THE KNEE IN PRIMARY CARE

"Good news, Mr. Pickett—it's just a slow leak."

Knee Pain

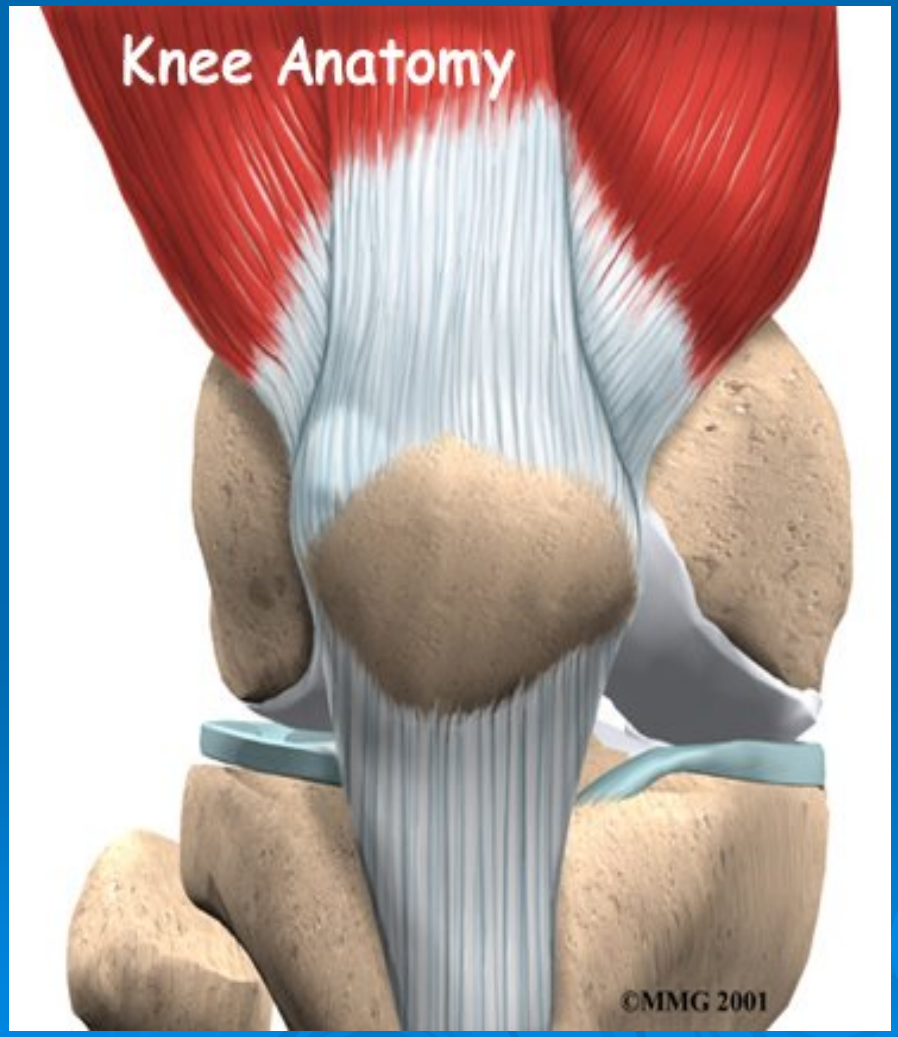
- 48 yo patient with “the list”:
  - “**My knee hurts**
  - but……”
  - So does my back and
  - I’ve been waking up a lot to urinate and
  - My daughter says that I’m depressed and
  - Would you look at this odd looking mole and
  - I need these disability forms filled out……

Strategies

- 1. Know the different presentations
- 2. Know the age-specific diagnoses
- 3. ‘Point to the Pain’
- 4. Use the examination to confirm the diagnosis.

What’s on the Surface?

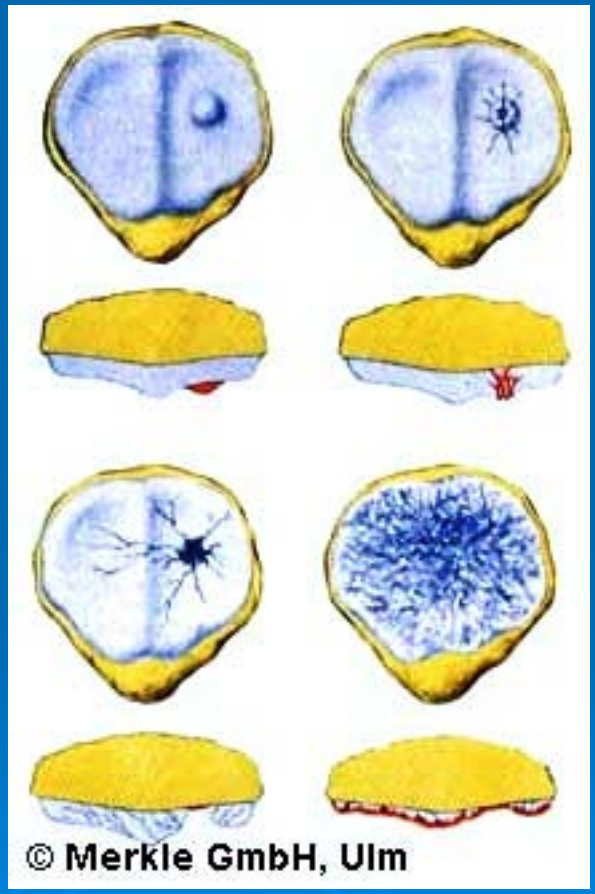
What's Inside?



