

## Fixation Strategies of Acetabular Fractures: What Outcomes Should be Expected? (How To Avoid Disasters)

**Steven A. Olson, MD**

**Goldner- Jones Distinguished Professor**

**Department of Orthopaedic Surgery**

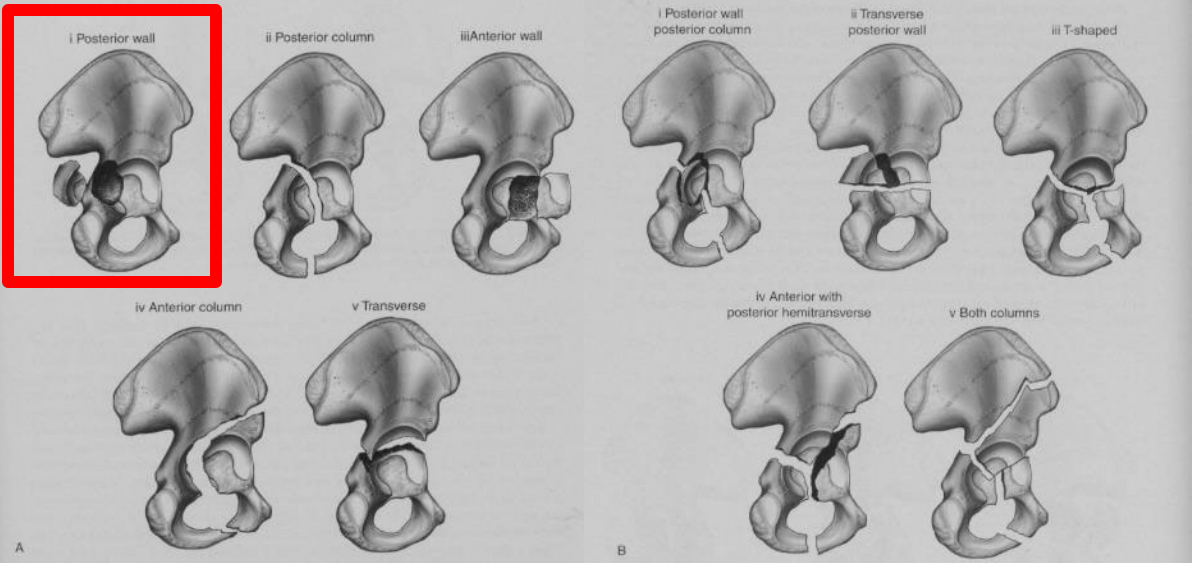
**Duke University Health System**

# Disclosures

No Disclosures relevant to this presentation

# Evaluation of The Fracture is the Same in Young & Old Patients

Plane Film Evaluation  
CT Scan Imaging  
Fracture Classification

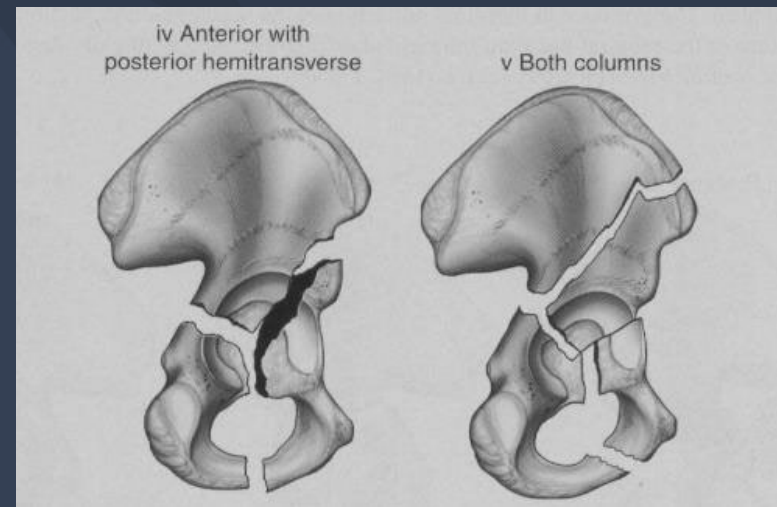


# Geriatric Acetabulum Fractures

An increasingly common injury

Can occur with low energy or high energy mechanism

Most common fracture patterns are Associated Both Column and Anterior + Posterior Hemi Transverse





# Operative Acetabulum Fractures

Treatment with ORIF - 1 year mortality reported 5-15%

Glogovac et al JOT 2020

Firoozabadi et al Arch Bone Jt Surgery 2017

Delay to ORIF > 48 hr does not increase risk of mortality

Glogovac et al JOT 2020

The addition of geriatric assessment decreases medical complications

Hafner et al Medicina 2021

# Maintaining Congruent Relationship Between Head and Acetabulum is Key!

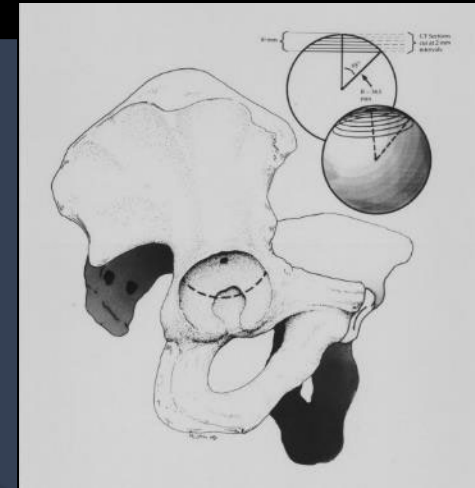
## Criteria to be Met to Treat Non-Operatively:

- CT Arc intact through the superior 10mm of the acetabulum
- Femoral head remains congruent with the acetabulum on all three plain radiographic views taken out of traction
- No associated posterior instability of the hip

