MY PATIENT HAS KNEE PAIN

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Causes of knee pain

- Non-traumatic
  - Osteoarthritis
  - Patellofemoral pain
  - Menisci or ligaments
  - Post-arthroplasty
  - Tumor
- Trauma
  - Bones
    - Contusion
    - Fracture
  - Soft tissue injury
    - Ligaments
    - Tendons
    - Menisci

Imaging modalities

- Radiographs
- MRI
- CT
- Nuclear Medicine
- Ultrasound

Radiographs

- Osteoarthritis
  - Sclerosis
  - Joint space narrowing
  - Marginal osteophytes
  - Subchondral cysts
- Intra-articular bodies
- Fractures
- Tumors

MRI

- Meniscal tear
- Ligament sprain
- Tendon tear or muscle strain
- Osseous
  - Trauma related contusion or fracture
  - Insufficiency fracture
  - Tumor
- Articular cartilage
- Baker's cyst

CT

- Fracture
- Best cortical detail
  - Fracture fragments and surgical planning
- Patellar maltracking
- CT arthrography
- Tumors

Nuclear medicine

- Post-arthroplasty imaging
- Stress fracture
- Tumor

Ultrasound

- Poor for evaluation of bones and deeper soft tissues
- Baker's cyst
- Ultrasound guided MSK procedures
- Extensor mechanism

Patient #1

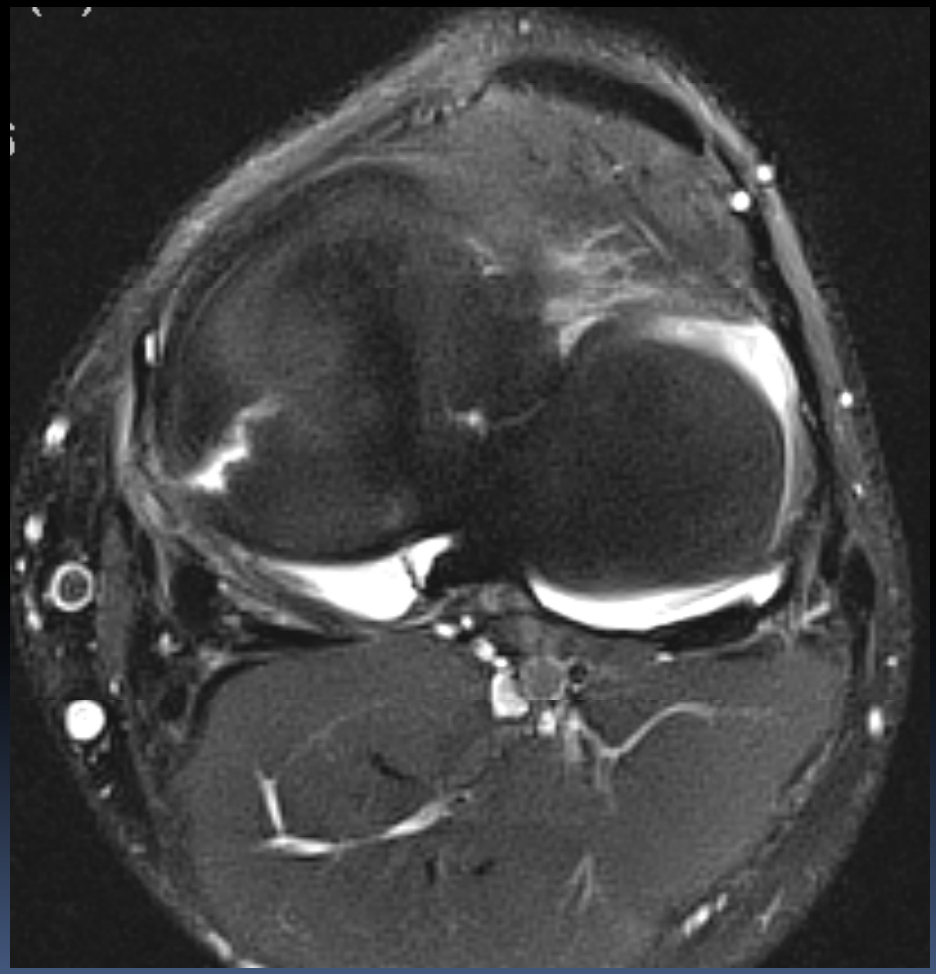
- 31 yo male, s/p slip and fall
- Medial knee pain x 2 weeks
- Limping badly
- Locking on physical exam
- Radiographs are read as negative