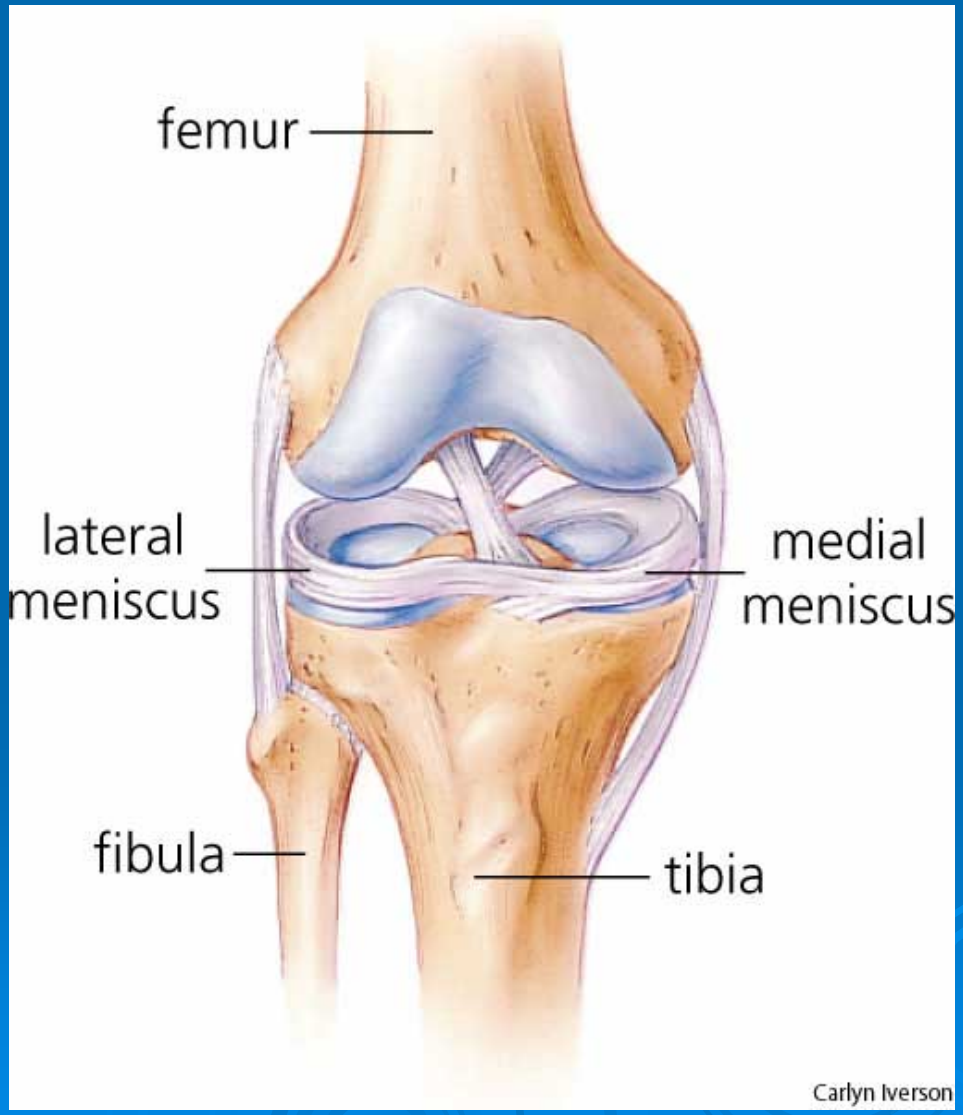
Patella

- Biggest sesamoid in the body
- Thickest cartilage in the body
- Biggest contact stresses of any joint
- Provides fulcrum for the quadriceps
- Important in any bent-knee activity
- Can dislocate, subluxate, malalign, degenerate, and just plain hurt.

Patella



What's Inside?

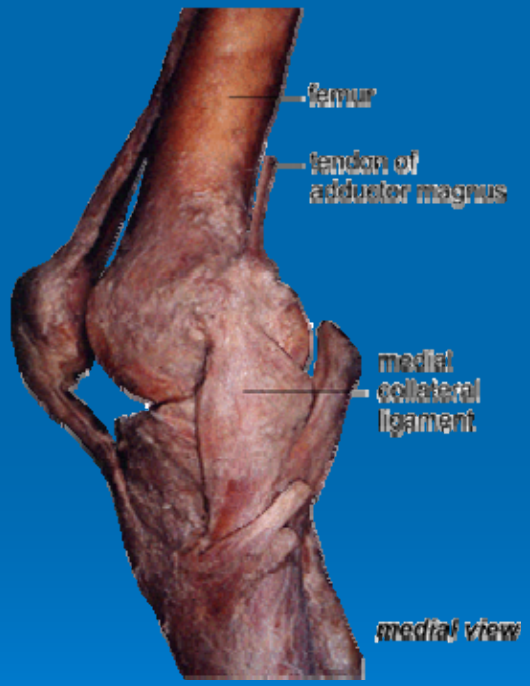


Ligaments

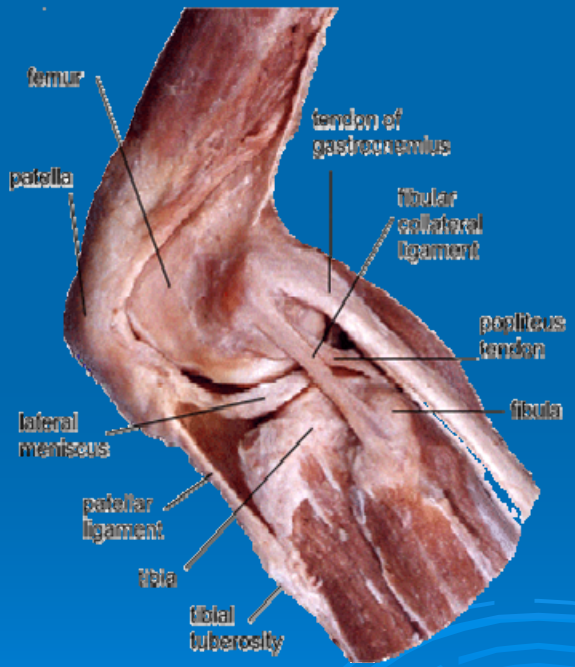
- Two live on the outside (collaterals: MCL/LCL) and two on the inside (cruciates: ACL/PCL).
- Provide stability to the knee.

Collaterals

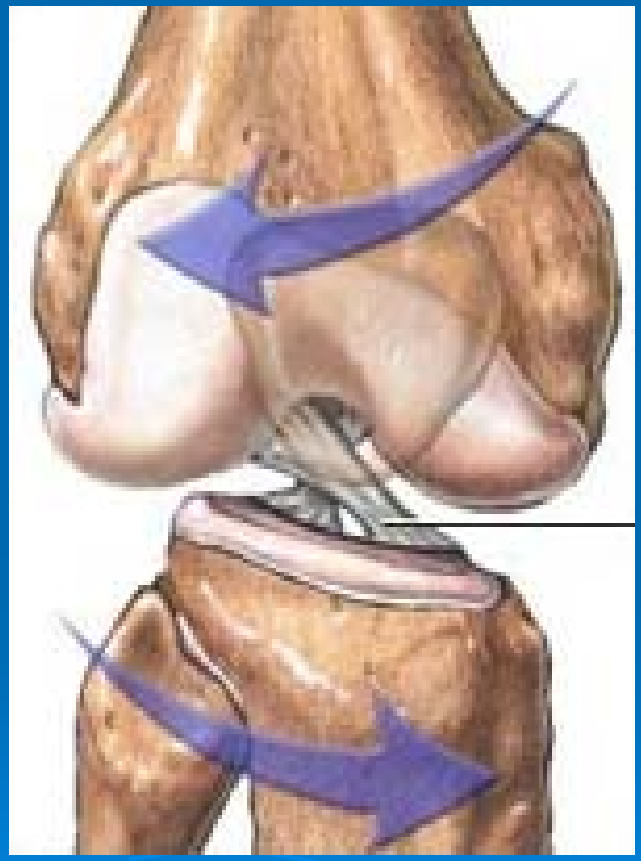
MCL



LCL



Cruciates



Cartilage

- Starts out nice and smooth
- Then can get ‘sick’: fissures/cracks/flakes (chondromalacia)
- Can continue to progress to arthritis.

