



# 66 yr old female with groin and hip pain

Paul Jabour, MD

R  
JEP





L  
JEP



2 months later

□

L  
JEB

5300



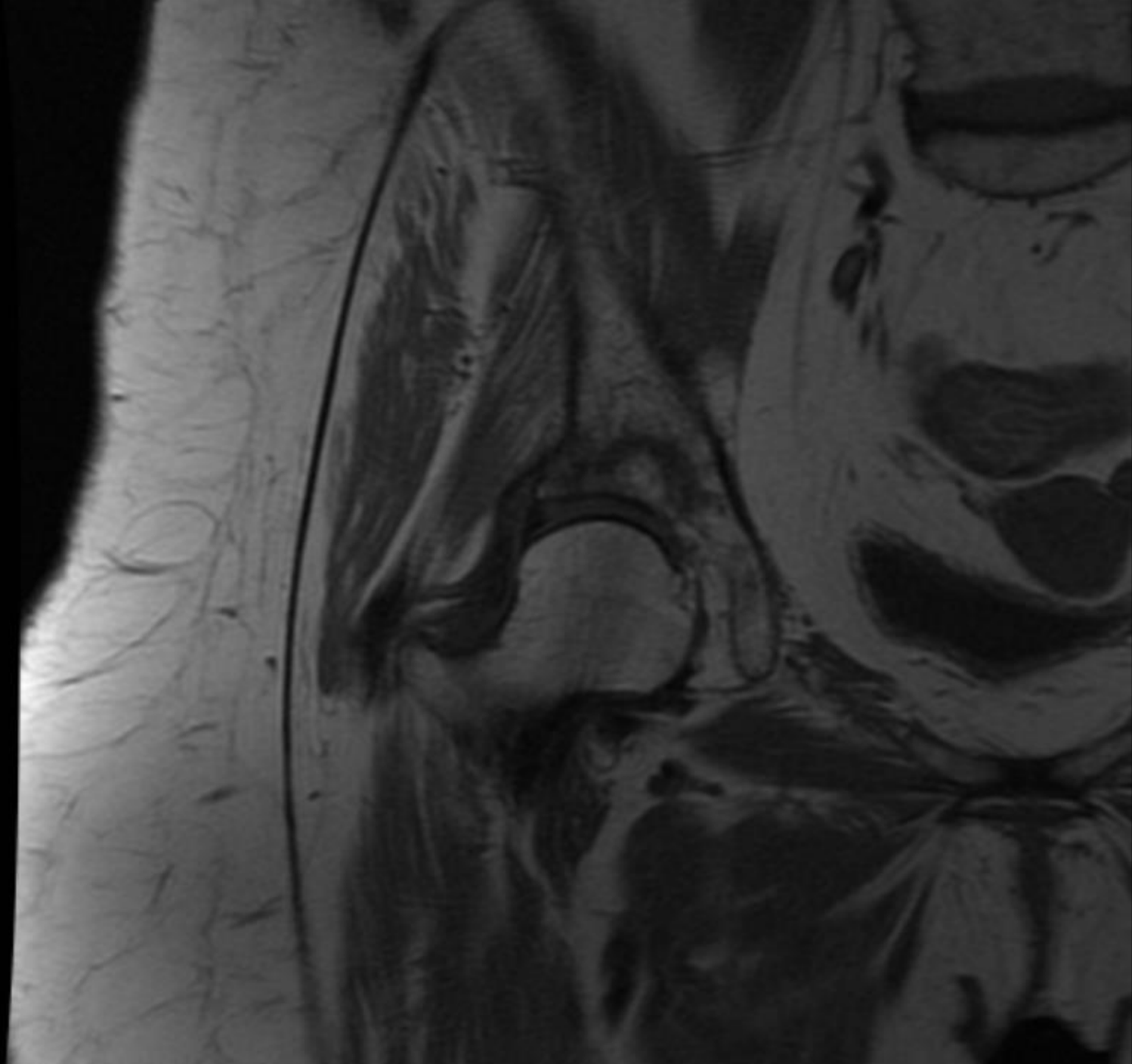
# 12 months later

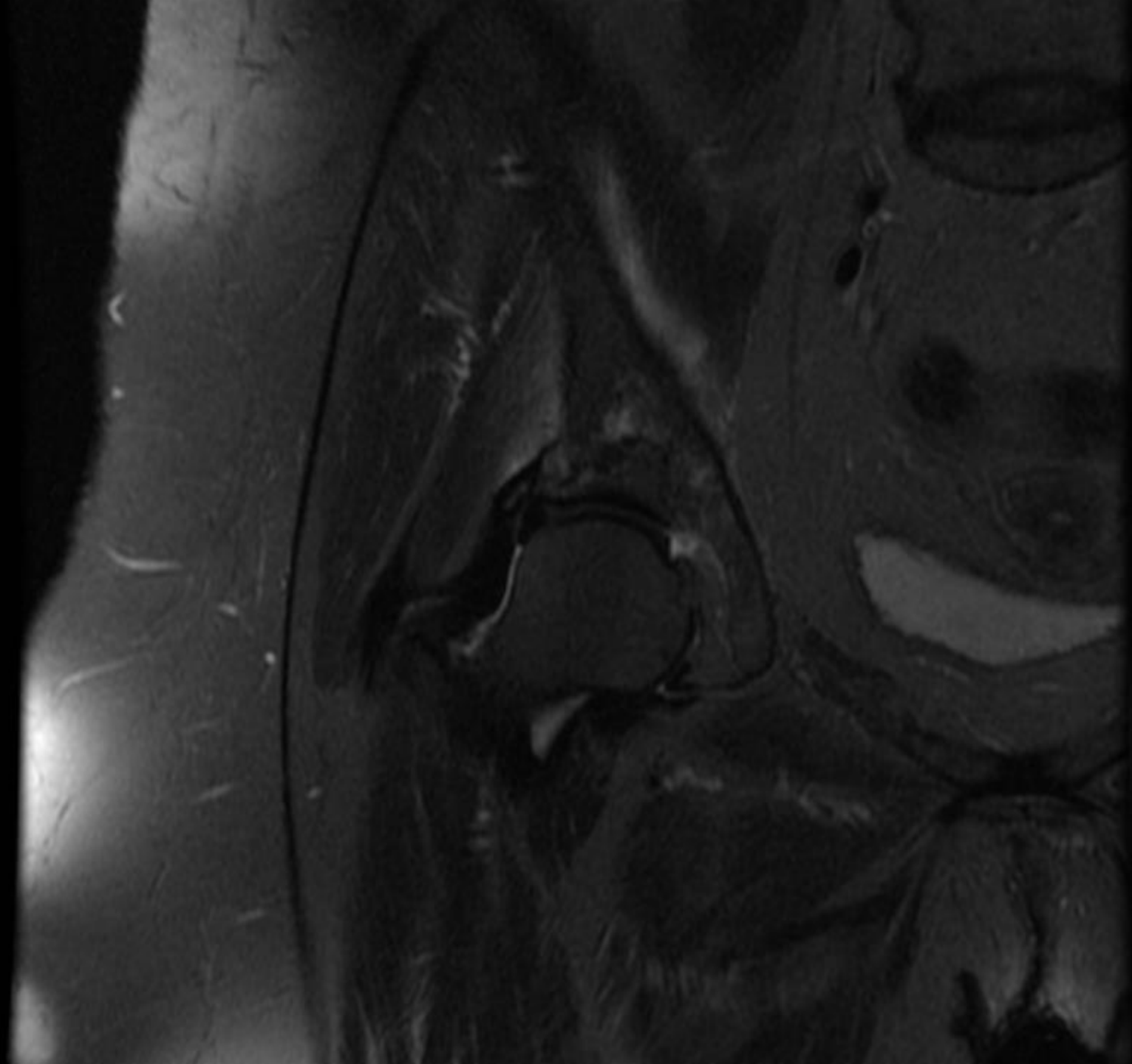
- 14 months after initial presentation

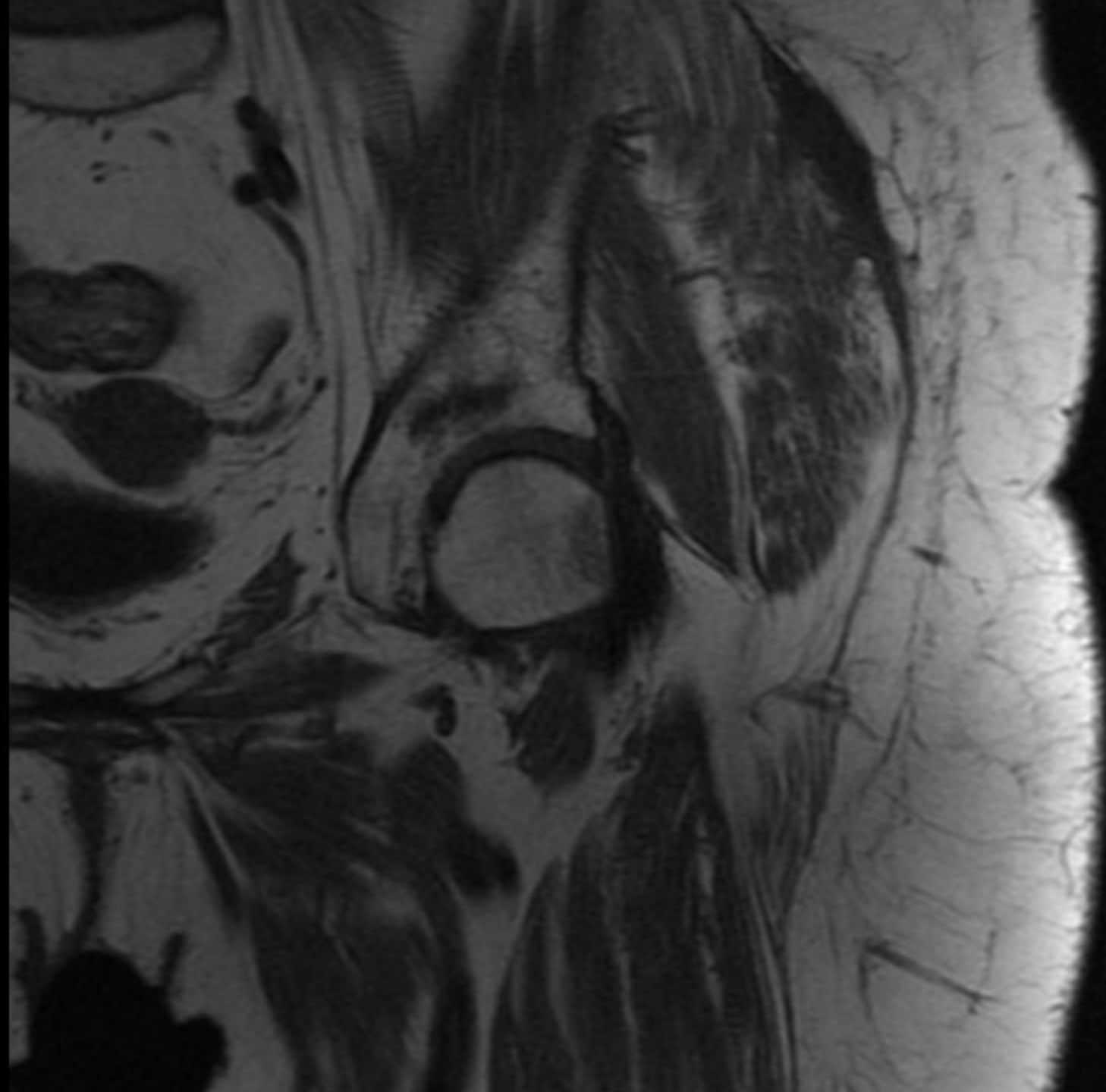


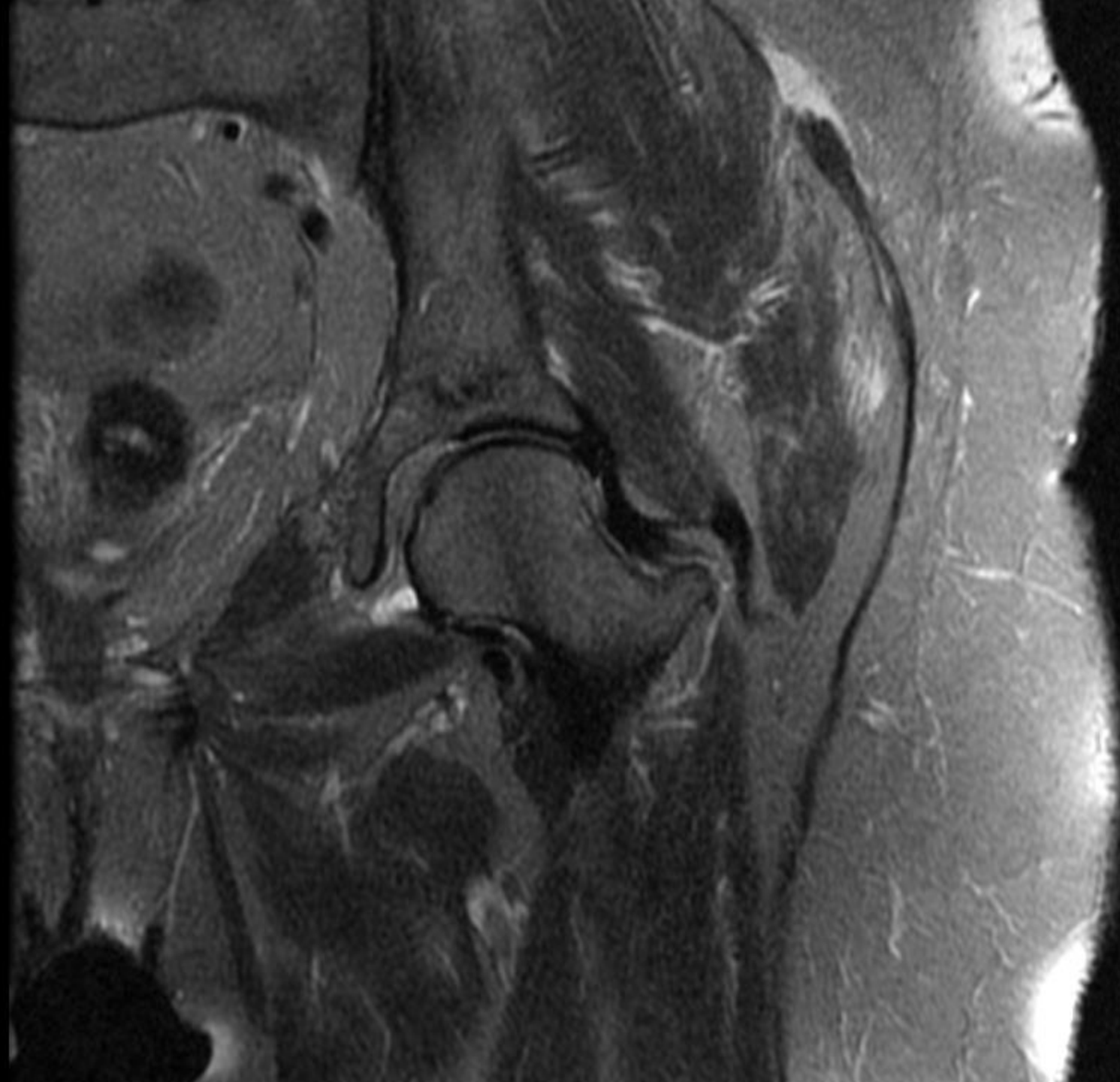
















# Acetabular Insufficiency Fracture

- Pelvic stress fracture
  - Fatigue fracture: Normal bone excessive stress
  - Insufficiency fracture: Normal stress on abnormal (usually osteoporotic) bone