Olson & Matta JOT 1993

- No displacement with EUA

Tornetta JBJS(Br) 1999



# Treatment for Acute Acetabular Fracture In Trauma Patient

## Non-Operative Treatment



Non-Displaced Injury  
Patient able to mobilize  
comfortably

Potentially viable strategy

Unable to mobilize  
Traction required to  
reduce hip  
Medically Unstable

High risk of M&M

# Treatment for Acute Acetabular Fracture In Trauma Patient

Operative

Reduction and  
Stable Fixation



THA +/- ORIF



ORIF without  
ability to maintain  
reduction

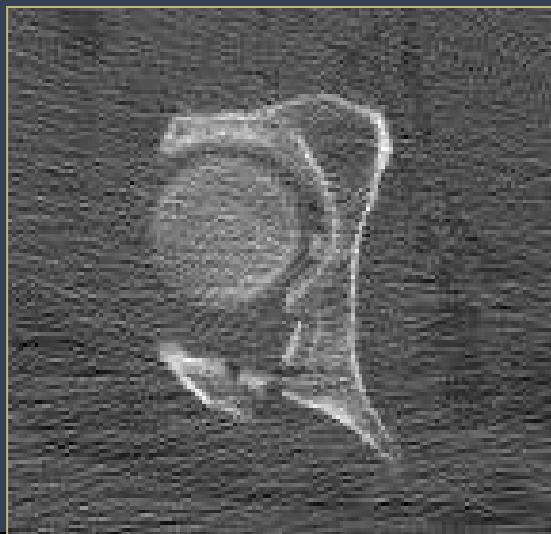


# Contra-Indications for ORIF (Indications for Arthroplasty)

Physiologic Age Plays a Role – Post Op Protected Gait

## 1. Posterior wall morphology

Severe Impaction

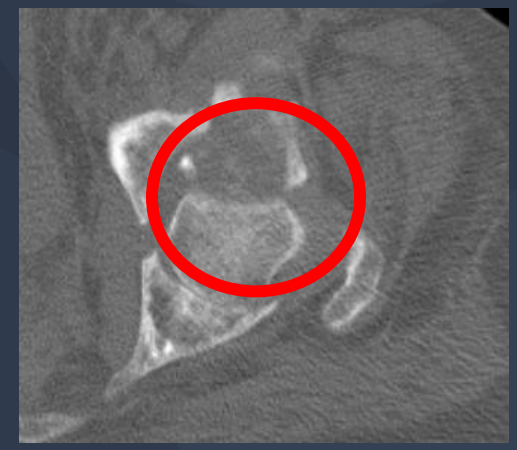
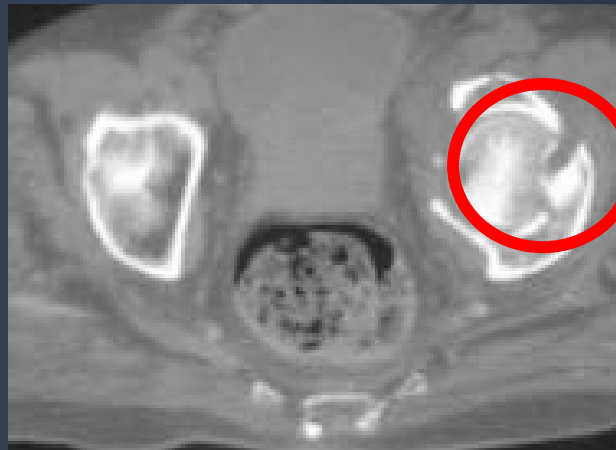
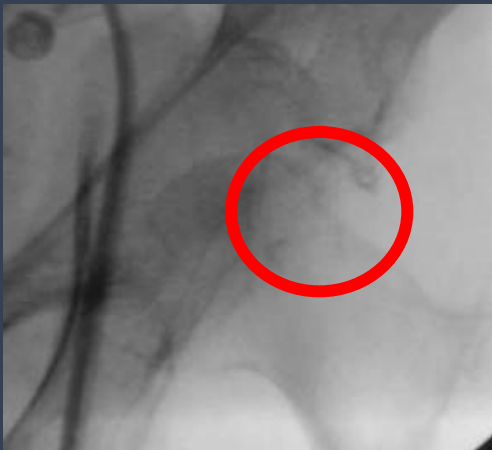


Significant Comminution



# Contra-Indications for ORIF (Indications for Arthroplasty)

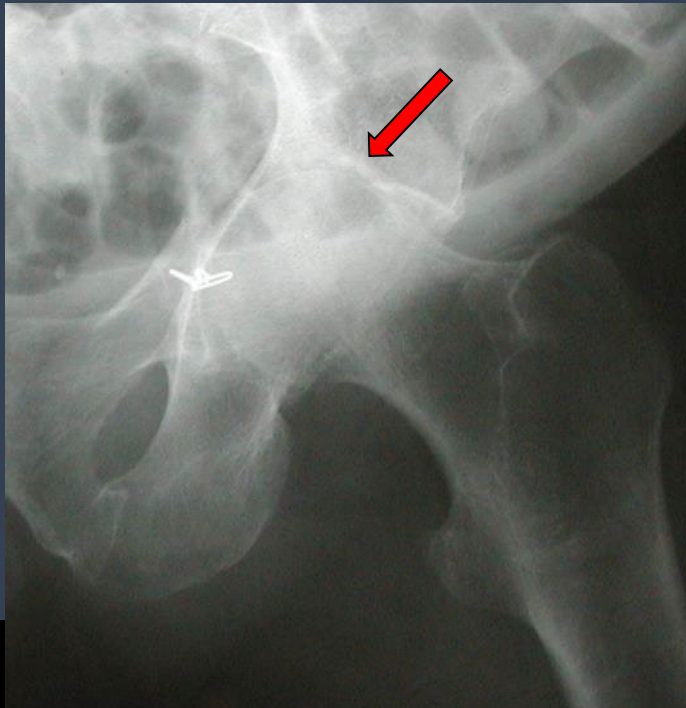
1. Posterior wall morphology
2. Impaction injury to the femoral head



# Contra-Indications for ORIF

Contra-indications are stronger the older the patient

Impaction of the superior acetabulum





# Outcomes Following ORIF

## Survivorship of Hip Function following Acetabulum Fx ORIF

TABLE II Accuracy of Reduction According to Fracture Type and Other Characteristics

	Anatomical, 0-1 mm	Imperfect, 2-3 mm	Poor	Surgical Secondary Congruence
Age				
<40 yr (n = 386)	316 (82%)*	50 (13%)†	15 (4%)	5 (1%)
40-65 yr (n = 318)	234 (74%)	63 (20%)	13 (4%)	8 (3%)
>65 yr (n = 112)	66 (59%)†	35 (31%)*	8 (7%)	3 (3%)

TABLE III Survivorship According to Fracture Type and Other Characteristics

	Survivorship (95% Confidence Interval)* (%)				Median Time to Failure†
	Two Years	Five Years	Ten Years	Twenty Years	
Age					
<40 yr (n = 386)	96 (95-97)§	95 (94-96)§	92 (91-94)§	87 (84-89)§	2.3
40-65 yr (n = 318)	88 (86-90)†	83 (81-86)†	81 (79-83)†	74 (71-77)†	1.3
>65 yr (n = 112)	83 (79-87)†	79 (75-83)†	70 (65-76)†	51 (38-64)†	0.8
>75 yr (n = 42)	80 (73-87)†	74 (66-83)†	65 (54-76)†	—	0.6

# Outcomes Following ORIF

## German Trauma Registry Data

**TABLE 5.** Follow-up Data of Acetabular Fracture Patients at Least 60 Years of Age Treated at the Senior Author's Level I Trauma Center (Minimum Follow-up 12 Months)

Variable	≥60 y ORIF (n = 77)	≥60 y Nonoperative (n = 19)	<i>P</i>
Age (y) (mean ± SD)	70.0 ± 7.2	76.3 ± 7.7	0.002
Male sex (%)	89.6	68.4	0.03
Follow-up (m) (mean ± SD)	57.2 ± 43.9	54.5 ± 30.5	0.80
Rate of secondary THR (%)	24.7	15.8	0.55
EQ-5D <sup>TM</sup> score*	0.60 ± 0.33	0.47 ± 0.38	0.17

\*Patients of whom only a score after a secondary THR was available were excluded (n = 14 for the ORIF group and n = 2 for the nonoperative group).