What does the knee do?

- Keeps us upright
- Allows us to walk, run, jump
- Gets us up and down stairs, hills, chairs.

What aggravates the knee?

- Standing
- Walking/Running
- Twisting
- Stairs/Hills/Sitting
- Squatting
- Gym exercises
- Everything

How useful are the symptoms:

- Swelling?
- Locking?
- Giving out?

Symptoms vs Signs

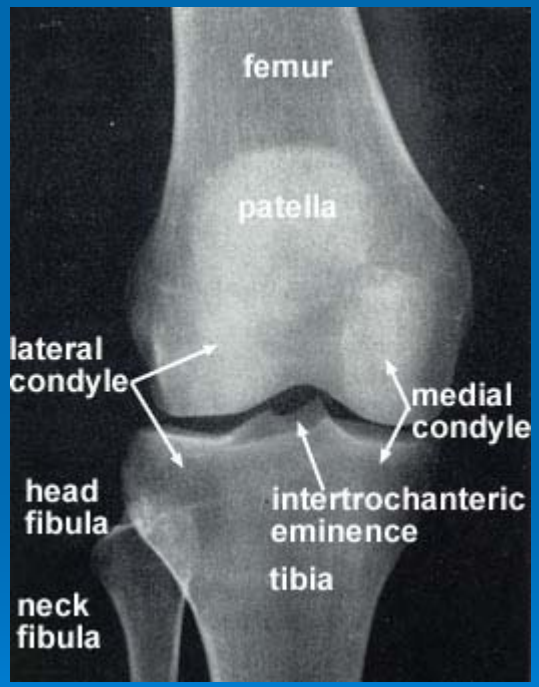
- Swelling is something the patient reports. Effusion is something you palpate
- Locking is usually a temporary sensation whereas true locking is a block to extension and usually flexion < 90 degrees
- Giving out is a reflex of the quadriceps muscle letting go due to pain.

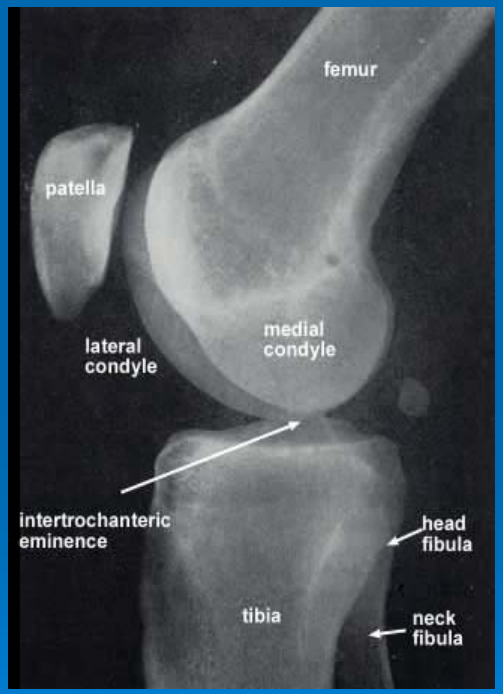
Knee Pain Imaging

- If arthritis is on your list or you are going to refer a patient, order:

- Standing AP both knees, both laterals and Merchant/Sunrise view radiographs.

Knee Radiographs





Knee MRI

- 90-95% sensitive and specific
- Useful to confirm diagnoses
- But most diagnoses can be made with an average history and careful examination
- Let the musculoskeletal specialist decide if it is necessary (orthopedist, physiatrist, OccHealth, rheumatologist)

Strategies

- 1. Know the different presentations
- 2. Know the age-specific diagnoses
- 3. ‘Point to the Pain’
- 4. Use the examination to confirm the diagnosis.

Strategy #1

- How Do Patients Present?

Presentations

- 1. **Atraumatic Swollen Knee**
- 2. Routine Office Visit
- 3. Acute Injury “Blow-out”

Atraumatic Swollen Knee

- No Injury, Positive Effusion
- Want to rule out:
- Infection (hematogenous/post-op/post-inj)
- Inflammation (RA, psoriasis, etc)
- Reactive (meniscus, DJD)

- ASPIRATE!!!

Atraumatic Swollen Knee

- Coronal plane needle angle.
- Level of superior pole of patella.

Atraumatic Swollen Knee

- **Joint Fluid**: Send for: cell count and differential, crystals, culture and gram stain.
  - purple and red top tubes, culturettes.
  - Microbiology and Special forms (aerobe/anaerobe/fungal/TB).
- **Blood tests**: CBC with diff, ESR, CRP.
- **Radiographs**: AP/Lat/Merchant

Atraumatic Swollen Knee

- Situation Specific:
  - Lyme titer
  - PPD
  - Echo for a murmur
  - RF/ANA
  - Rashes/mouth ulcers/back symptoms, eye symptoms
  - MRI and/or bone scan
  - (or leave it to the rheumatologist)

Atraumatic Swollen Knee

Dx	Cell count	Culture	ESR
Reactive	0-20K	(-)	<30
Inflamm	20-50K	(-)	<50
Infection	>50K	+	>100
		joint 60%	
		blood 30%	

Knee Pain Presentations

- 1. Atraumatic Swollen Knee
- 2. **Routine Office Visit**
- 3. Acute Injury “Blow-out”

Strategy #2
The Routine Office Visit

- Know the Age-Specific Diagnoses
  - Practical
  - Narrows the possibilities
  - Small list heavily weighted towards favorites

Causes of Knee Pain

1. Meniscus
2. Ligament
3. Plica
4. DJD
5. RA
6. Synovitis
7. Infection
8. Patellar
9. OCD
10. PVNS
11. Tumor
12. AVN
13. Referred
14. Vascular
15. Radicular
16. Bruise
17. Sprain
18. Tendinitis
19. Osgood-Schlatters
20. Tendon rupture
21. Chondromalacia
22. Bursitis
23. Loose body
24. Deformity
25. Dislocation
26. Fracture
27. Neuroma