<https://my.statdx.com/document/pelvic-stress-fractures/2fc74210-58cb-41c6-9687-a17ba2e31f40?searchTerm=acetabular%20insufficiency%20fracture>

# Pelvic Stress Fracture Imaging

- Assess for additional fracture sites
- Radiographs: Sclerotic band or lucent line
- MR: Fracture line is low signal intensity on all sequences
  - Band of bone marrow edema surrounds fracture line
- Insufficiency fractures
  - Sacral ala
  - Pubic rami, pubic body
  - Supraacetabular ilium
  - Subchondral femoral head
- Fatigue fractures
  - Medial femoral neck or sacrum
- Radiographs for primary evaluation
  - MR for equivocal or negative radiographs
  - Often incidentally found on pelvic or lumbar-spine CT

<https://my.statdx.com/document/pelvic-stress-fractures/2fc74210-58cb-41c6-9687-a17ba2e31f40?searchTerm=acetabular%20insufficiency%20fracture>



# **Post-traumatic Abnormalities of the Pubic Bone Simulating Malignancy<sup>1</sup>**

**Thomas G. Goergen, M.D., Donald Resnick, M.D.,  
and Richard R. Riley, M.D.**

Three cases are presented in which unusual healing patterns of pubic fractures simulated malignant processes. Consideration of trauma as an etiologic factor in such cases may obviate the need for extensive clinical and histologic evaluation.

