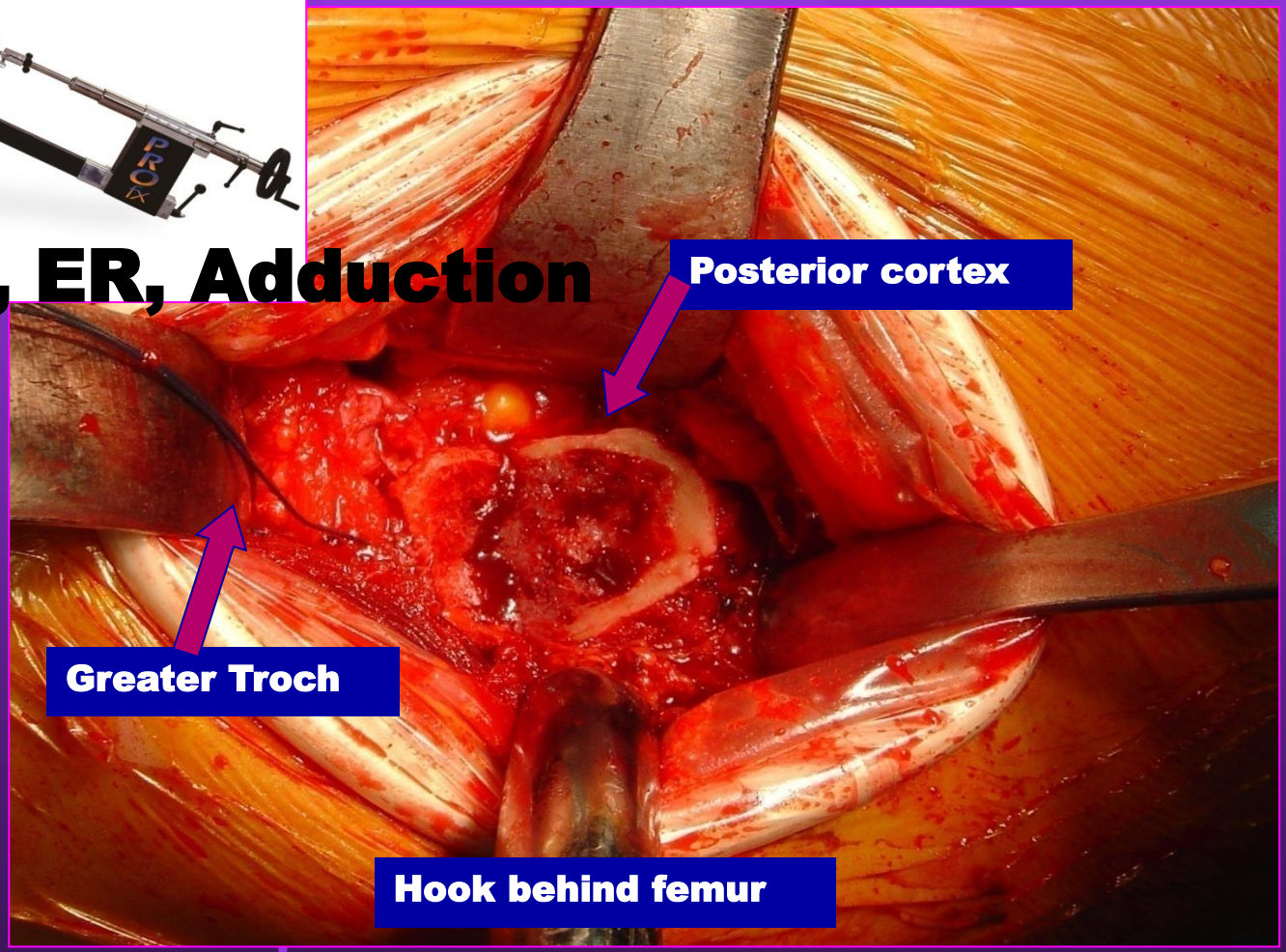
Medtronic
Medtronic
AEX
PlasmaBlade
AquamantYs