Clinical Condition: **Acute Trauma to the Knee**

Variant 3: **Patient any age (excluding infants); fall or twisting injury with either no fracture or a Segond fracture seen on a radiograph, with one or more of the following: focal tenderness, effusion, inability to bear weight. Next study.**

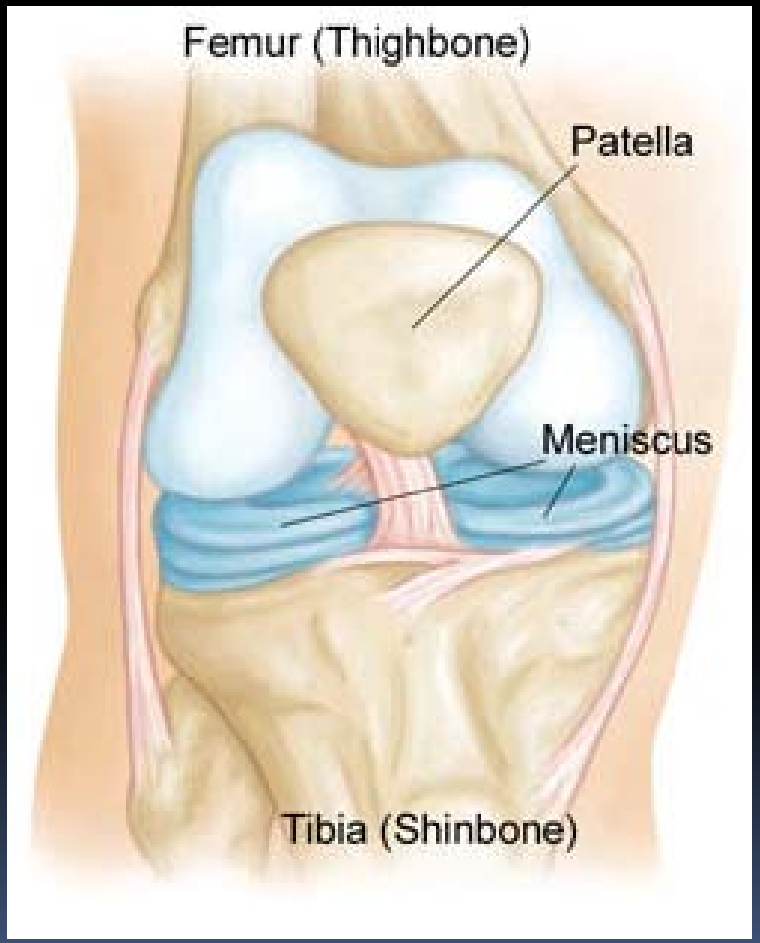
Radiologic Procedure	Rating	Comments	RRL*
MRI knee without contrast	9		O
CT knee without contrast	5	The RRL for the adult procedure is ☢.	☢☢
US knee	1		O

Patient #1



Medial meniscal radial tear

- Menisci = shock absorbers
- Radial tear results in loss of meniscal hoop strength
- Can predispose to early cartilage loss, OA
- Difficult to repair



Patient #2

- 45 yo female, medial knee pain
- History of partial meniscectomy 1 year prior
- Evaluate for meniscal tear/ re-tear
- What is the best imaging test?

Patient #2

Patient #2

Patient #3

- 26 yo male, skiing injury
- Diffuse knee pain
- Unable to bear weight
- What is the first imaging test that should be done?

Patient #3

Segond Fracture

- Avulsion fracture at the anterior, lateral tibial plateau
- 75-100% association with ACL tear
- Secondary to stress of the anterior oblique band of the LCL

Patient #3

- Are we done????