# Case 1

Vigorous 66 yo falls while riding bicycle

No other health issues

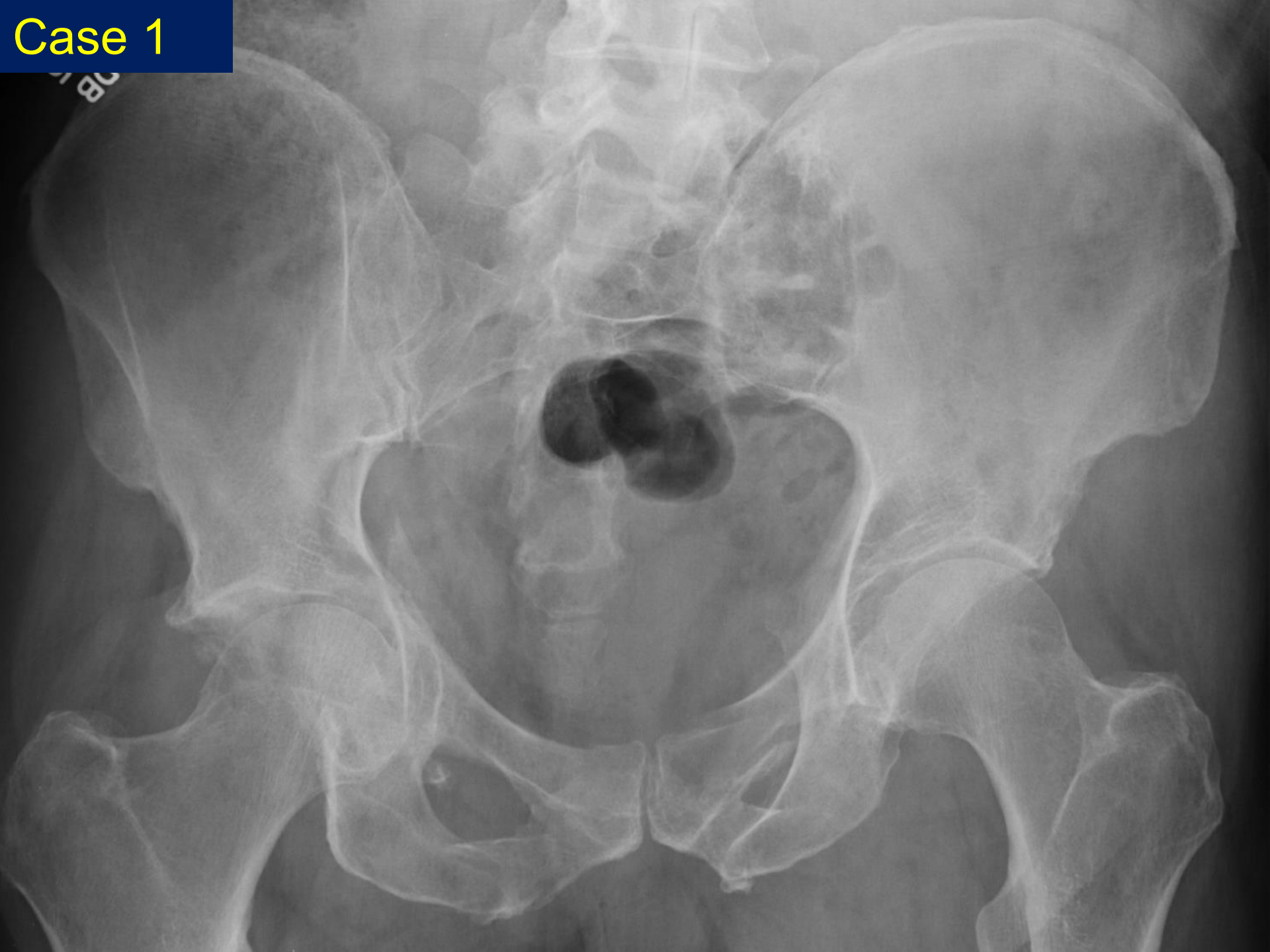
Patient is seen at outside hospital

Patient is told – “Will need a total hip anyway”

Non-operative management

Patient presents several days post injury

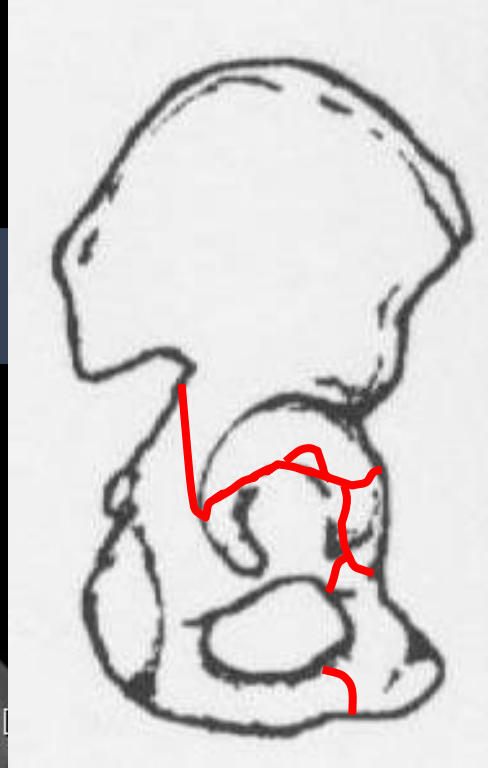
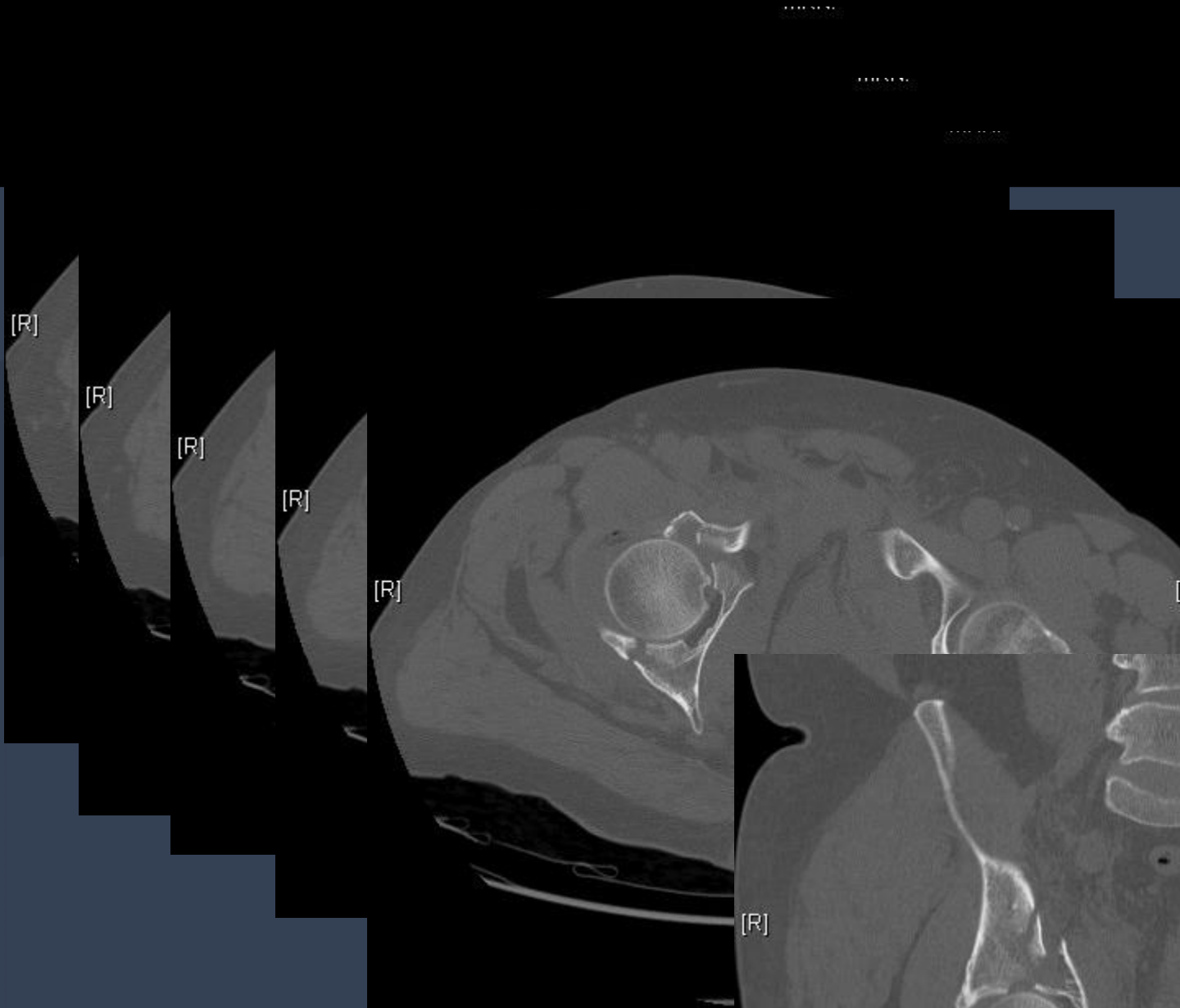
Case 1