**INDEX TERMS:** Fractures, pathologic • (Pelvis, fracture, 4[4].411) • Pelvis wounds and injuries

**Radiology 126:85–87, January 1978**

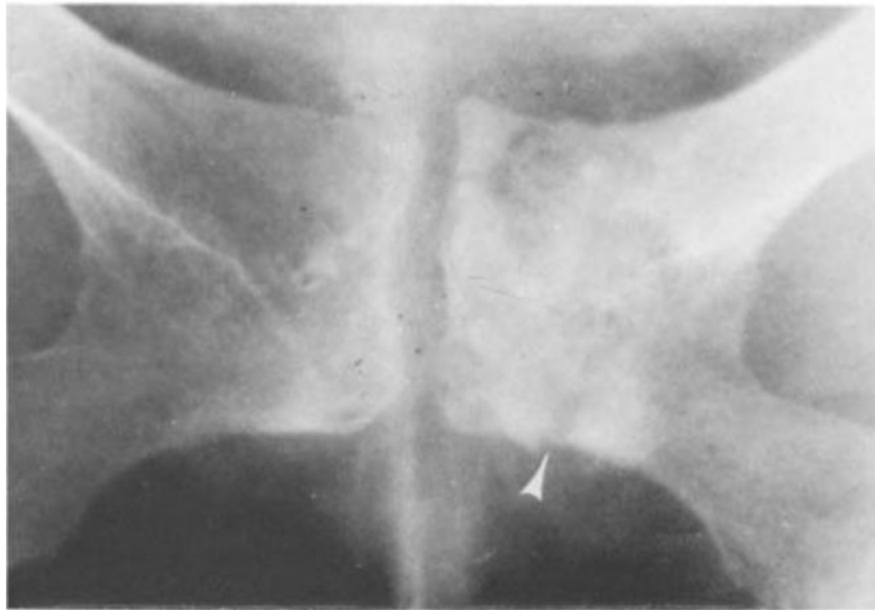


Fig. 1. CASE I. Pubic symphysis radiograph showing a mixed lytic-sclerotic lesion of the left pubis, with associated fracture (arrowhead).

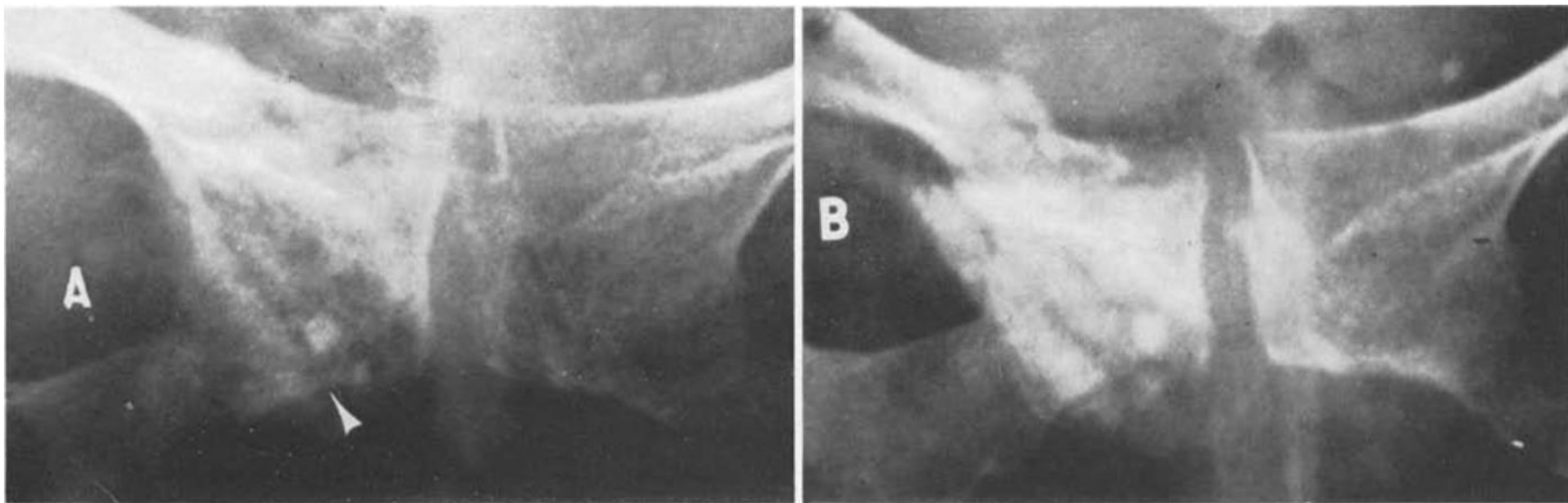


Fig. 2. CASE II. A. Pubic symphysis radiograph showing a lytic lesion of the right pubis, with associated fracture (arrowhead). B. Radiograph six weeks later showing increasing sclerosis and disruption of the cortex superiorly.

