58-year-old female presenting with one year history of right shoulder pain

Alexander J. Ment, BA

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AP Radiograph

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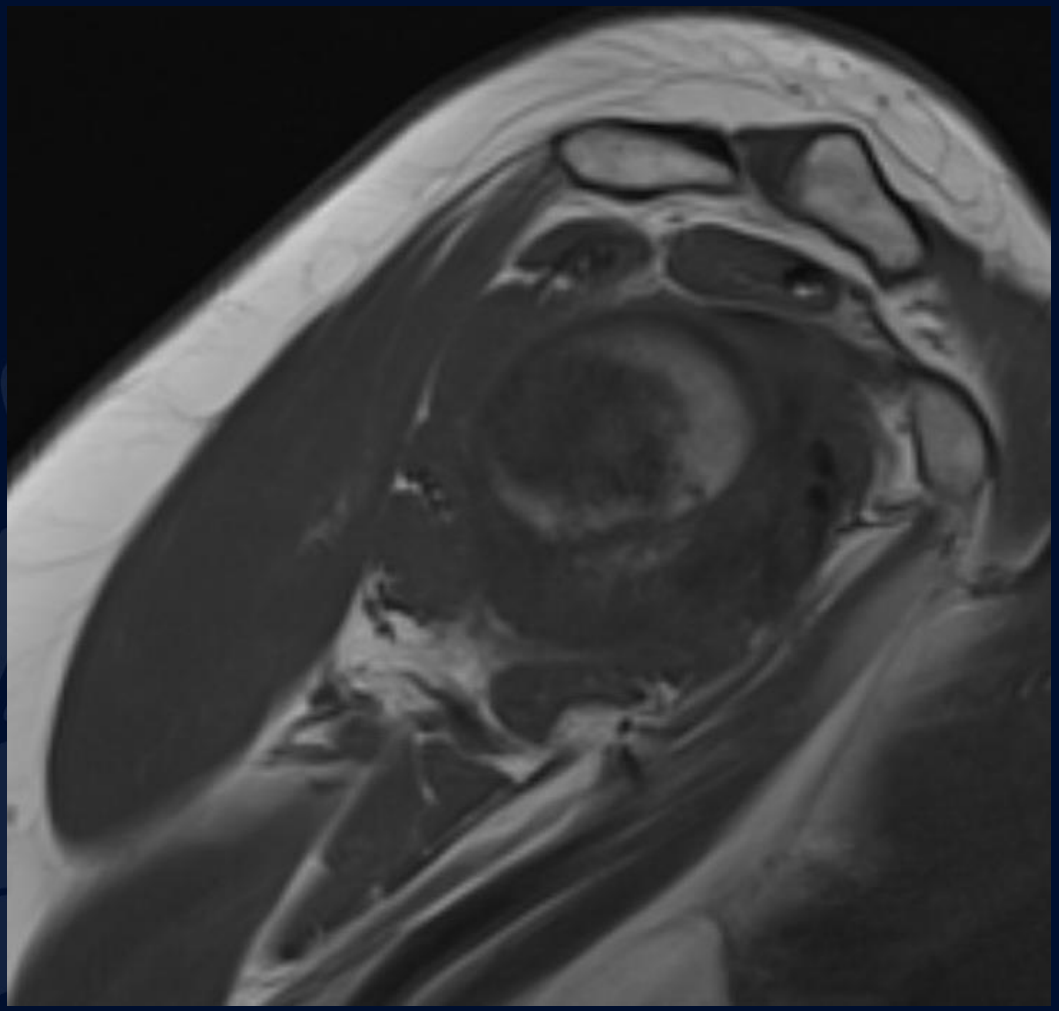
Sagittal MR T1