R.D.  
025

R DB  
025







# Transverse Pattern + Ant Wall

## T-Shape Anterior Variant vs Anterior + Posterior Hemi-Transverse

Primary displacement anterior

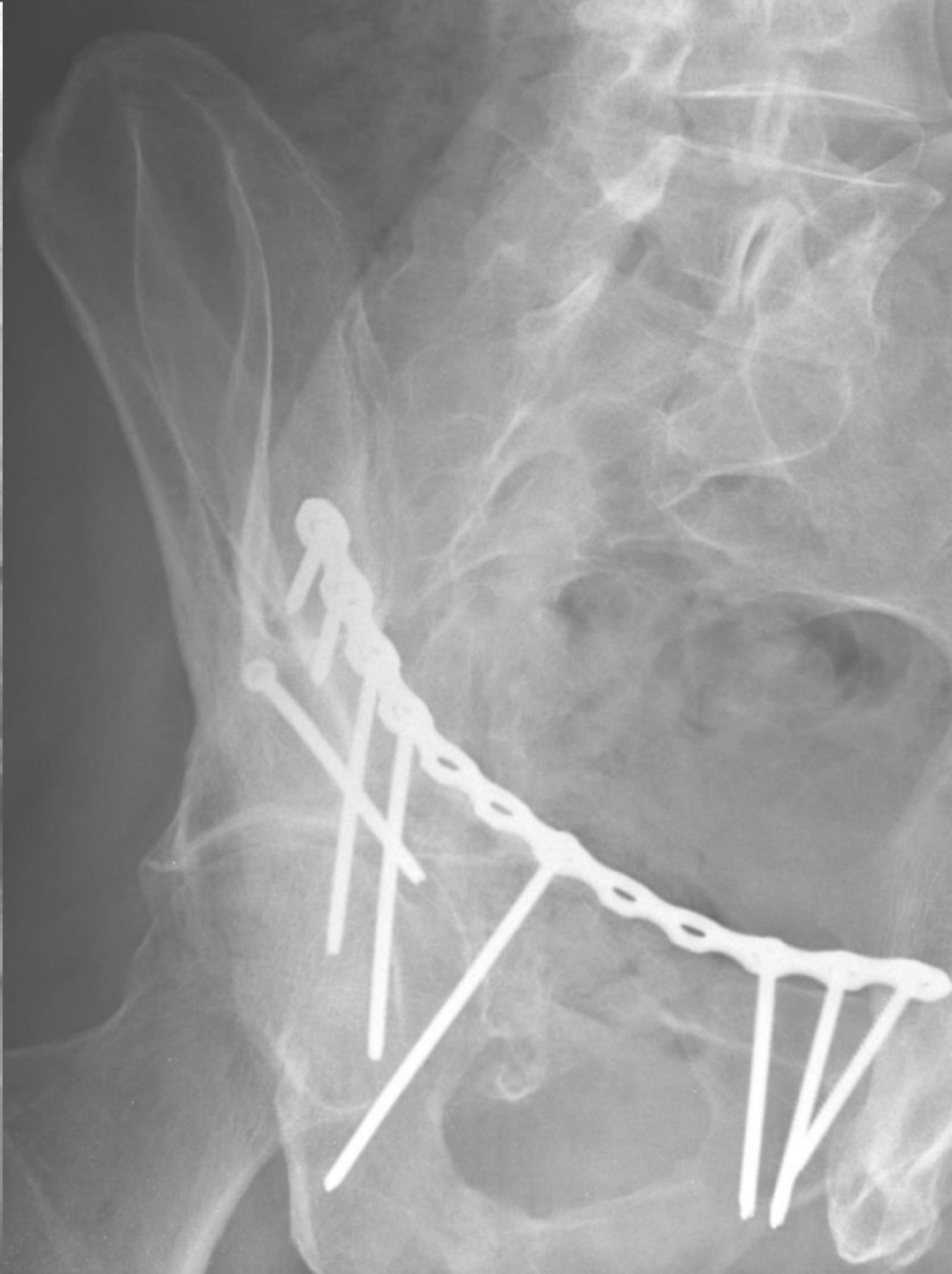
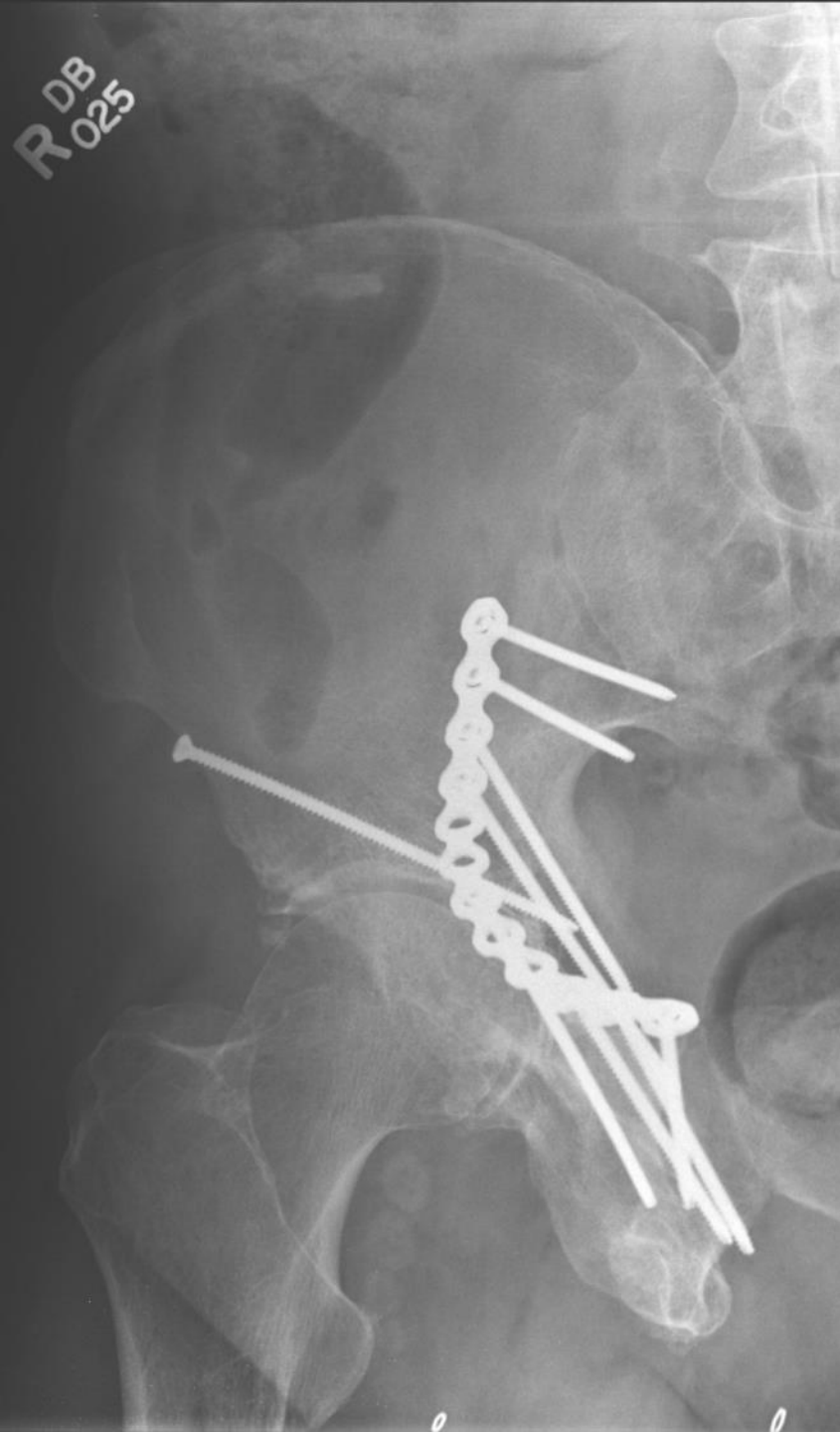
Begin with Ilioinguinal approach