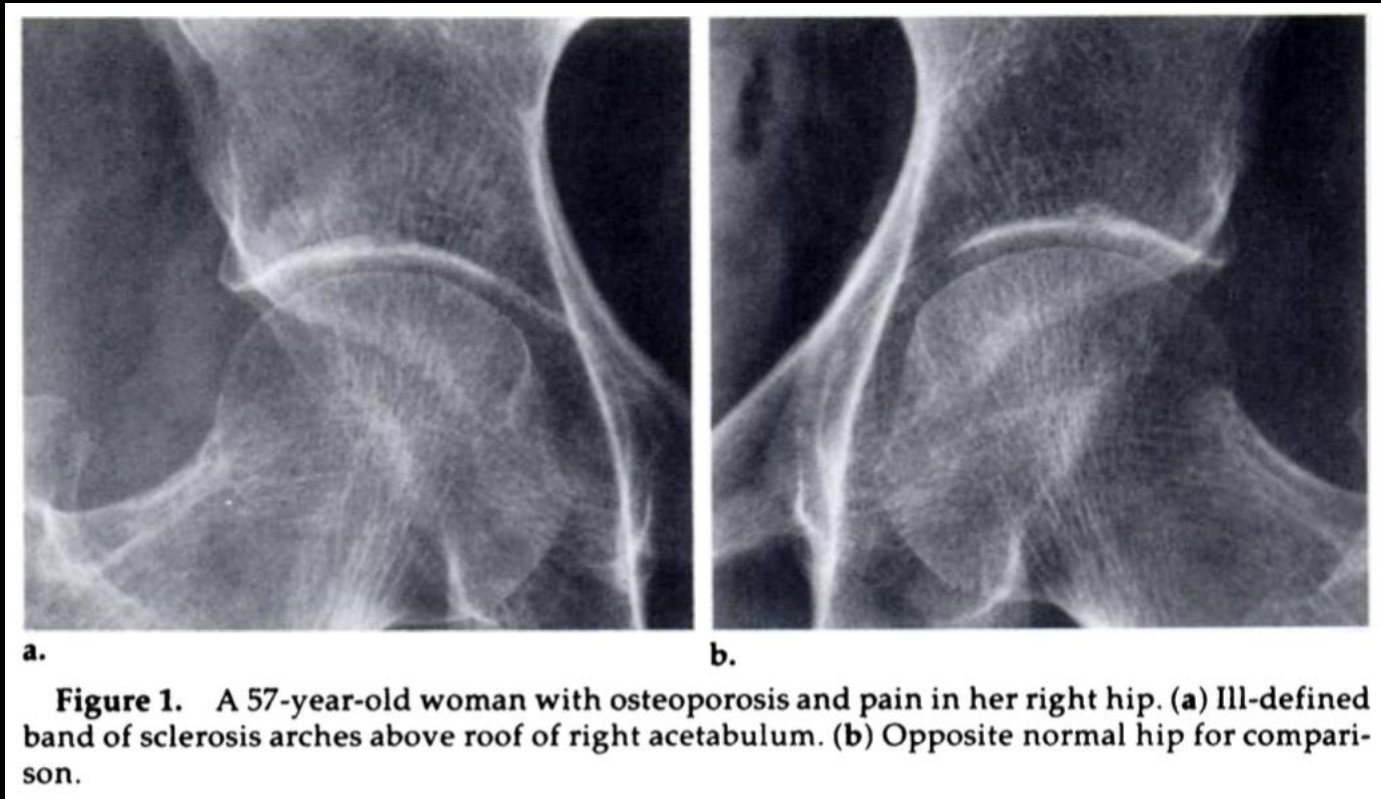
# Supraacetabular Insufficiency Fractures

- 5 women 55-83 years old
  - Postmenopausal osteoporosis
  - Steroid therapy
  - Radiation therapy
  - RA
  - Renal Failure
  - Mechanical changes after hip surgery

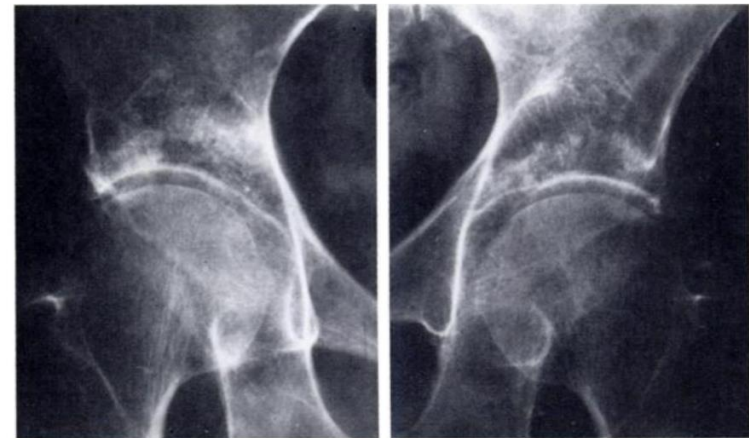
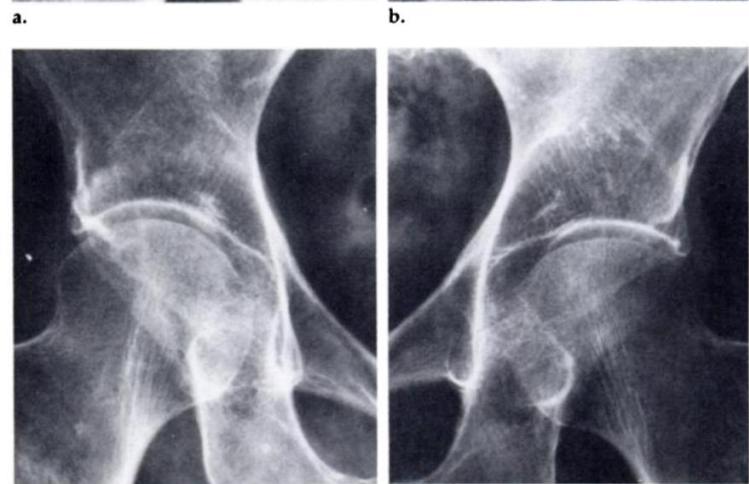
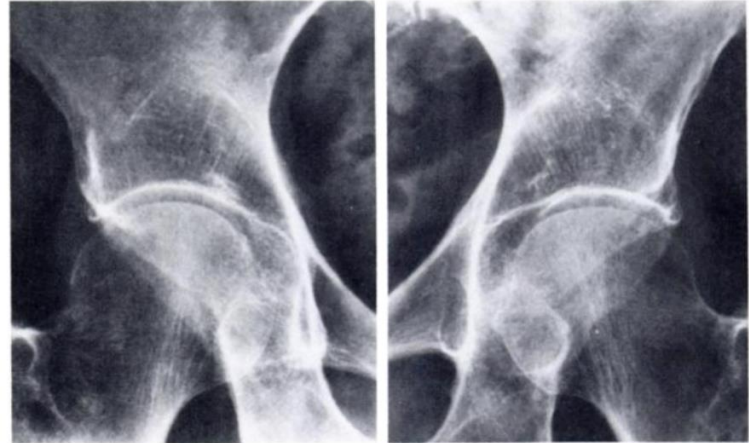
Cooper K et al. Supraacetabular Insufficiency Fractures. Radiology 1985; 157: 15-17.