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Coronal MR T2

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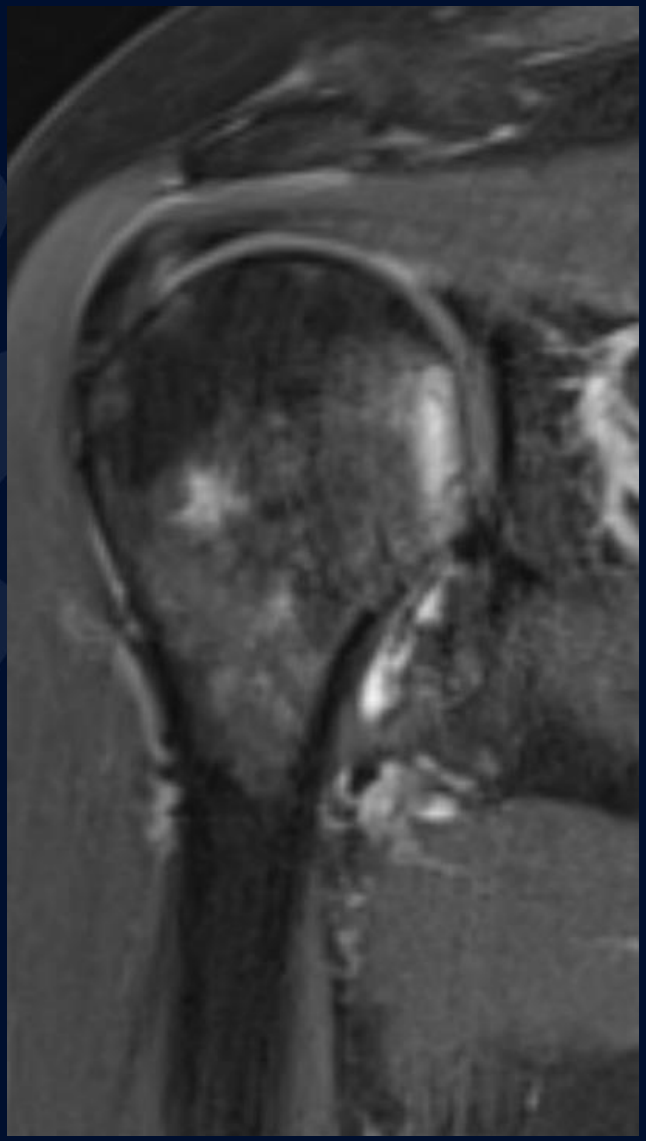
Coronal MR PD



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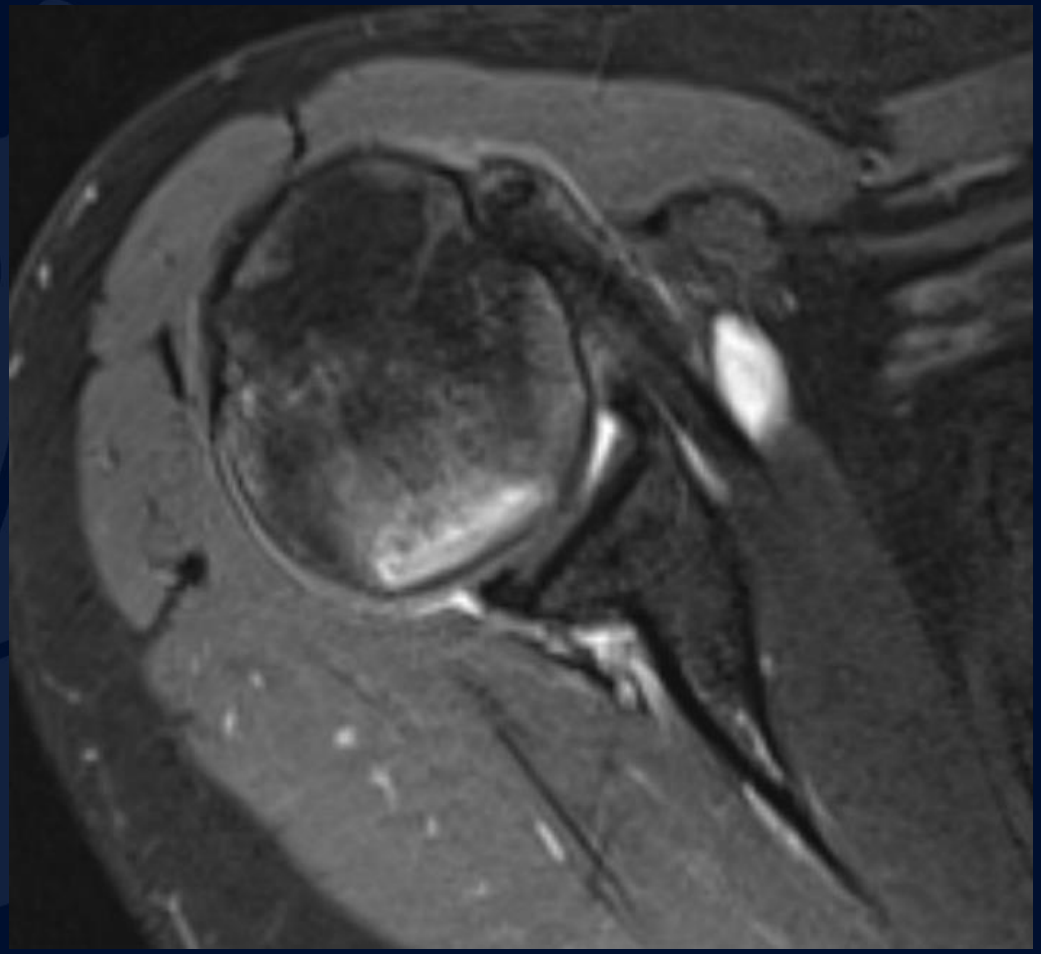
Sagittal MR PD