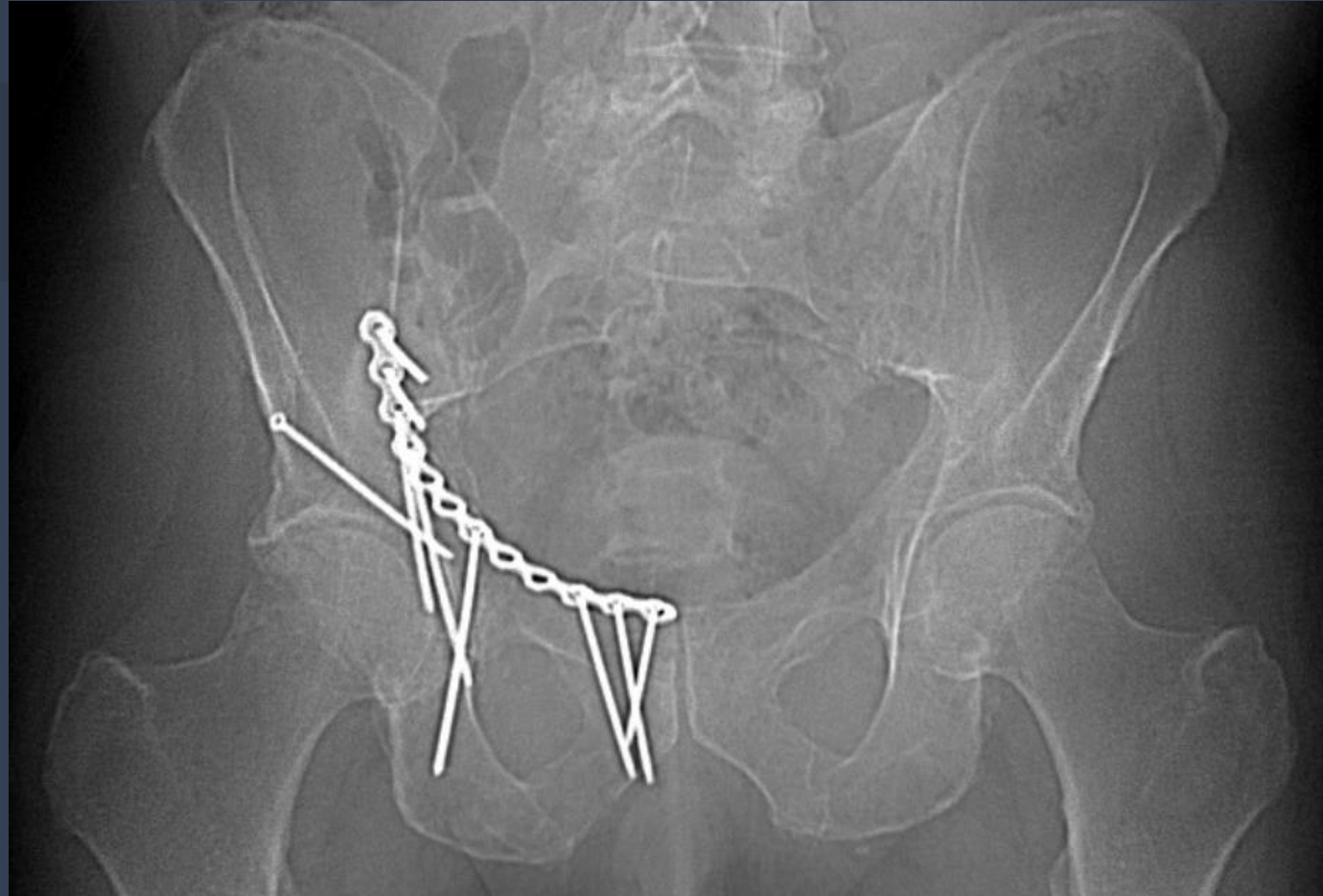
R DB  
025



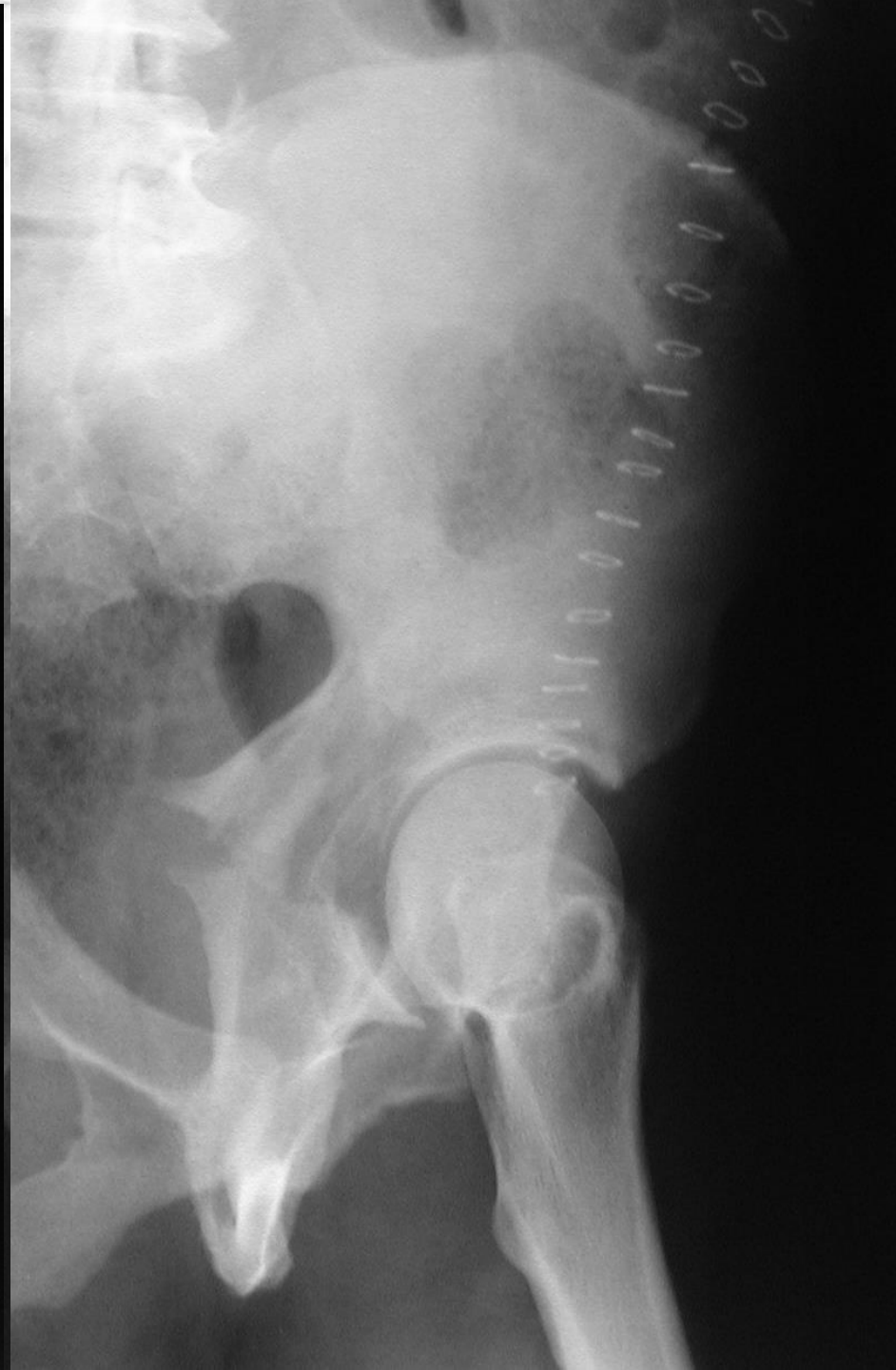


2 year Follow up

9 year Follow up



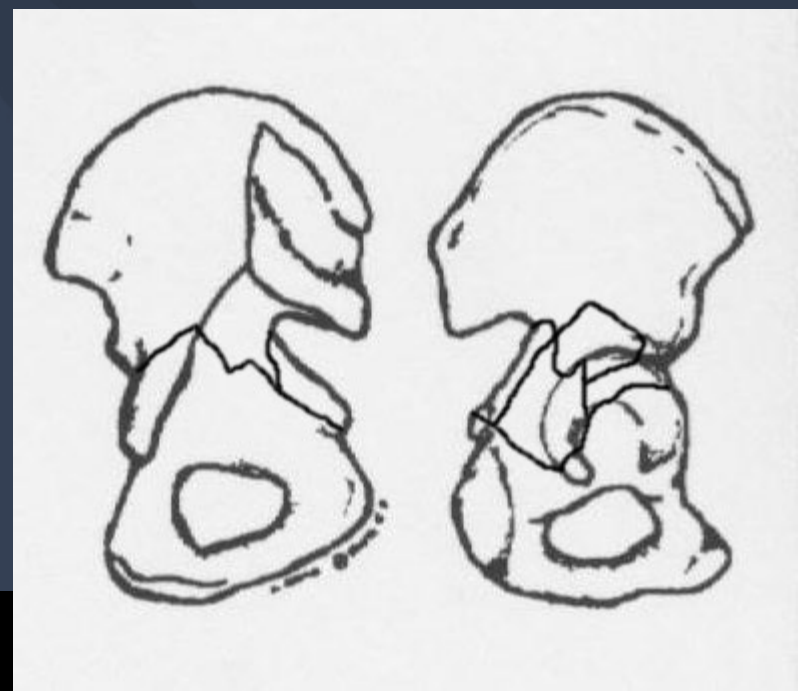
# Case 2







Transverse + Posterior Wall fx  
Greater sciatic notch involved  
Multiple posterior wall fragments



# Transverse + Posterior Wall

Reduction sequence – Transverse fx, then posterior wall

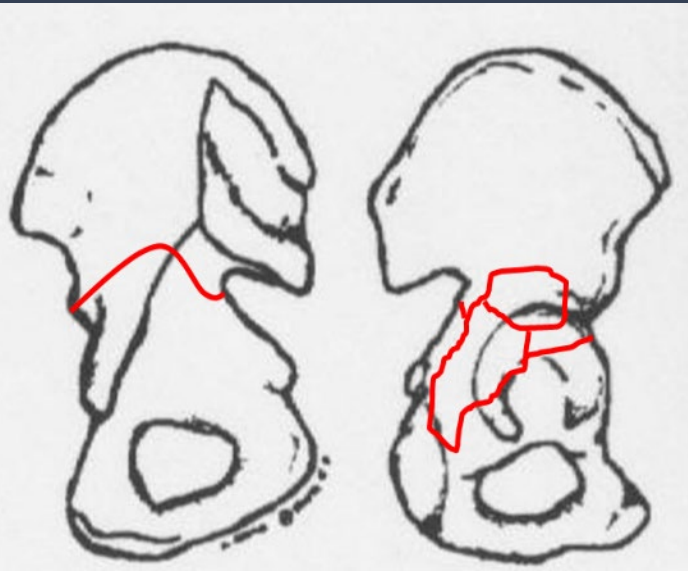
Patterns with extensive involvement of the retro-acetabular surface or greater sciatic notch require access to the articular surface to ensure reduction of the transverse fracture line