Cabarrus et al. MRI and CT of Insufficiency Fractures of the Pelvis and Proximal Femur. AJR 2008; 191:995-1001

- Hazy band of sclerosis above and parallel to acetabular roof
- All had additional fractures in spine or pelvis
- Unsuspected cause of hip pain, in older women.



**Figure 2.** An 83-year-old woman who recently began receiving steroid therapy for temporal arteritis. (a, b) Before steroids, both hips are normal. (c, d) Two months after administration of steroids, an insufficiency fracture is present on the right. (e, f) Bilateral fractures are present 2½ months later.



Cooper K et al. Supraacetabular Insufficiency Fractures. Radiology 1985; 157: 15-17.

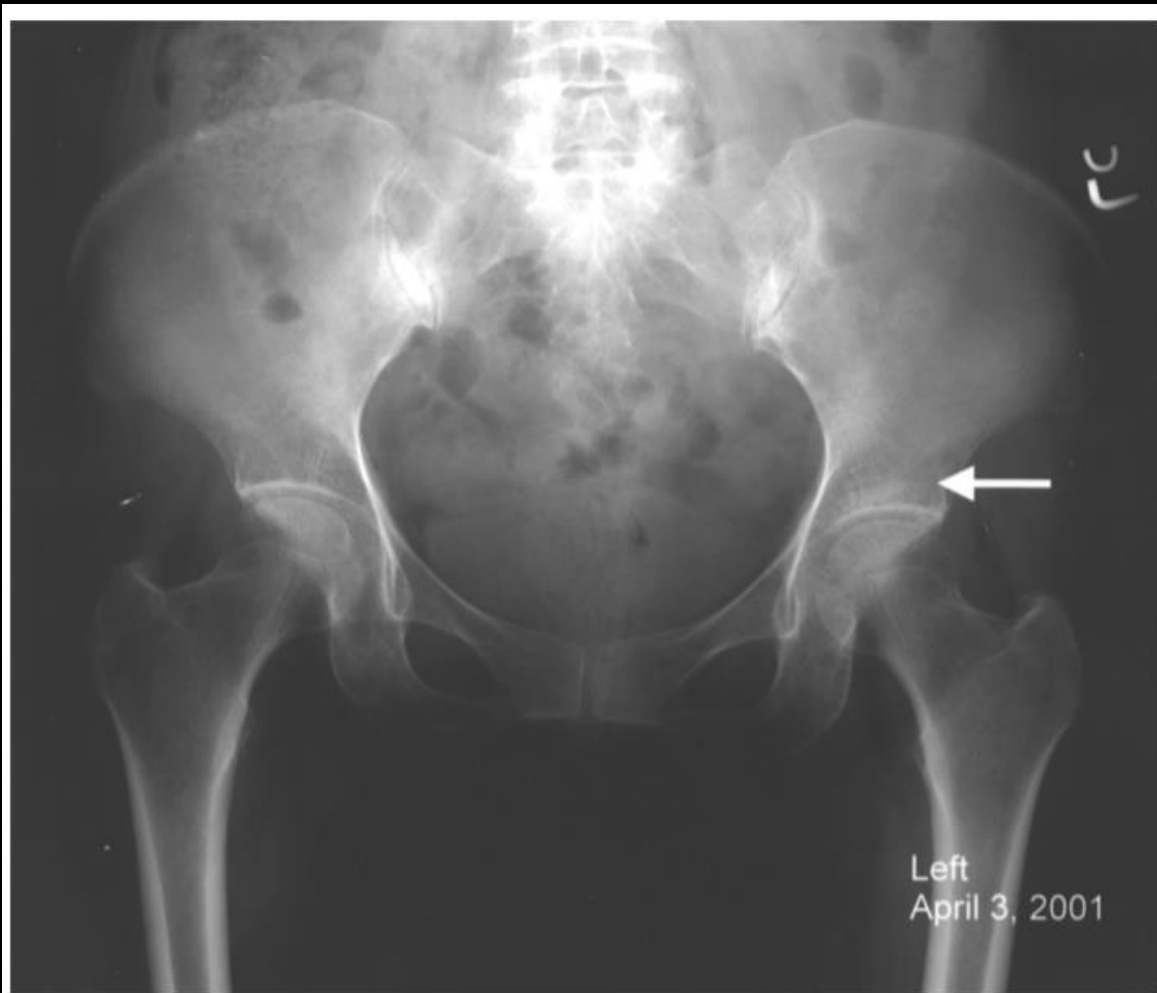


**Figure 3.** A 55-year-old woman with insufficiency fractures bilaterally in the sacrum, right pubic bone, and left acetabulum.