- What is the next imaging test?

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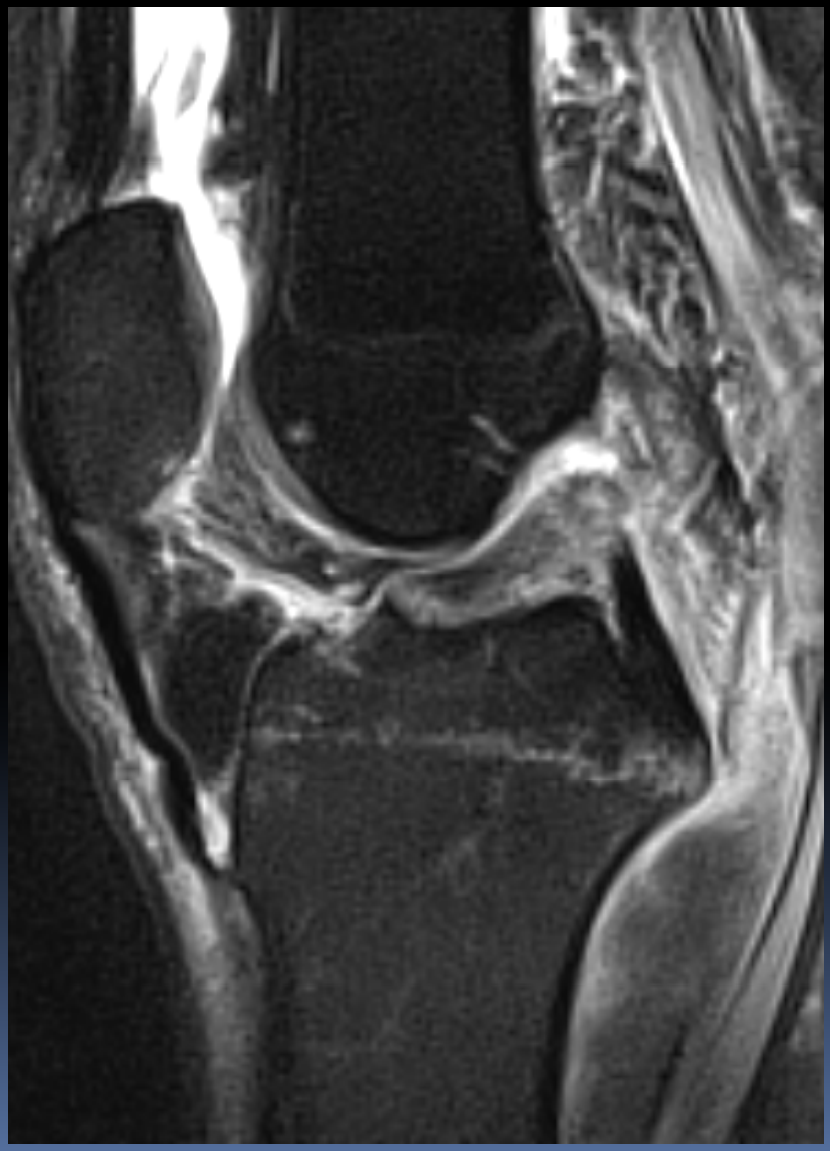
Patient #3



Imaging after acute trauma

- Acute knee trauma in ER
  - 93% have soft tissue injury
  - 7% have osseous injury
- First clinical examination after knee trauma has low diagnostic yield
- In 90% of patients with non-operative tibial plateau fractures, there was significant associated soft tissue injury
- MRI is the optimal imaging modality for soft tissue and osseous injury to the knee

Patient #4

- 14 yo female, anterior and lateral knee pain x 1 week status post injury
- Pain on palpation in medial aspect of patella and lateral femoral condyle
- Outside radiographs read as normal
- What is the next imaging test?