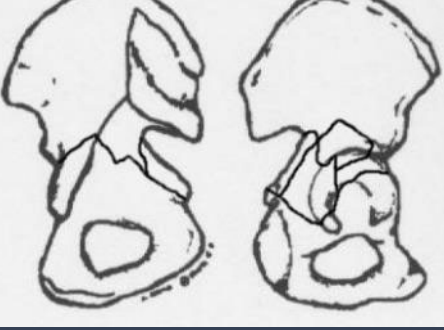
Options:

Prone Kocher with Hip Flexion (Pro-Fx Table)

Kocher with Trochanteric Flip and Subluxation

Extended Lateral Approach

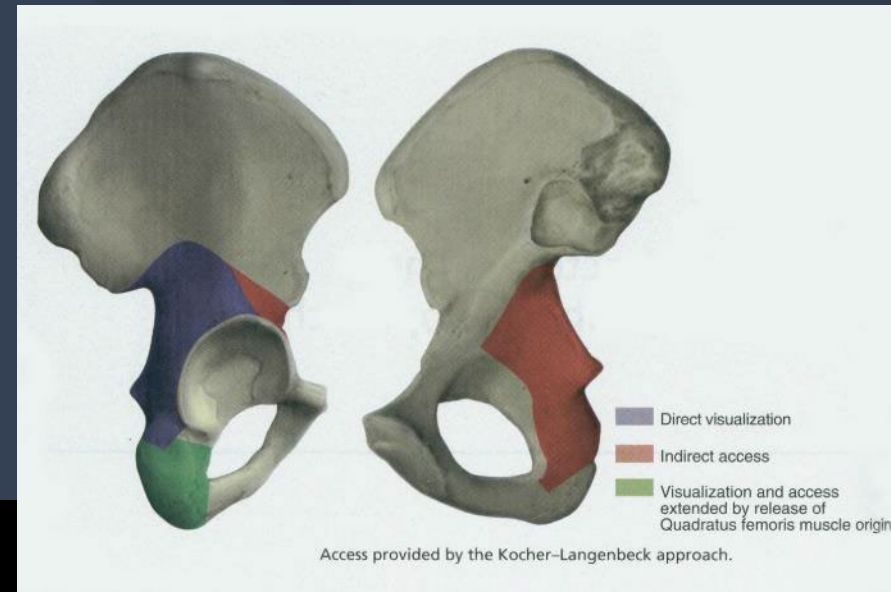
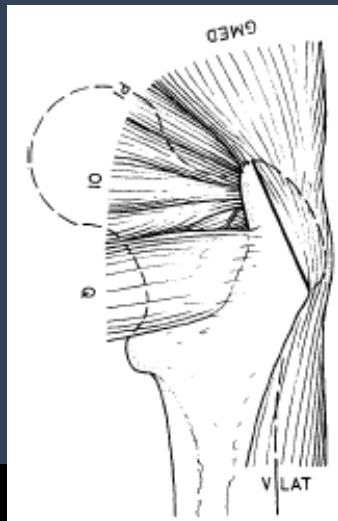




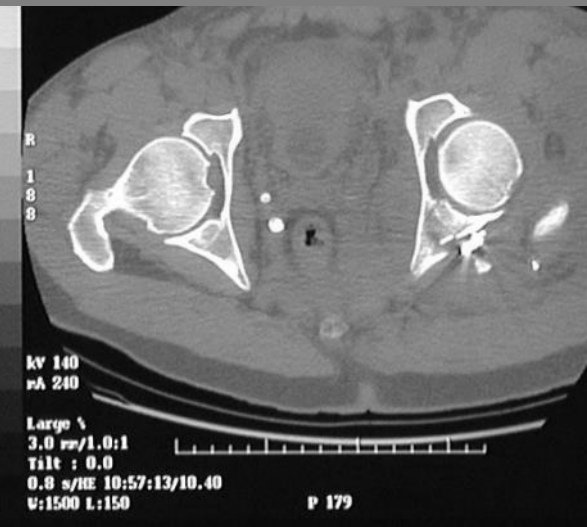
# Kocher-Langenbeck + Trochanteric Osteotomy

Best choice for majority of transverse + posterior wall  
Selected Transverse and T-Shape patterns

Trochanteric Osteotomy – access to  
Superior acetabular bone  
Subluxation of femoral head