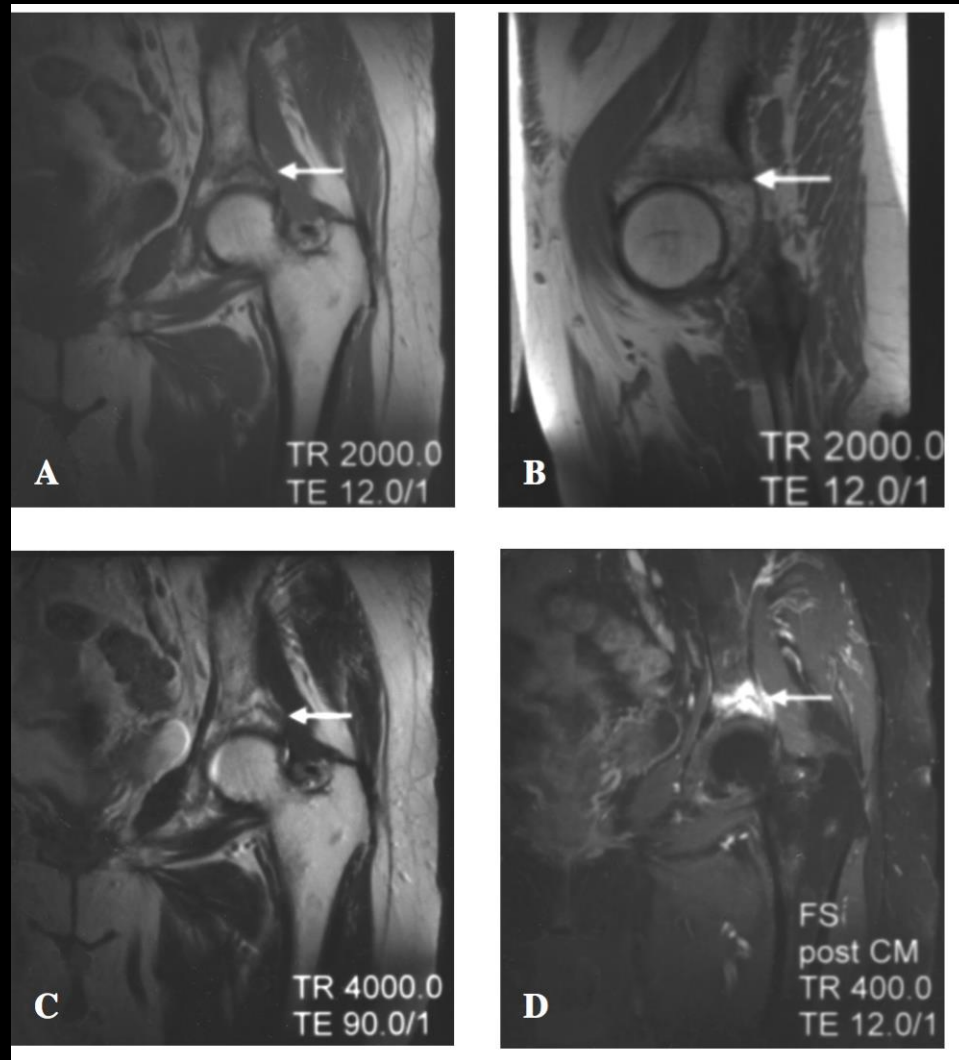


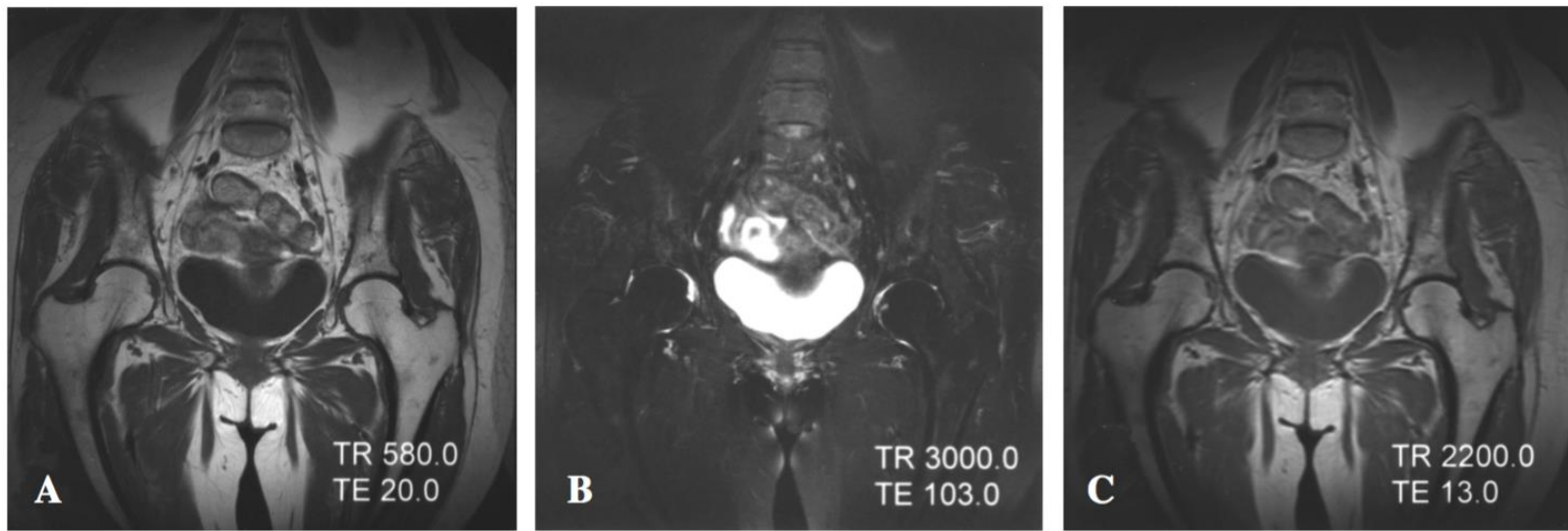


**Figure 4.** Two years after radiation therapy for carcinoma of the anus, stress fractures are present in both iliac wings, in both supraacetabular areas, and in the left femoral neck.



**Fig. 1.** Plain roentgenogram of the pelvis shows diffuse osteopenia and an ill-defined sclerotic arch above the roof of the left acetabulum (arrow).





**Fig. 3.** Repeated magnetic resonance imaging of the pelvis after 5 months shows normal signals in the acetabulum. A) Coronal T1-weighted image (SE 580.0/20.0); B) coronal T2-weighted image (SE 3000.0/103.0); C) proton density image (SE 2200.0/13.0).

- Kiuru et al in 2003
- prevalence and distribution and of stress fractures in young patients
- 340 patients stress related pain in hip, buttock or groin. (18-29 yo)
  - 45 women, 295 men
- age range 18–29 years; mean age 20.7 years) suffering from stress- related hip, buttock or groin pain took part in the study.