Patient #4

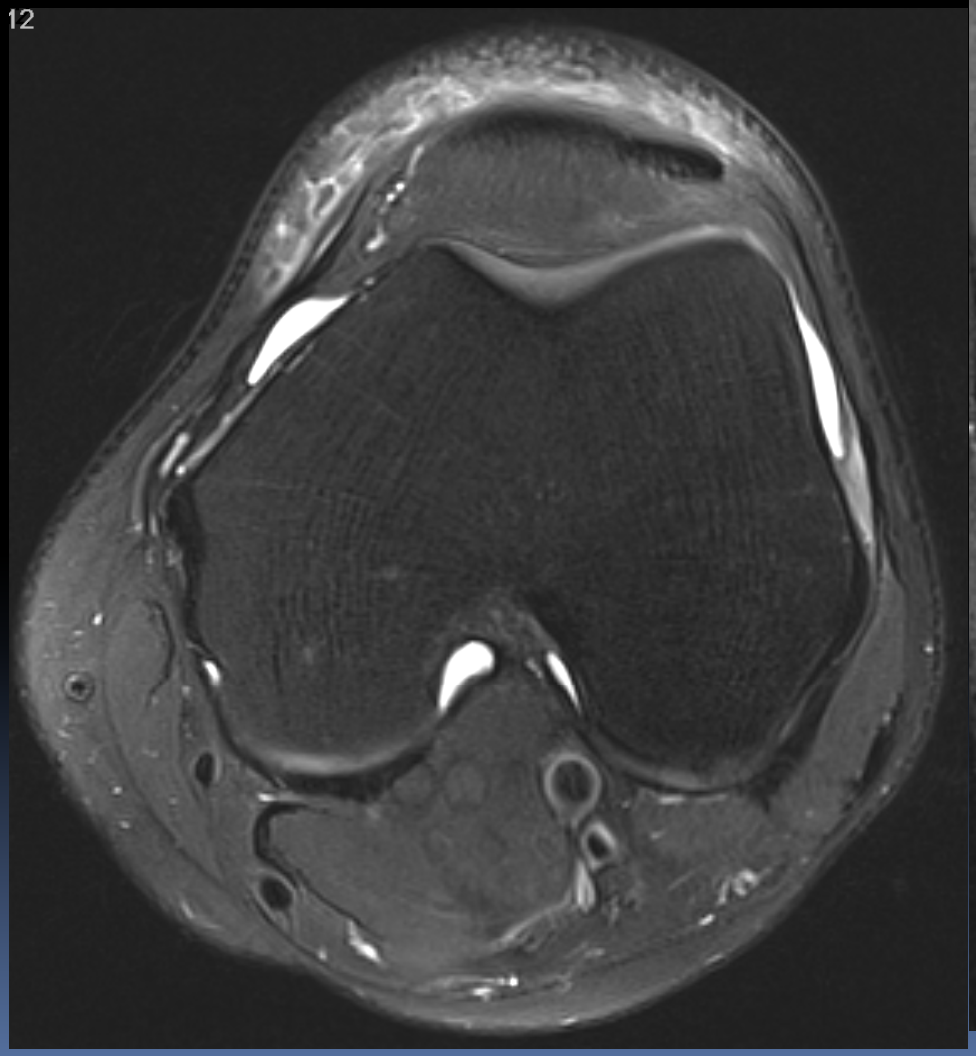
Transient lateral patellar dislocation/relocation

- Often affects adolescents/teenagers
- Morphologic predisposition to injury
  - Shallow trochlear groove
  - Patella alta
  - TTTG
- May require Fulkerson osteotomy

Patient #5

- 29 yo female, runs 3x per week
- Persistent lateral knee pain
- Radiographs read as normal
- Prescription states: "Lateral knee pain, r/o lateral meniscal tear"

Patient #5



Iliotibial band friction syndrome

- Friction between iliotibial band and lateral femoral condyle
- Most commonly affects runners
- Mimicker of other causes for lateral knee pain

Patient #6

- 62 yo female with chronic knee pain, with recent worsening
- No history of trauma
- What is the first imaging test?