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Subchondral Insufficiency Fracture of the Humeral Head

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AP Radiograph

No evidence of acute osseous abnormality

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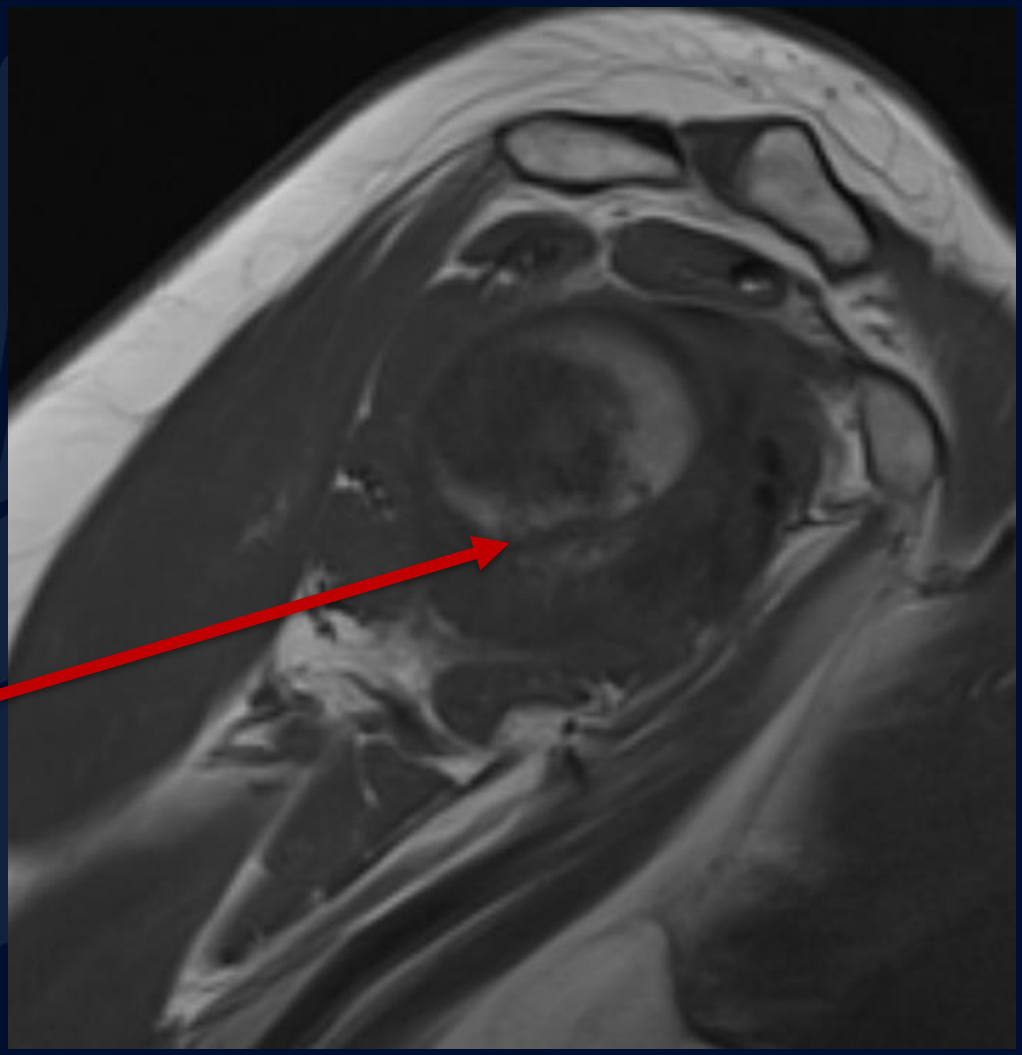
Sagittal MR T1