# Findings

**Table 1** Distribution of 174 bone stress injuries in 137 patients and correlation with MR findings

Bone	No. of cases (F/M)	Location of pain in relation to MRI findings	
		Same side	Contralateral
Sacrum	28 (9/19)	21 (75%)	7 (25%)
Iliac bone	3 (1/2)	3	–
Inferior pubic ramus	34 (11/23)	30 (88%)	4 (12%)
Superior pubic ramus	3 (–/3)	2	1
Acetabulum	1 (–/1)	1	–
Femur, head	1 (–/1)	1	–
Femur, neck	70 (13/57)	59 (84%)	11 (16%)
Femur, proximal shaft	34 (7/27)	26 (76%)	8 (24%)
Total	174 (41/133)	143 (82%)	31 (18%)

Kiuru M et al. Fatigue stress injuries of the pelvic bones and proximal femur: evaluation with MR Imaging. Eur Radiol (2003) 13:605–611

# CT vs MRI for Insufficiency Fractures

- 145 patients with insufficiency fractures
  - 104 women and 41 men, with an average age of  $65.9 \pm 17.7$  years (average age in women,  $67.7 \pm 16.2$  years; in men,  $61.1 \pm 20.5$  years; age range, 13–101 years) were identified and included in this study.
- 64/145 had both CT and MRI and were compared
- MRI 128/129 fractures (99%) in 63/64 patients
- CT 89/129 (69%) in 34/64 (53%) patients
- Mri significantly better for acetabulum and femoral head
- 70% had 2 or more fractures
- 89% of pubic insufficiency fx had additional fx location
- 40% had a prior malignancy (likely chemo and/or radiation)

**TABLE 1: Comparison of Fracture Detection Rates of MRI and CT and Locations of Fractures Most Frequently Missed**

Location of Fracture	Total No. of Fractures	Fractures Detected with CT	% of Fractures Detected with CT	Fractures Detected with MRI	% of Fractures Detected with MRI
Ilium	5	3	60.0	5	100.0
Sacrum	67	50	74.6	67	100.0
Ischium	2	2	100.0	2	100.0
Pubis	29	19	65.5	29	100.0
Femur, neck	10	7	70.0	9	90.0
Acetabulum	9	5	55.6	9	100.0
Femur, head	7	3	42.9	7	100.0
Total	129	89	69.0	128	99.2

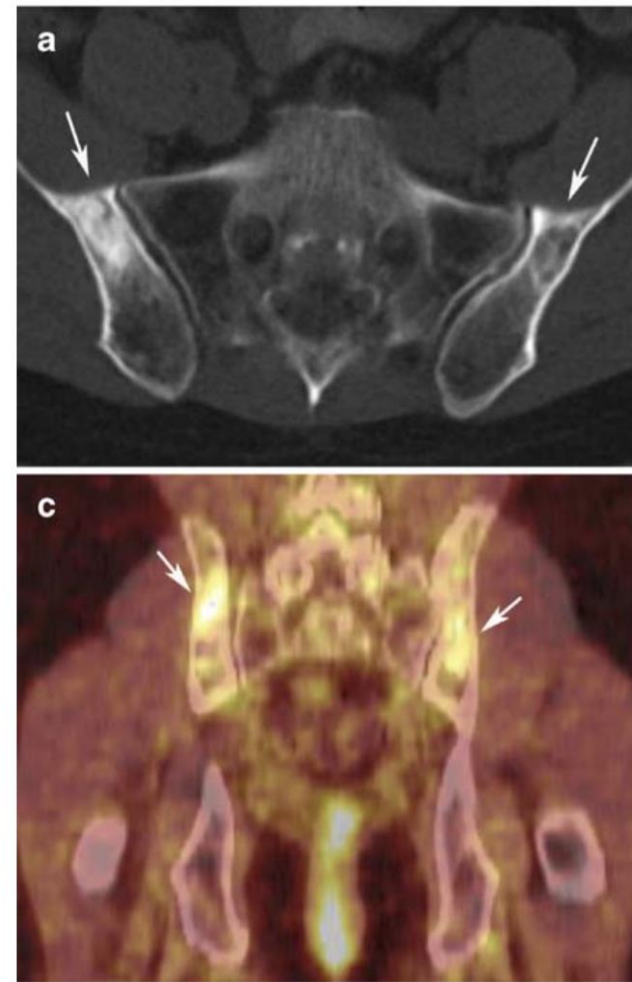
**TABLE 2: Fracture Locations and Numbers in All 145 Subjects**

Location	No.
Ilium	10
Sacrum	162
Ischium	4
Pubis	54
Femur, neck	24
Femur, intertrochanteric	5
Acetabulum	28
Femur, head	19
Femur, subtrochanteric	1
Total	307

Cabarrus et al. MRI and CT of Insufficiency Fractures of the Pelvis and Proximal Femur. AJR 2008; 191:995-1001



# Insufficiency Fractures Mimic Malignancy



**Fig. 4** A 47 year-old male (patient 4) with metabolic bone disease, history of jaw sarcoma, and thyroid carcinoma presented with pelvic pain. **a** Axial CT image showed superomedial iliac medullary sclerosis adjacent to the sacroiliac joints, with right more prominent than left (*arrows*). **b** Posterior images from bone scintigraphy showed increased

# Why important to diagnose

- functional disability that frequently results in loss of independence in elderly
- may present after minor trauma or have symptoms of chronic lower back, pelvic, or groin pain that may appear unrelated to trauma.
- Frequently radiographically occult.
- incorrect diagnoses and many unnecessary, costly diagnostic procedures.
- avoid misinterpretation as bone metastases.
- Delayed diagnosis can lead to immobility and complications such as deep vein thrombosis, loss of strength, decreased cardiac output, depression, and increased bone resorption and calcium excretion.

# References

- <https://my.statdx.com/document/pelvic-stress-fractures/2fc74210-58cb-41c6-9687-a17ba2e31f40?searchTerm=acetabular%20insufficiency%20fracture>
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