Routine Office Visit

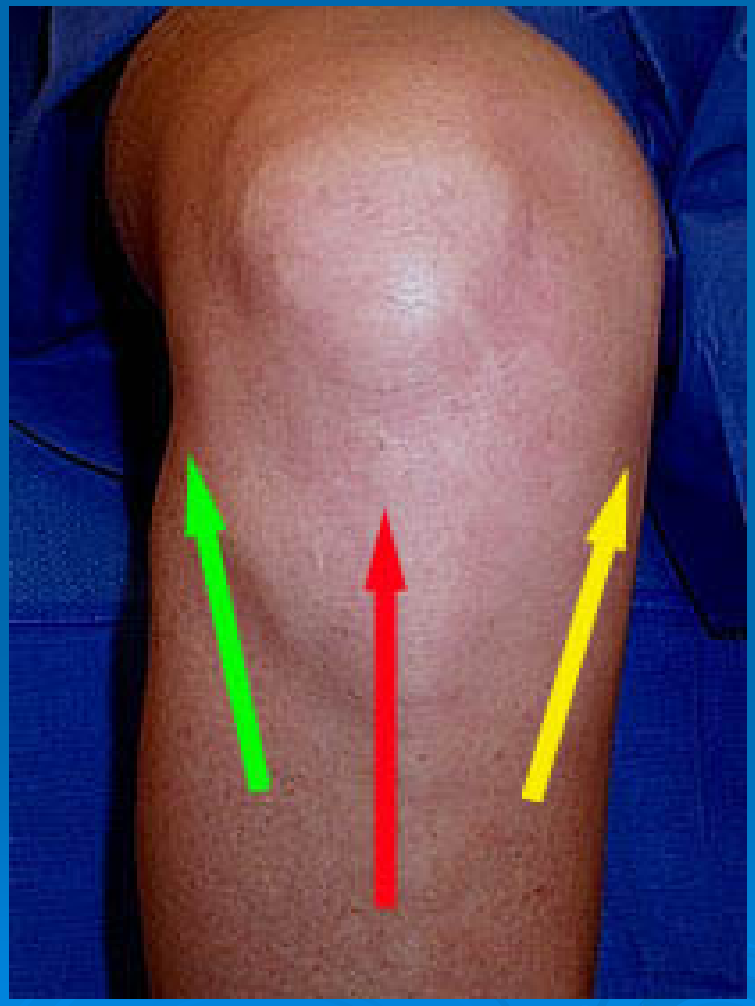
- **Teen patient (<20 yrs)**
  - Patellofemoral syndrome (PFS) 95%
  - Tendinitis (patellar)
  - Osgood-Schlatters
  - Osteochondritis Dissecans (OCD)
- Adult patient (20-48 yrs)
  - PFS
  - Meniscus tear
  - Ligament tear
  - Bursitis (prepatellar)
  - Tendinitis (IT band friction)
- Older patient (>48 yrs)
  - Meniscus tear
  - Arthritis
  - Bursitis (pes)

Strategy #3
‘Point to the Pain’

Strategy #4

And use the examination to add supporting data to cinch the diagnosis.

‘Point to the Pain’



‘Point to the Pain’

- Combined with the history this gives you some idea of the diagnosis.
- Anterior: PFS, Tendinitis, Osgood-Schlatters,
- Bursitis
- Medial: Meniscus, DJD, Bursitis
- Lateral: Meniscus, DJD, Tendinitis
- Posterior: Baker’ cyst, Vascular, Sciatica

Example 1

- 16 yo girl with knee pain for one month
- Makes a broad swath of pain around the front of the knee
- Hurts to walk and go up stairs
- Gives out

Based on age: PFS

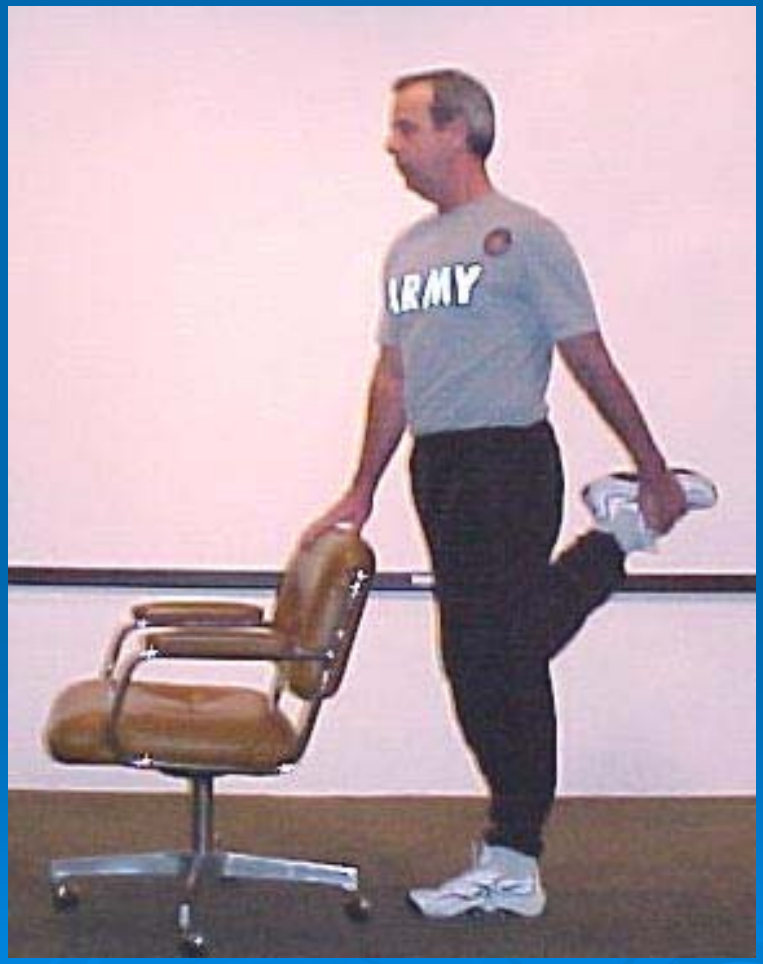
History and aggravators sound patellar.

Patellar signs:

- Pain with single leg dip
- Atrophy (rare) or tightness of quadriceps
- NO effusion, jt line tenderness, instability

Single Leg Knee Dip

Quadriceps Tightness and Stretch




STEVENSON

Patellofemoral Syndrome Initial treatment

- "You don't have anything serious. This almost always gets better with activity changes and stretching."
  - No or limited bent-knee activity. Keep knee almost straight if sitting. Avoid stairs.
  - Straight leg raises to prevent atrophy.
  - Quadriceps stretching twice/day, 1 minute.
  - PT: taping/bracing/strengthening.
  - Might take 3 months to improve.