Hypointense subchondral fracture line

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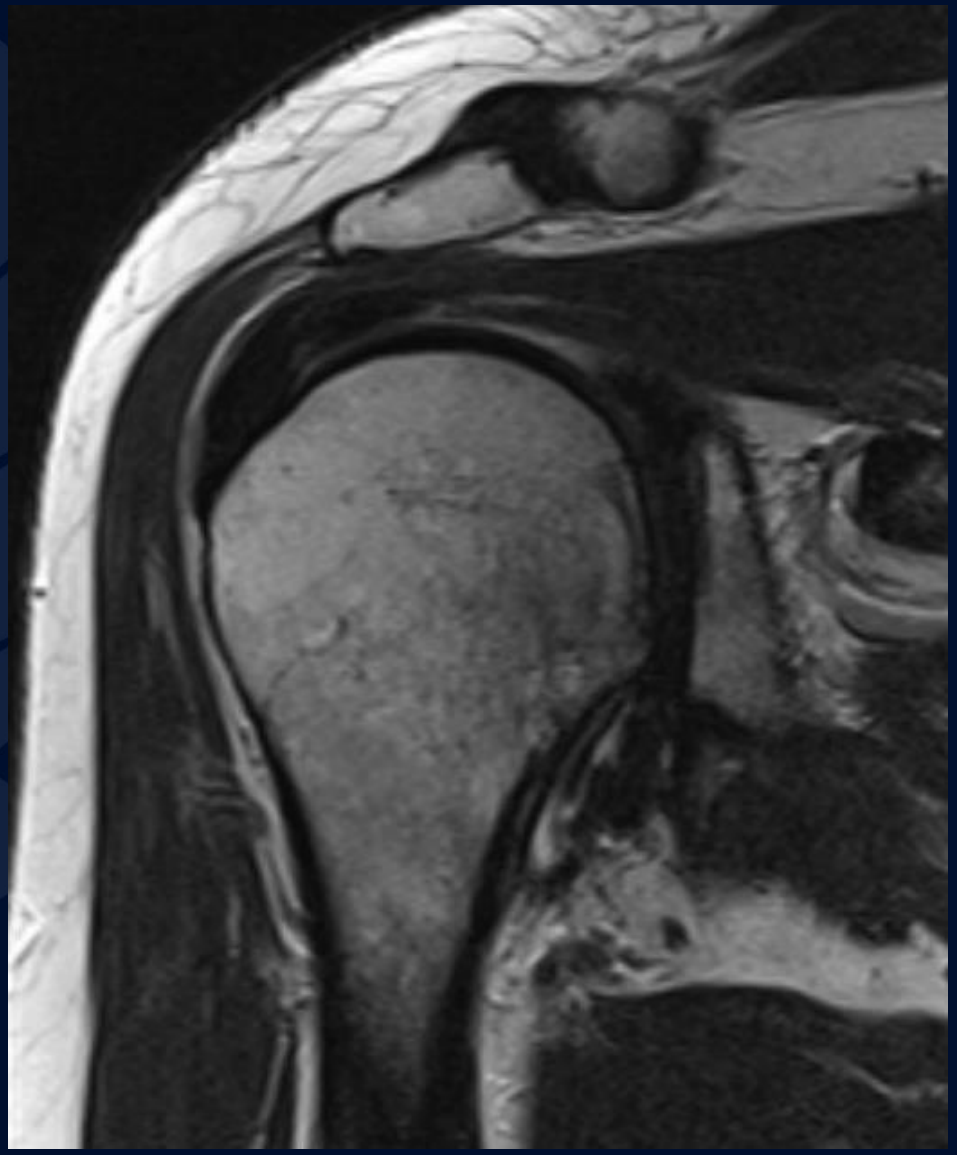
Coronal MR T2