Patient #6

Patient #6

Patient #6

Normal patient

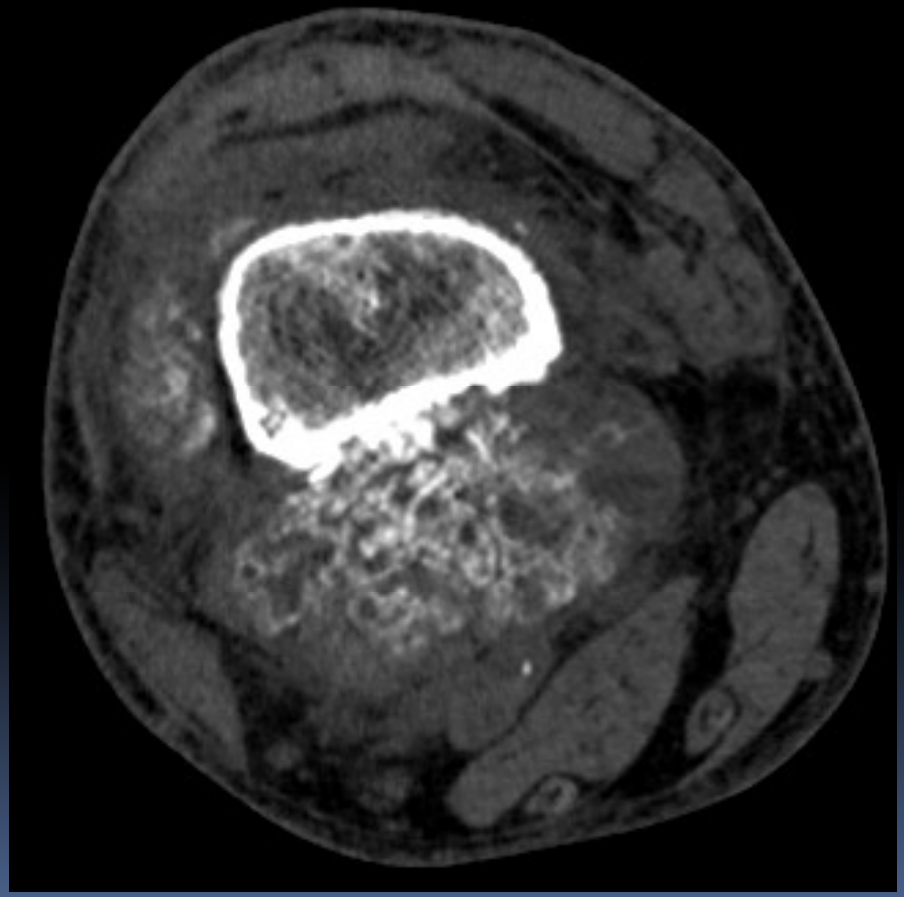
Osteoarthritis

- Joint space narrowing
  - Usually greater in the medial tibiofemoral compartment
- Marginal osteophytes
- Subchondral sclerosis
- Intra-articular bodies
- Usually requires no further imaging other than radiographs