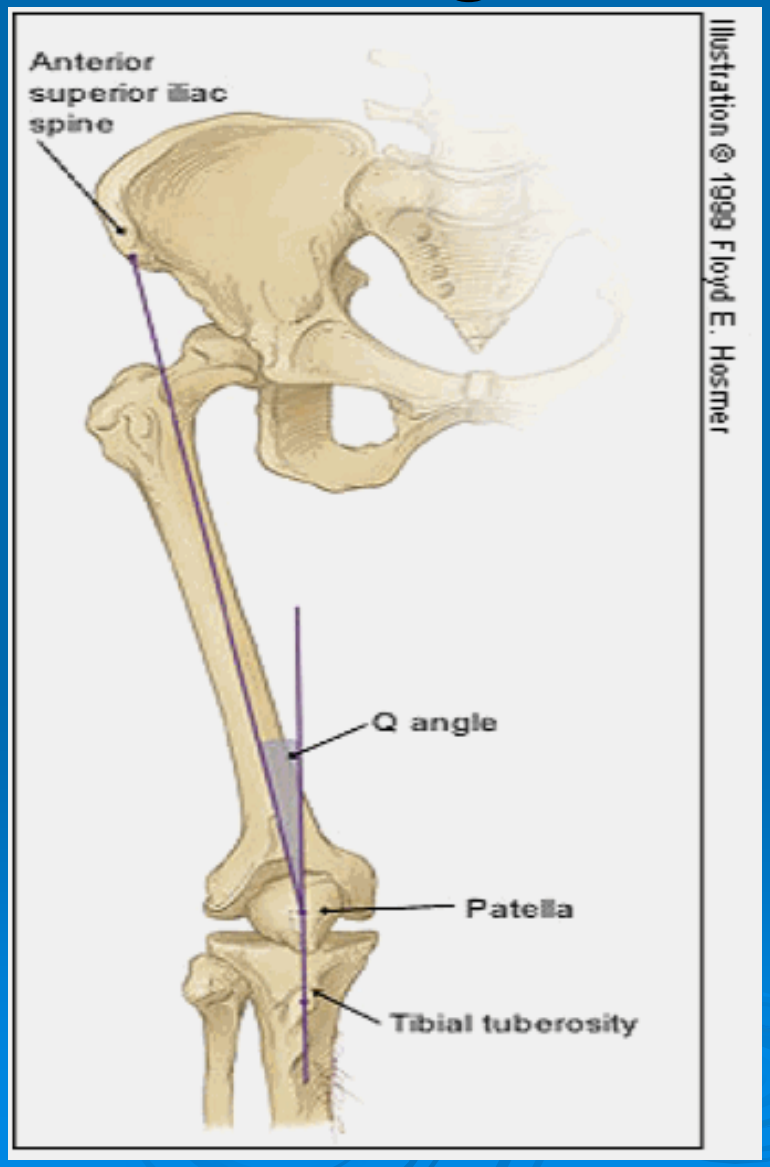
PFS and Pain

- Where does it come from?
  - Could be subchondral pressure
  - Could be surrounding synovial tissue
  - Could be ???

Patellofemoral Malalignment or Subluxation

- Special group. H/o ‘events’.
- Kneecap sits or tracks laterally
- High Q (quadriceps) angle, ‘J’ sign
- +apprehension test
- Might be tight laterally
- Merchant XR might show tilting.
- PT: taping/stretching/strengthening/sleeve

Q Angle


Anterior
superior iliac
spine
Q angle
Patella
Tibial tuberosity
Illustration © 1999 Floyd E. Hosmer

Knee Pain
Normal Exam

- Occasionally the history isn't helpful and the examination is normal.
- Pick the DX that is most likely and if there is a failure to DX it will cause no harm:
  - **PFS**

PFS and Failure to Improve

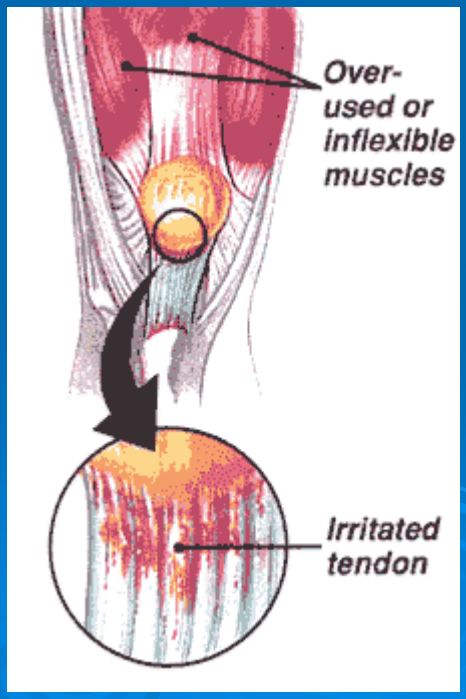
- “Did you do what we talked about at the last visit? And that was...?”
- If PT was ordered, did they go?
- Consider a new XR, especially ‘tunnel’ view.
- Re-examine the knee. Sometimes the exam is different.
  - Clearly PFS, continue PT. Consider referral.
  - Jt line tenderness or effusion: refer.

Routine Office Visit

- Teen patient (<20 yrs)
  - Patellofemoral syndrome (PFS)
  - **Tendinitis**
  - **Osgood-Schlatters**
  - **OCD**
- Adult patient (20-48 yrs)
  - PFS
  - Meniscus tear
  - Ligament tear
  - Bursitis (patellar)
  - Tendinits (ITB)
- Older patient (>48 yrs)
  - Meniscus tear
  - Arthritis
  - Bursitis (pes)

Infrapatellar pain
Teen patient

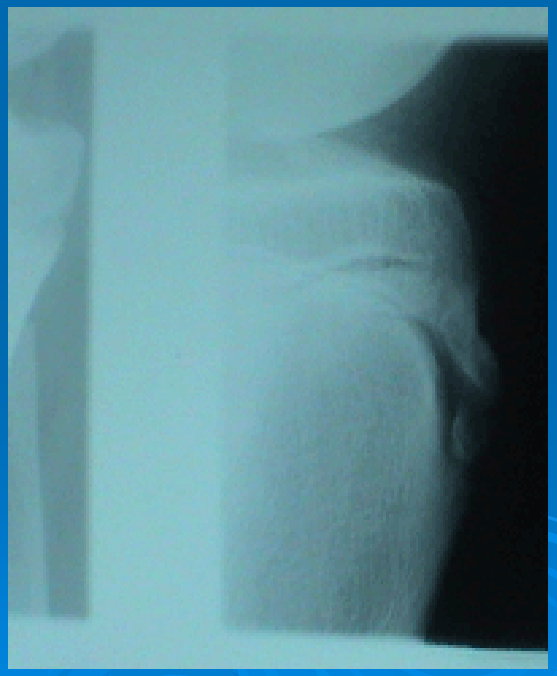
- Young patient, +/- history of overuse
- Point tenderness at inferior pole of patella
- "Jumper's knee" = tendinitis
- RICE, stop activity
  Sports when there is full, pain-free motion.