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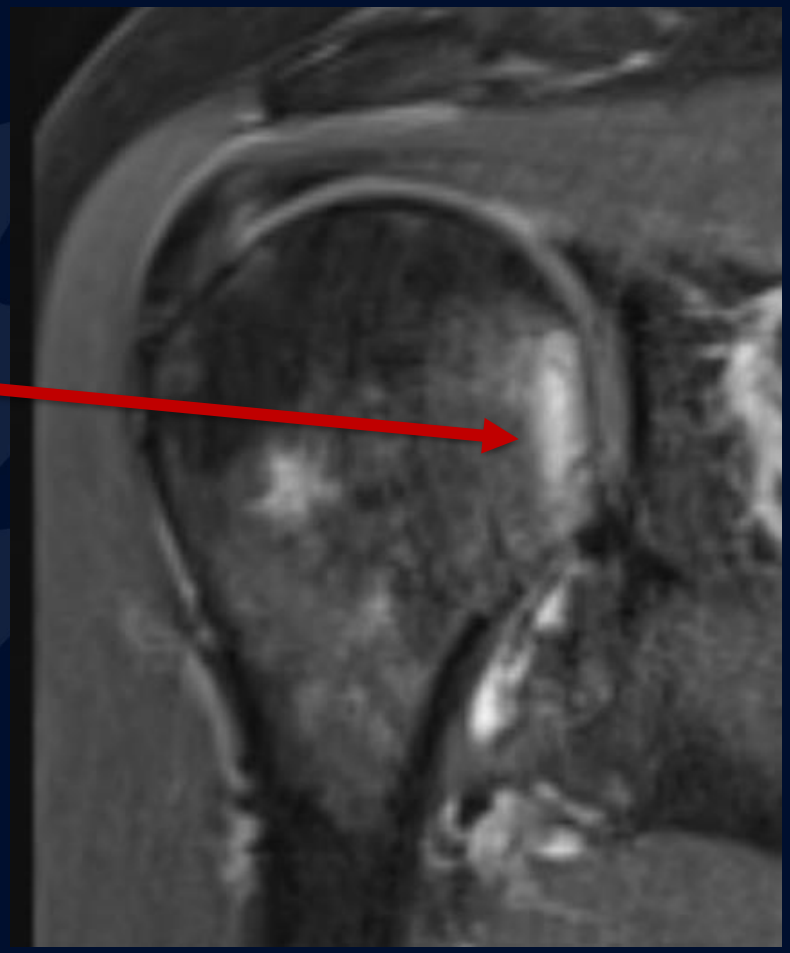
Coronal MR PD