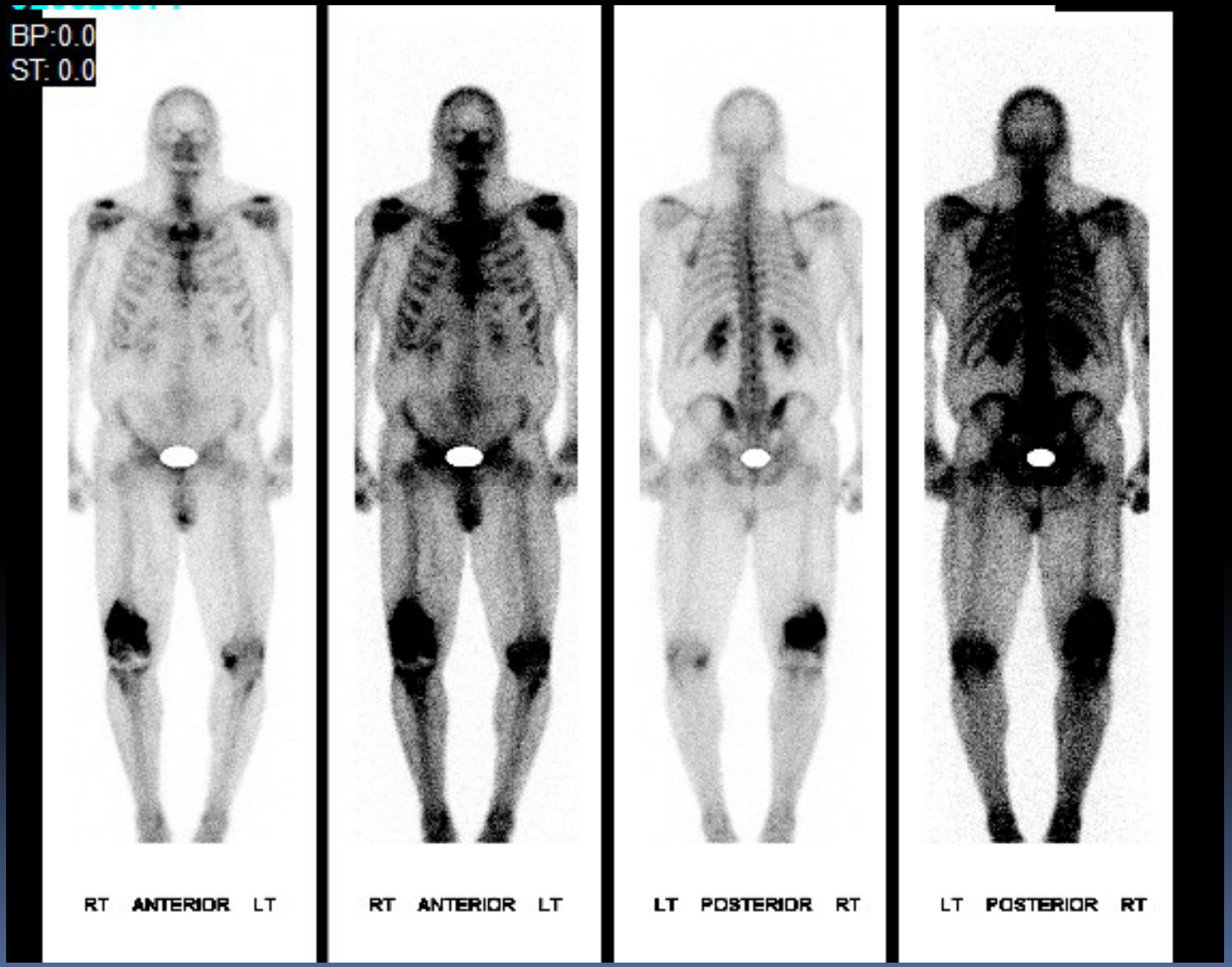
Patient #7

- 53 yo male with knee pain, history of total knee arthroplasty 4 years ago.
- Outside knee radiographs showed a "partially calcified mass in the distal femur."
- What is an appropriate next imaging test?