Osgood-Schlatters Disease

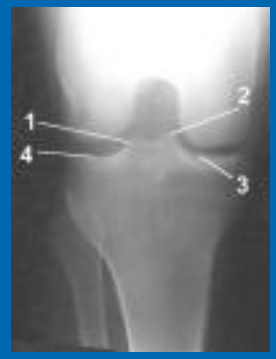
- Tibial tubercle (apophysis) becomes inflamed from repeated traction.

- Prominent swelling
- Tender at tubercle
- XR: irregular lateral
- Self-limited
  Sports when there is full, pain-free motion.



Osteochondritis Dissecans (OCD) Teen patient

- Localized avascular necrosis usually of the lateral wall of the medial femoral condyle.
  Locking
  Swelling
  Pain
- Treat with RICE, refer for no improvement.



Routine Office Visit

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  - Tendinitis
  - Osgood-Schlatters
  - OCD
- **Adult patient (20-48 yrs)**
  - PFS
  - **Meniscus tear**
  - **Ligament tear**
  - **Bursitis (patellar)**
  - **Tendinitis (ITB)**
- Older patient (>48 yrs)
  - Meniscus tear
  - Arthritis
  - Bursitis (pes)

Example 2

- 27 yo man with knee pain for 3 months
- Hurts on the medial side of the knee
- Worse with twisting or squatting
- Gives out
- Swells

Based on age: meniscus

- And it sounds meniscal.

- Meniscal signs:
  - Effusion
  - Joint line tenderness
  - No patellar signs or ligament instability
  - McMurray or Thessaly test is confirmatory

Knee Effusion

Knee Joint Line

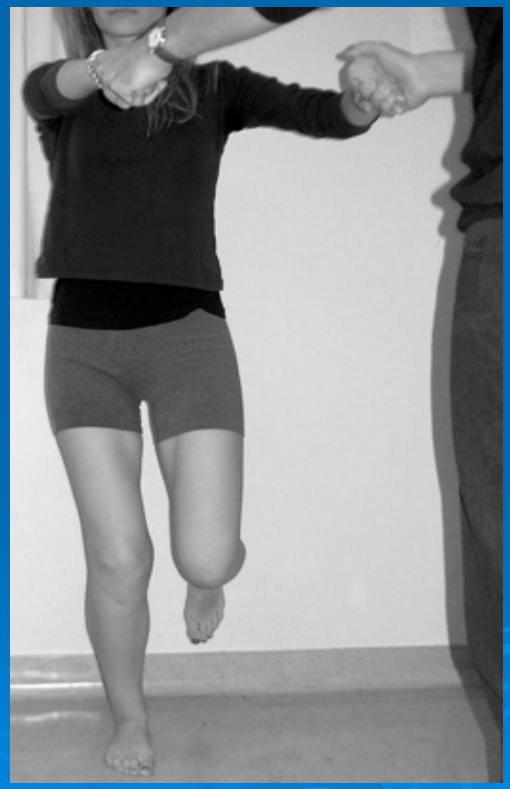
McMurray Test

Why don’t we like the McMurray test?

- As described by McMurray in 1942: “the knee is acutely and forcibly completely flexed”…

Thessaly Test

- Karachalios et al, JBJS 87A:955-962



Thessaly Test

- Named after the ‘prefecture’ in Greece with a 10,000 year history.
- 213 patients with exam, MRI, ‘scope.
- Used 2 experienced, 2 inexperienced MDs
- Test done at 5 and 20 degrees, 20 is best.
- + test is pain at medial or lateral joint line with possible locking/catching sensation.
- Do normal side first.

Meniscus tear
Initial treatment

- “You might have torn cartilage. This acts as a pad between the bones. Some of these heal and some need surgery. We’ll hope yours heals. It can take 2-6 weeks.”
- RICE
  - Immobilizer for a few days if pain severe.
  - Straight leg raises to prevent atrophy.
  - Crutches as needed, activity modification.
  - Refer if no better in 2-6 weeks.

Meniscus Tear Treatment

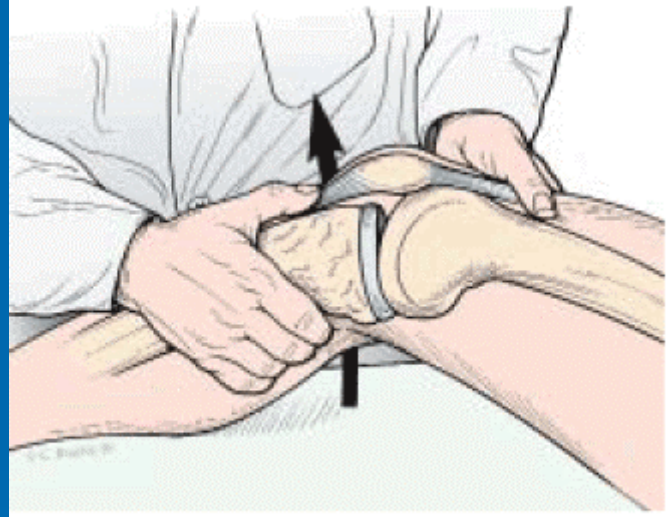
- Why wait 2-6 weeks?
- It's better to have the meniscus than not
- If the pain goes away, there is no reason to do an operation, even if the MRI says there is a tear.

Example 3

- 32 yo male with knee injury 2 yrs ago and knee pain
- Meniscus tear still high on the list.
- Must examine ligaments carefully, especially the ACL, given the remote trauma.
- ACL specific test: **Lachman**

Lachman Test

FIGURE 2

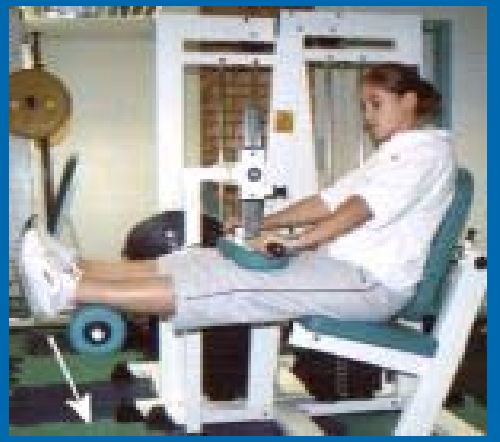


To perform the Lachman test, grasp the back of the proximal tibia posteriorly and place thumb over joint line anterolaterally. Pull the proximal tibia anteriorly and posteriorly, and compare sides for endpoint laxity.