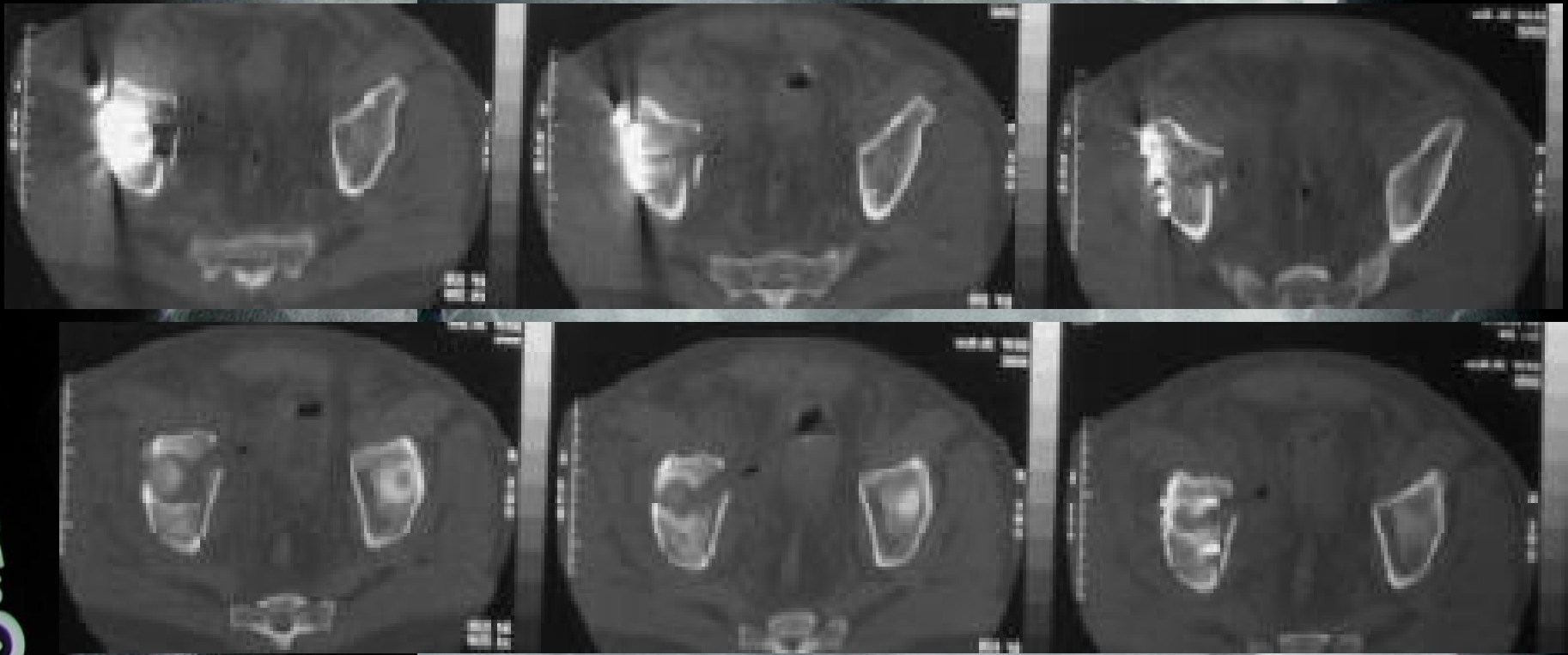


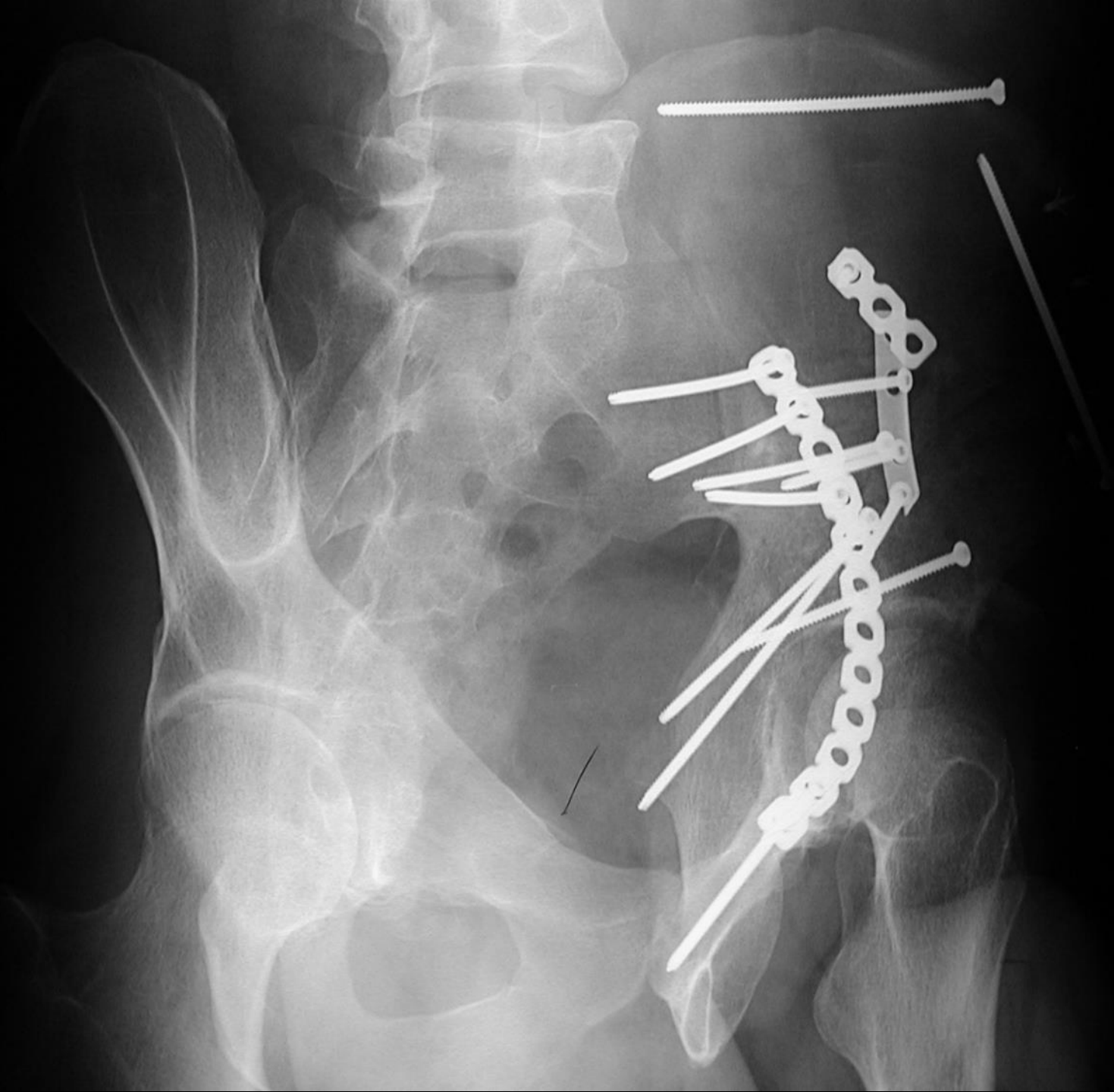




# Case 3

## Malreductions – Revise vs Observe





# Case 4 A 65 yo female – MVC – Left hip fracture dislocation



# Case 1 A 65 yo female – MVC – Left hip fracture dislocation and right leg injuries

The left leg is now her “good leg”