Patient #7



Patient #7


BP:0.0
ST: 0.0
RT ANTERIOR LT
RT ANTERIOR LT
LT POSTERIOR RT
LT POSTERIOR RT

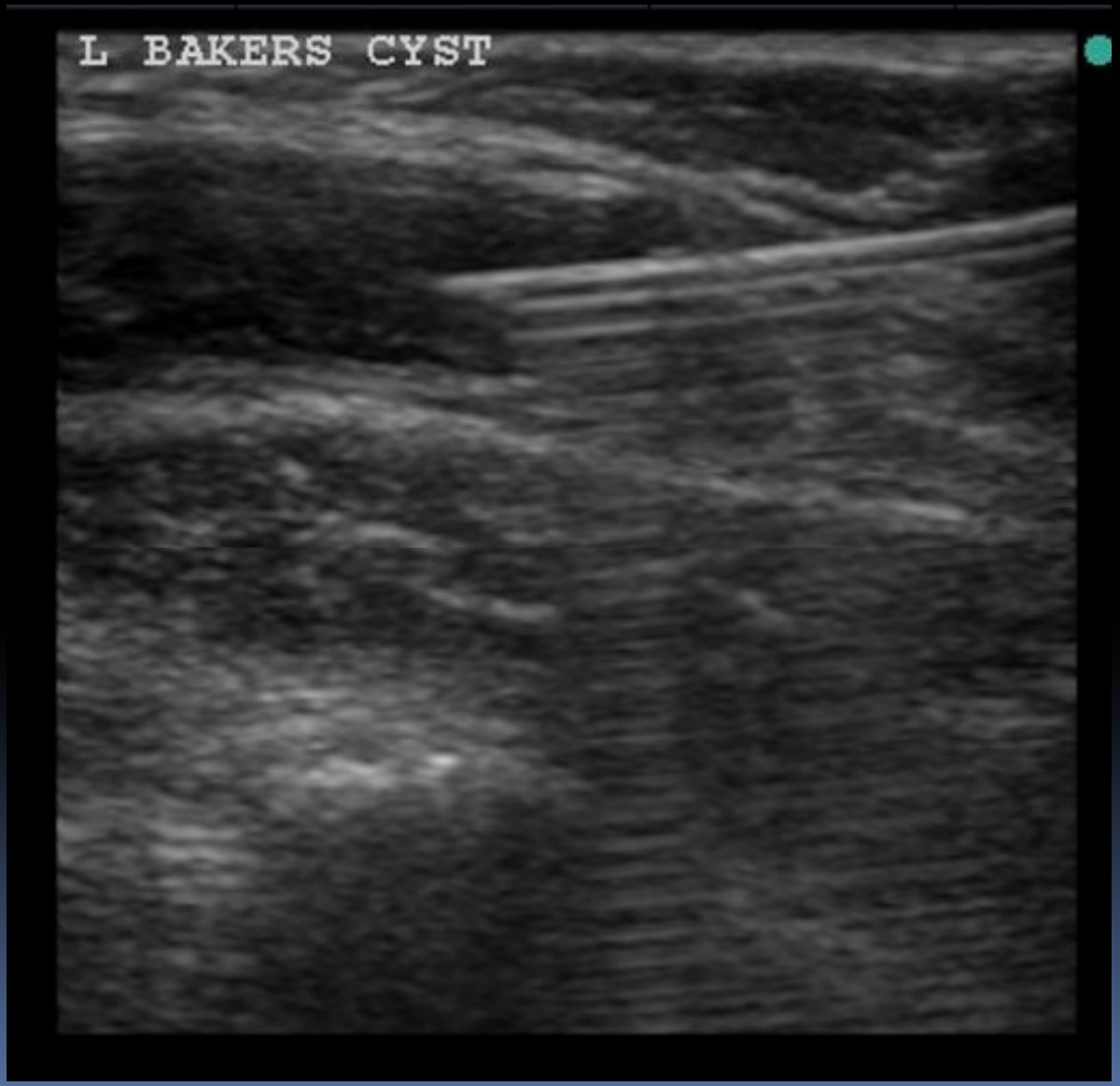
Patient #7

- CT is the best next imaging modality after radiographs in this case
  - Best to evaluate for calcification/matrix of tumor
  - Best spatial resolution
  - Good to consider in patients with metal
- Bone scan good to exclude distant metastatic disease

Patient #8

- 55 yo female with posterior knee pain and swelling
- Clinical suspicion of Baker's cyst
- What is an appropriate next imaging test and possible therapeutic option?

Patient #8



Baker's cyst

- Popliteal cyst
- Potential joint recess extending between the semimembranosus insertion and medial gastrocnemius origin
- Potential source of posterior knee pain
- Well demonstrated by ultrasound

Conclusion

- While radiographs are usually the starting point, there is an algorithm for approaching the patient with knee pain.
  - http://www.acr.org/Quality-Safety/Appropriateness-Criteria
- MRI is the workhorse
  - Menisci and ligaments
  - Occult fracture
  - Cartilage

Thank you