Chronic ACL laxity

- Usually not painful, unless meniscus is torn.
- Instability is the problem.
  - Is it with ADLs or activity/sport-specific?
- “How much does it bother you? Enough to have surgery?” (Almost everyone gets surgery these days.)
- Physical therapy useful no matter what.
  - Hamstring strengthening.

Hamstring Strengthening



Posterior Cruciate Ligament

- Much less common injury.
- Sports or dashboard impact in MVA
- Less disability and swelling with injury event.
- DX made with posterior drawer test.
- TX is Quad rehab for most.

Posterior Drawer Test

- Knee is flexed to 90 degrees
- Push straight back on tibial tubercle
- Normal ‘contour’ of the front of the knee is lost and the tibia ‘sags’

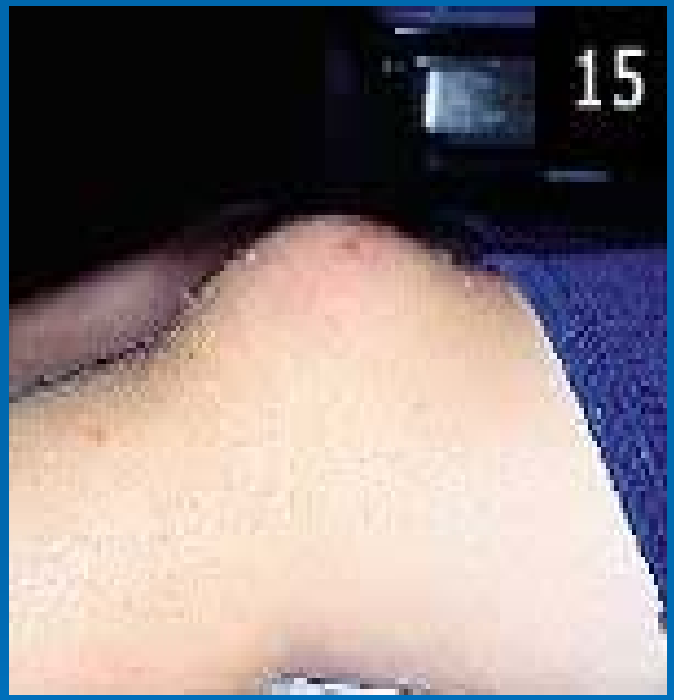
Routine Office Visit

- Teen patient (<20 yrs)
  - Patellofemoral syndrome (PFS)
  - Tendinitis
  - Osgood-Schlatters
  - OCD
- **Adult patient (20-48 yrs)**
  - PFS
  - **Meniscus tear**
  - **Ligament tear**
  - **Bursitis (patellar)**
  - **Tendinitis (ITB)**
- Older patient (>48 yrs)
  - Meniscus tear
  - Arthritis
  - Bursitis (pes)

Anterior Knee Mass
Prepatellar Bursitis

- Traumatic (bloody) or atraumatic (friction, kneeling) obvious cyst/mass over the front of the kneecap.
- If the mass is red, aspirate it but NOT THE JOINT. If it isn't red, leave it alone.
- TX: avoid friction, immobilizer or acewrap prn, NSAID or antibiotics, and lots of TIME (months).

Prepatellar Bursitis

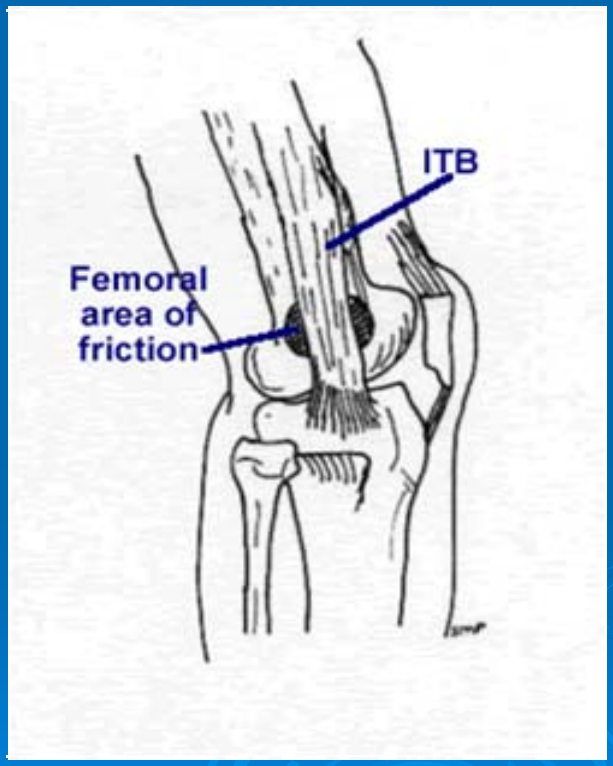


Septic Bursitis vs Septic Arthritis

- Bursitis is red and angry looking. There is an area of fluctuance. The knee moves pretty well. Don't aspirate **joint** through the cellulitis.
- Septic joint doesn't look red, just swollen. It is very tender and any motion causes severe pain.

Iliotibial Band Friction Syndrome ("tendinitis")

- Runners/Cyclists
- Tendon rubs over lateral femoral epicondyle.
- Sometimes pops.
- Heat/ice, U/S, stretching, activity modification