Increased signal on proton density sequence, consistent with marrow edema



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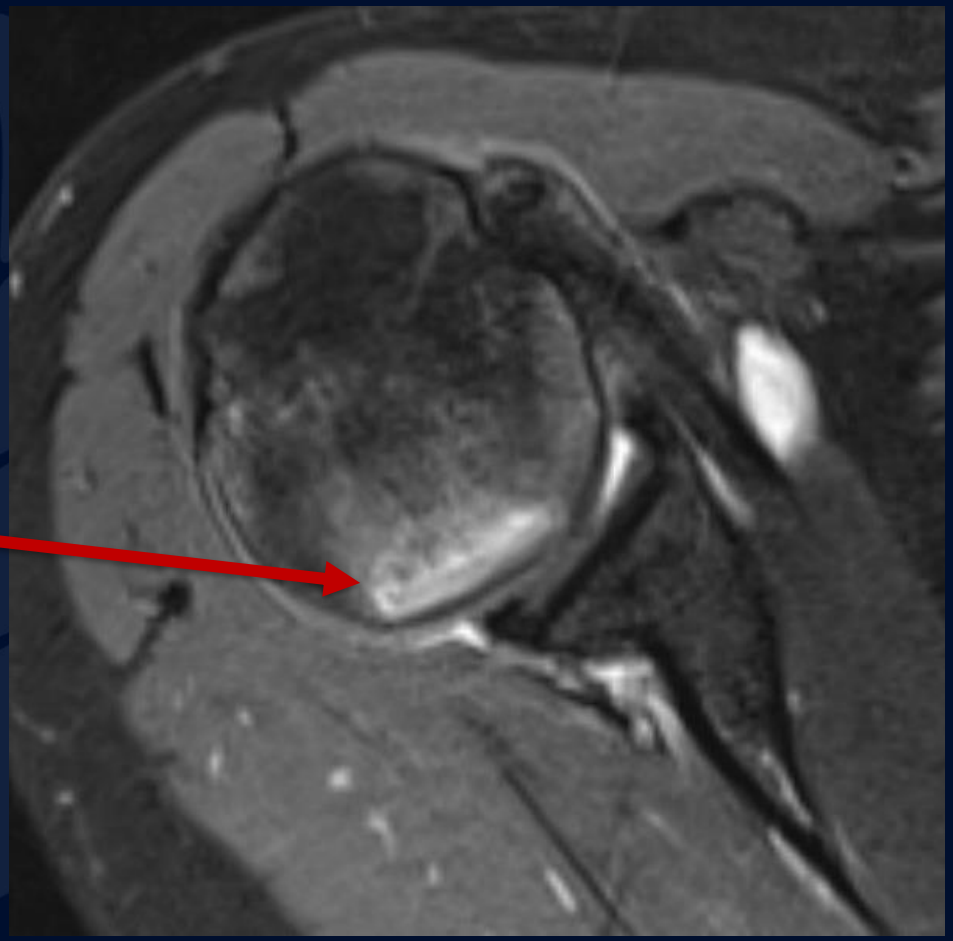
Sagittal MR PD

Increased signal on proton density sequence, consistent with marrow edema



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Subchondral Insufficiency Fracture

Subchondral insufficiency fractures (SIFs) due to repetitive microtrauma resulting in stress fracture underneath the articular cartilage. SIFs typically present with a sudden onset of pain in weight-bearing areas such as the femoral head, femoral condyle, or tibial plateau. Severe cases can lead to rapid destructive arthrosis.

Risk factors

- Elderly females, repetitive microtrauma, overuse, osteoporosis, osteomalacia and obesity

Differential Diagnosis

- Bone marrow contusion
- Osteoarthritis
- Avascular necrosis

Management

- Observation, NSAIDs, bisphosphonates, physical therapy, arthroplasty

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Imaging Findings

Radiographs

- Radiographs may be normal initially
- Linear subchondral sclerosis or radiolucency following callus formation

MR

- T1 hypointense fracture line
- T2 hypointense fracture line
- PD bone marrow edema
- SIF Knee (SIFK) Classification System
  - Grade 1: bone marrow edema
  - Grade 2: bone marrow edema accompanied by hypointense fracture line
  - Grade 3: fluid-filled fracture line with cysts
  - Grade 4: cortical collapse and step off

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References

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