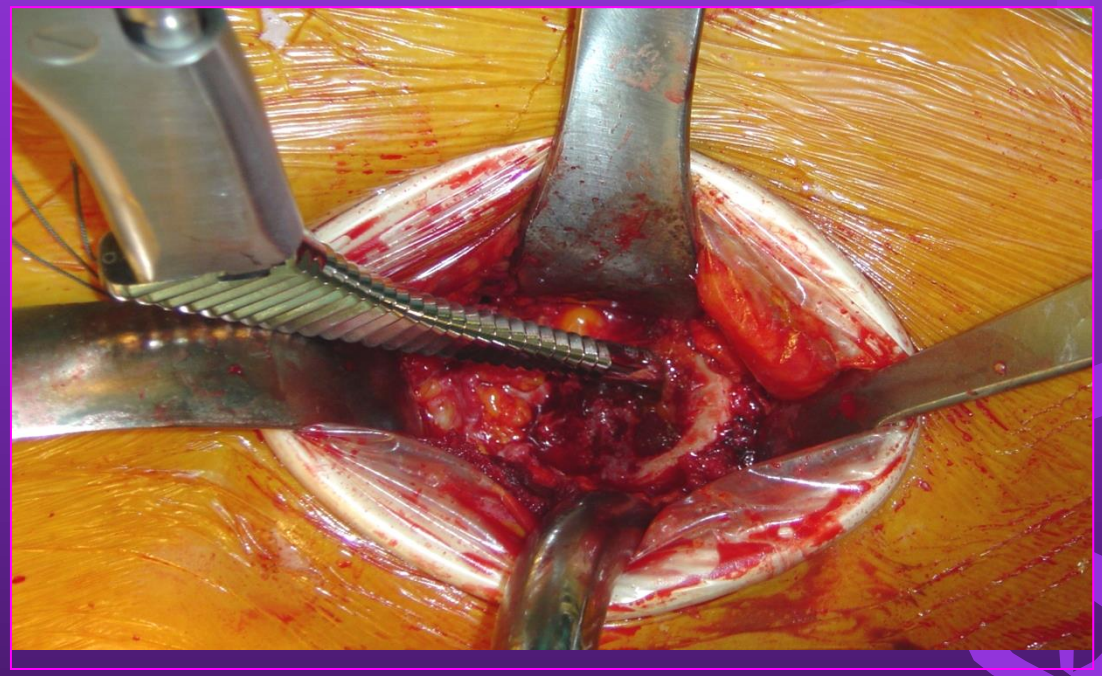
Case #1

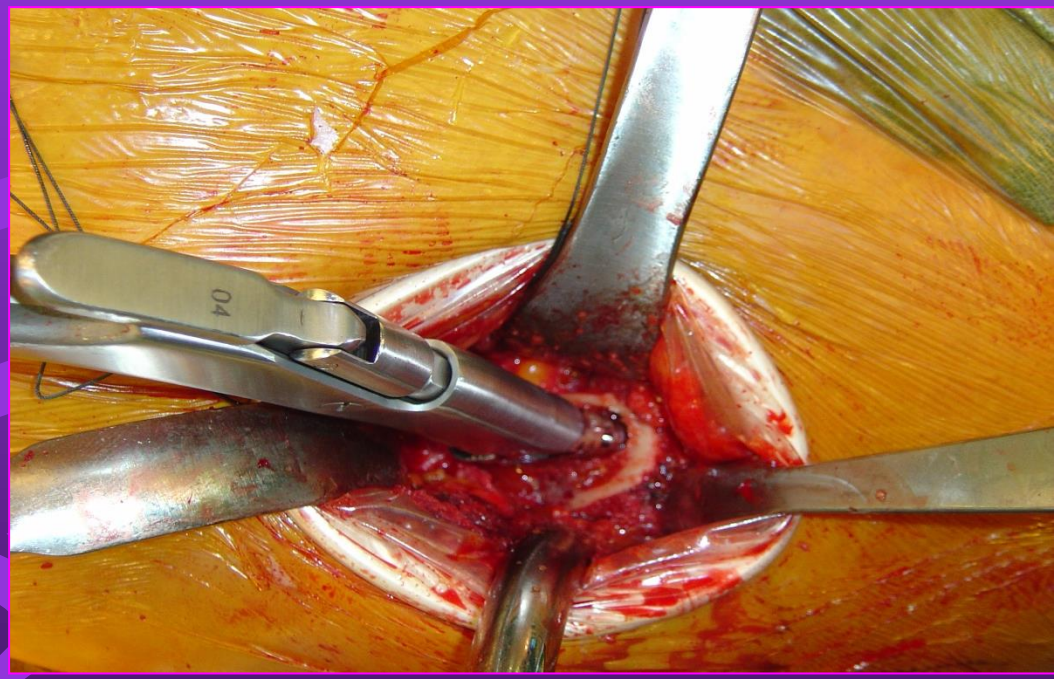
Hyperextention, ER, Adduction



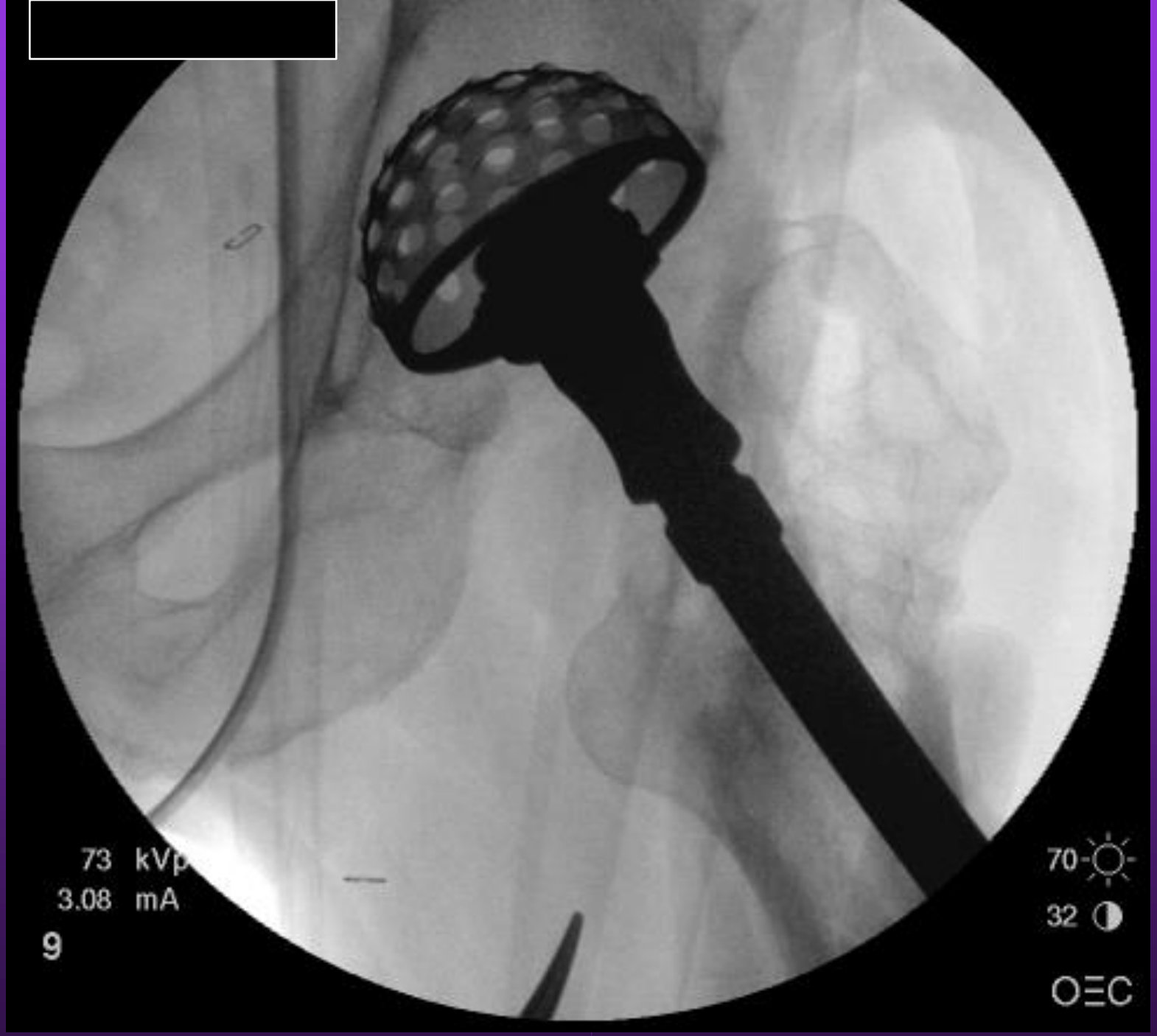
Hip hyperextended and adduction with external rotation allows delivery of proximal femur for femoral broaching

Case #1





Broach insertion easily accomplished through anterior incision.


73 kVp
3.08 mA
9
70
32
OEC