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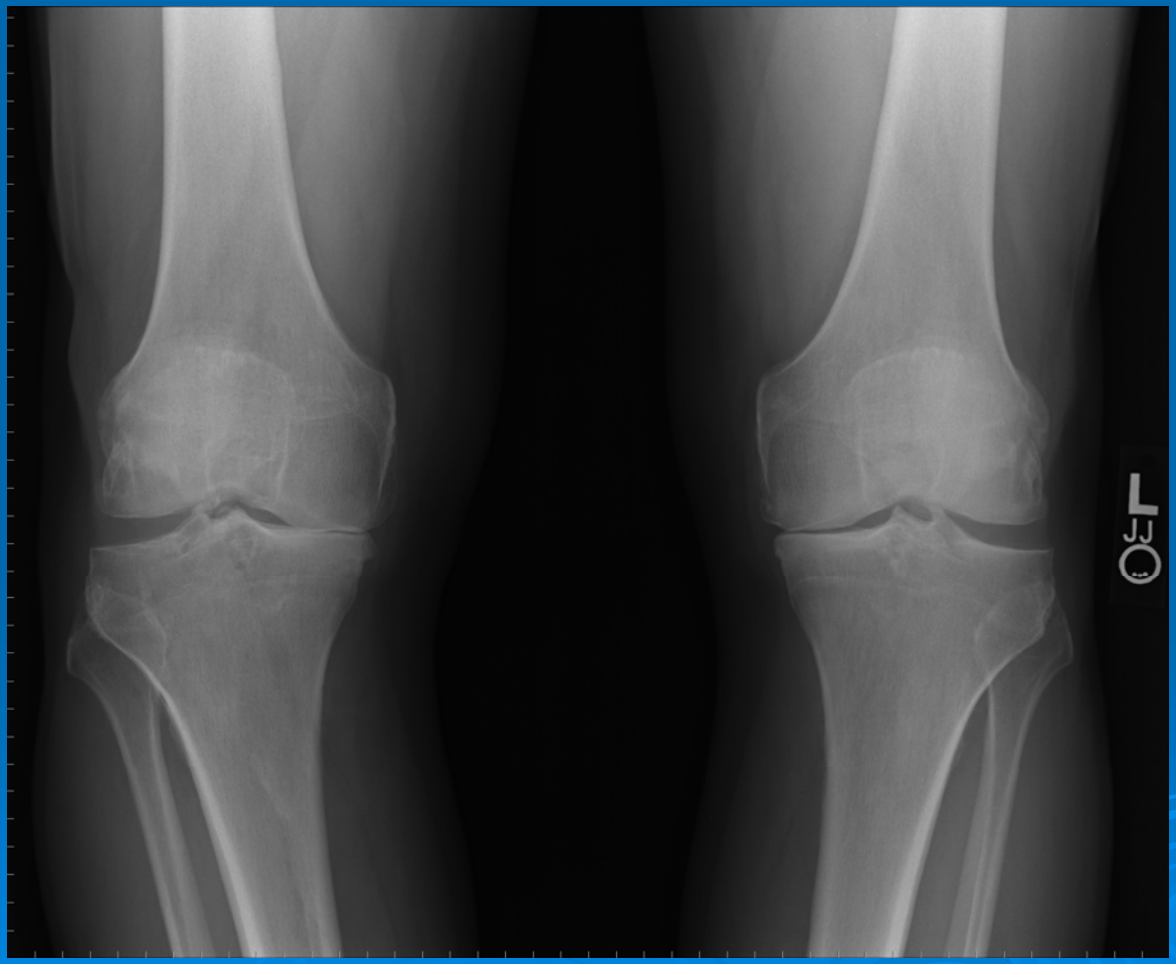
- **Older patient (>48 yrs)**
  - Meniscus tear
  - **Arthritis**
  - **Bursitis (pes)**

Example 4

- 58 yo female with knee pain for 5 months
- Joint line tenderness, pain at extremes
- Given the age, must order an xray to exclude arthritis (early changes: minimal joint space narrowing, tibial spine peaking, osteophytes).
- All patients with arthritis have meniscal tears.

Early Radiographic Changes of Arthritis



Example 4

- 58 yo female with knee pain for 5 months
- Normal xray.
- Joint line tenderness +/- swelling
- Likely DX is meniscus tear.
- Cortisone appropriate once.

Example 4

- 58 yo female with knee pain
- Xray shows mild-moderate arthritis.
- DON’T ORDER A MRI
- Are symptoms coming from meniscus (catching/locking/localized) or arthritis (pain with weight bearing/diffuse)?

Elderly patient with knee DJD When is TKR considered?

- 1. Must fail maximum medical therapy:
  - NSAIDs, glucosamine/chondroitin, steroid injection, activity modification, PT.
- Must have arthritis on radiographs.
- Pain should be disabling (limits lifestyle and ADLs, interferes with sleep).
- ‘Referral’ = de facto medical clearance.

Cortisone Injection?

- Patient on coumadin?
- Elderly pt., stepped funny, has swelling and XR shows DJD.
- Obese pt. with normal exam and XR.
- Elderly pt. with CHF, CRF, COPD.

Glucosamine? Hyaluronate injections?

- Studies show a weak benefit in pain relief with glucosamine +/- chondroitin. No harm except $.

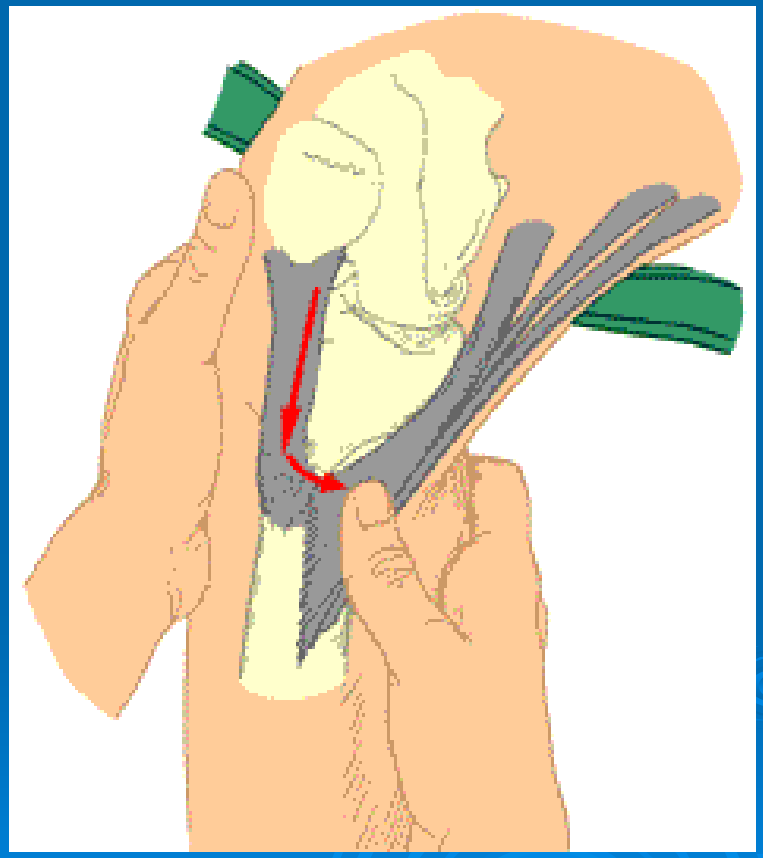
- Studies have not supported benefit of hyaluronate injections (multiple) over single cortisone injection.

Baker's Cyst

- Almost always is secondary to intra-articular pathology (arthritis or meniscus tear, RA).
- Can aspirate once to prove it is fluid.
- Can rupture into calf, mimicking DVT.
- Treat underlying pathology

Pes Anserine Bursitis

- Bursa that allows the tendons to slide past tibia and MCL gets inflamed.
- Middle-aged to elderly woman
- Start with ice, stretching, NSAID
- Inject prn



"Very good. Now go out there and convince the others."