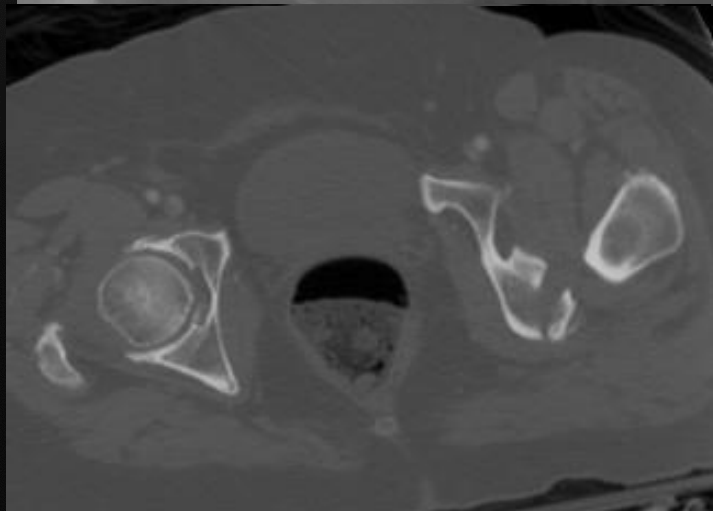
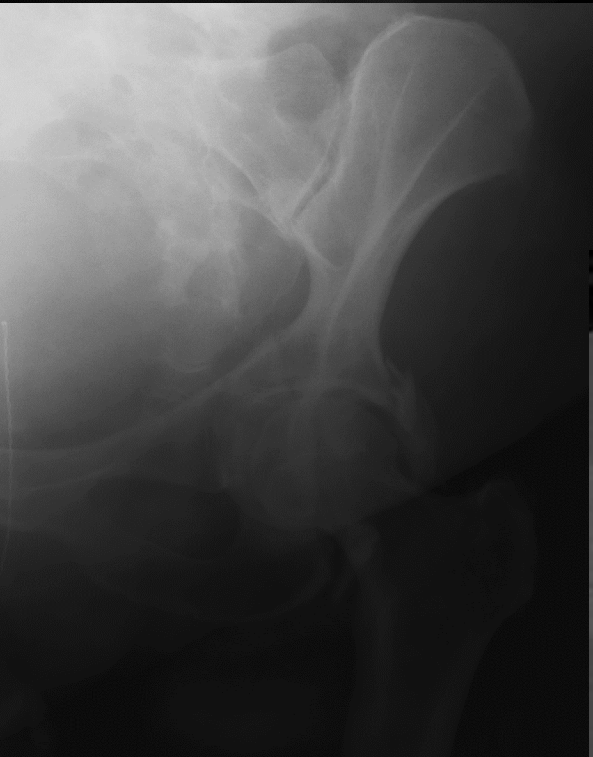


A Transverse with posterior wall pattern

A very comminuted posterior wall

Mild pre-existing OA

A relative indication for Acute ORIF and Primary THR



# Kocher Langenbeck Approach

Femoral neck cut

Femoral head used as template for posterior wall

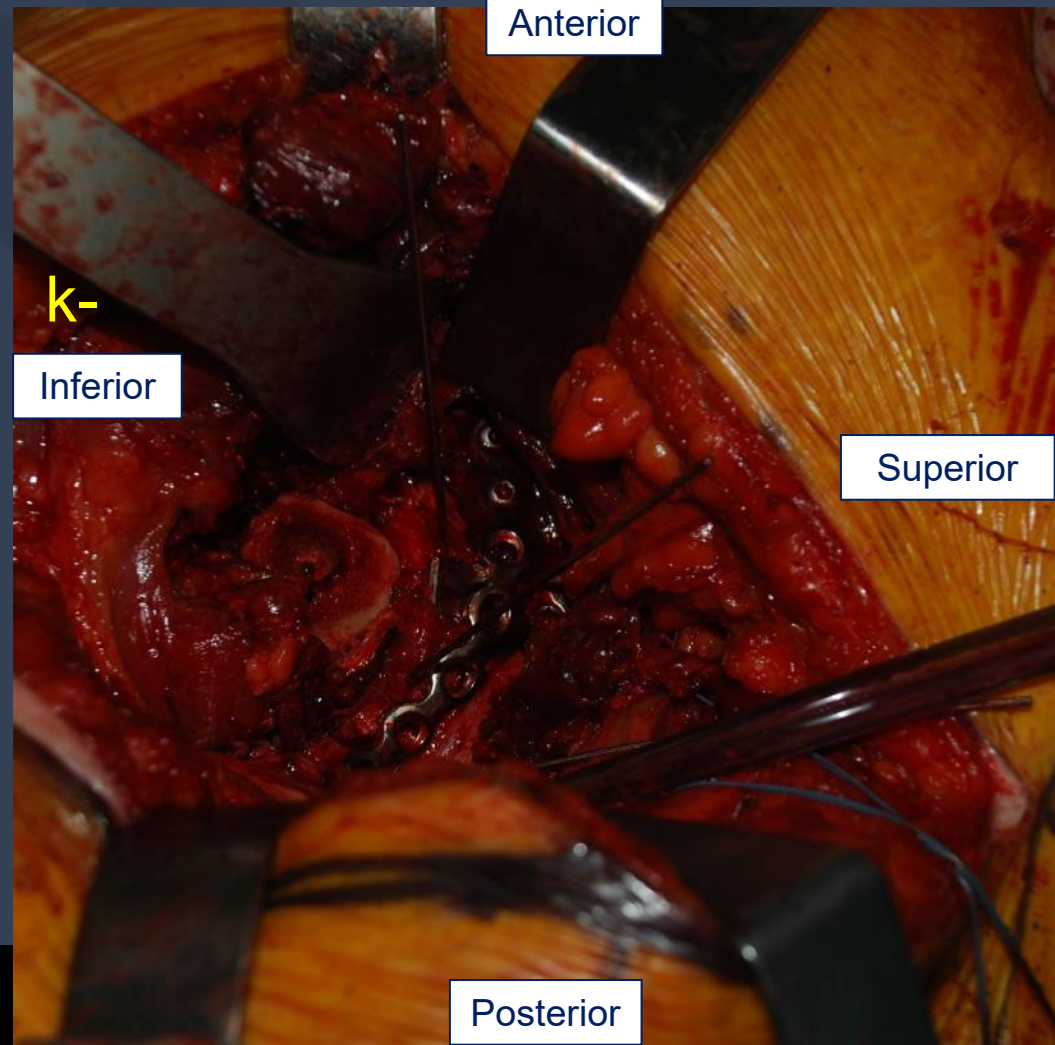
Fixation of both columns

K-wire cage for wall fx

Substitute fixation for wires

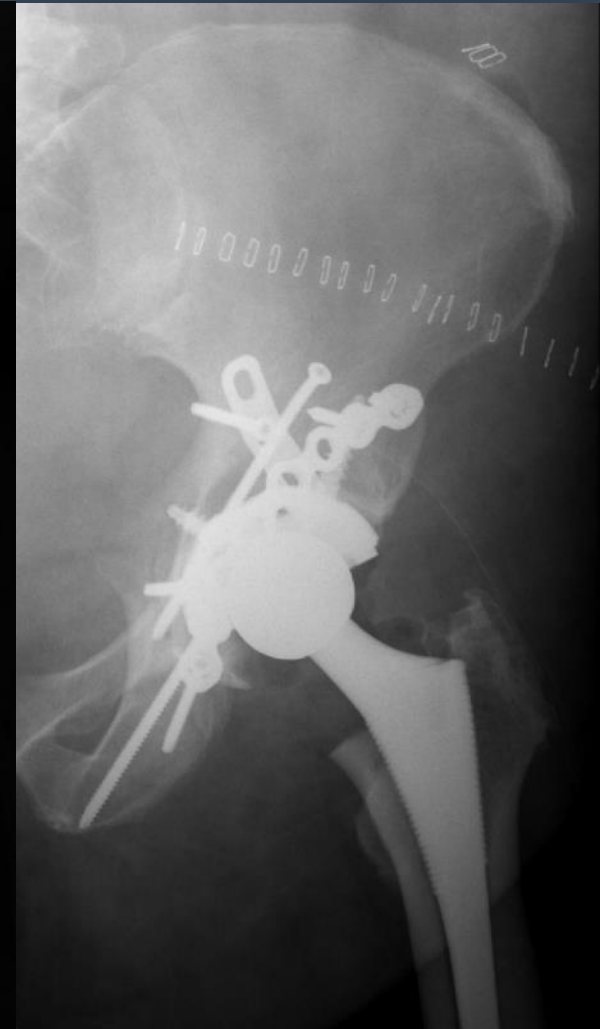
Place Acetabulum cup

Femoral stem





# Post-Op Images



# One Year Follow Up



# Summary

ORIF of Displaced Acetabulum Fractures in geriatric patients can have a good clinical outcomes

Appropriate – Fracture patient

Surgeon and Surgical team

Favorable patient factors

There is a limited role for ORIF in the setting of acute THR

# Summary

Is the fracture “fixable”?

Can it be surgically reduced and stabilized?

If Yes – Can you fix it?

Yes – Do so, No – Transfer the patient

If it is not fixable –

Consider – ORIF / THR

Consider – Non-op care & delayed THR

Thank You!