Common Disorders of the Knee

Knee: Top 3 referral diagnoses from primary care IM to ortho (at UCSF in 2011)

1. Osteoarthritis (OA)
2. Anterior knee pain
   - Patellofemoral pain syndrome
   - Chondromalacia patella
   - Patellar tendinopathy
3. Meniscus tear

Objectives

Upon completion of this session, participants should be able to:

1. List 4 exam maneuvers for meniscus tear
2. List the diagnostic criteria for knee OA
3. Identify 5 non operative treatment options for knee OA
4. Identify indications for surgery for patient with meniscus tear
   - Without knee OA
   - With knee OA
5. Generate a differential diagnosis for chronic anterior knee pain

Disclosures

I have nothing to disclose.
Case #1

25 y/o man with medial-sided pain and swelling of the R knee for 6 weeks since he twisted the knee playing soccer. No locking, no instability.

All of the following tests, if positive, would raise concern for a meniscus tear except…

A. Joint line tenderness
B. Pain when he stands and pivots on the knee
C. Pain when you axially load and rotate the knee
D. Pain when you flex the R knee and extend the R hip with the patient lying on his left side.
E. Pain when he squats

4 tests for meniscus tear

1. Isolated joint line tenderness
2. McMurray
3. Thessaly
4. Squat

Joint line tenderness

Medial: Sensitivity 83%, Specificity 76%
Lateral: Sensitivity 68%, Specificity 97%
(Konan et al. Knee Surg Traumatol Arthrosc. 2009)

Meniscus: McMurray

Sensitivity medial 65%, Specificity medial 93%

Video used with permission from Anthony Luke, MD

Meniscus: Thessaly

Sensitivity 90%, Specificity 98% (Harrison BK et al. CJSM, 2009)
Sensitivity 51-67%, Specificity 38-44% (Snoeker BAM et al. JOSPT, 2015)

Video used with permission from Anthony Luke, MD

Meniscus: squat

Sensitivity 75-77%, Specificity 36-42%
(Snoeker BAM et al. JOSPT, 2015)

Ober’s Test for tight IT Band

Passive hip abduction and extension.

Hip extension \(\rightarrow\) ITB positioned over greater trochanter of femur.
Case #1 Management
- Exclude bucket handle meniscus tear
  - Locked knee, large effusion, acute injury
  - Crutches, non weight bearing, urgent MRI and surgery
  - MRI to evaluate for medial meniscus tear
- Refer for knee arthroscopy
  - Meniscus repair vs debridement
- If no bucket handle tear and patient prefers non surgical treatment, also okay to try physical therapy first and monitor.

Case #2
- 65 y/o man with h/o medial meniscus surgery R knee years ago.
- Moderate medial-sided pain and generalized swelling of the R knee since hiking last week.
- No locking, no instability, no stiffness > 30 min in AM
- Exam:
  - Moderate effusion, no warmth
  - Crepitus with range of motion
  - Tenderness to palpation and above/below medial joint line on the medial femoral condyle and medial tibial plateau.
  - (-) McMurray, knee feels tight with squat, unable to perform complete squat, unable to perform Thessaly due to pain.
  - No ligamentous laxity

Diagnosis?
A. Medial meniscus tear  
B. ACL tear  
C. Medial compartment osteoarthritis  
D. Gout  
E. Septic arthritis  
F. Medial meniscus tear and medial compartment osteoarthritis

Clinical criteria for diagnosis of knee OA

Case #2

- 65 y/o man with h/o medial meniscus surgery R knee years ago.
- Moderate medial-sided pain and generalized swelling of the R knee since hiking last week.
- No locking, no instability, no stiffness > 30 min in AM
- Exam:
  - Moderate effusion, no warmth
  - Crepitus with range of motion
  - Tender medial joint line and above/below medial joint line on the medial femoral condyle and medial tibial plateau.
  - (-) McMurray, knee feels tight with squat, unable to perform complete squat, unable to perform Thessaly due to pain.
  - No ligamentous laxity

What do you recommend?

A. Refer for arthroscopic debridement of cartilage and lavage
B. Nonoperative knee OA program
C. Refer for total knee arthroplasty

Interventions

- Control
  - PT: 1 hour/week x 12 weeks
  - Home ex program 2x/day
  - Instruction on ADLS
  - Self management arthritis education reading + videotape
  - Medications (APAP, NSAIDs, hyaluronic acid injections)

- Arthroscopic surgery
  - Irrigation with saline
  - 1 or more of the following:
    - Debridement or excision of degenerative meniscus tears
    - Removal loose bodies, chondral flaps, bone spurs
  - Medical and physical therapy like controls

Results


Corticosteroid injections for knee osteoarthritis

- Anti-inflammatory
- Probably inhibit COX-2 and phospholipase-A2, both inflammatory mediators

Published 22 October 2015.
Intra-articular corticosteroid injections: take home points

- Short-term pain relief (6 weeks average)
- Small effect on function
- No evidence for long-term pain relief
- Clinical effect independent of degree of inflammation present
  - Don’t need to restrict injection just to those with effusion
- Frequency: general practice once every 3-4 months max
  - Concern for cartilage toxicity if given q 3 months x 2 years

Hyaluronic acid injections for knee OA

- No data for 1 brand name over another
- Can provide pain relief for longer than steroid (5-13 weeks)
- Evidence is heterogeneous
- Significant placebo response
- Risk = 1-3% pseudoseptic reaction
- Less likely to benefit
  - > 65 yrs old
  - Severe joint space narrowing
- "Uncertain” recommendation from OARSI 2014
- “Cannot recommend” (strength of recommendation = strong) from AAOS 2013

OA: disease modifying treatment?

- Surgical repair of cartilage
  - Efficacious for isolated cartilage lesions
  - Less useful for global cartilage wear in OA
- Injections: some promise, more data needed
  - Platelet rich plasma (PRP)\(^1\)
  - Mesenchymal stem cells\(^2,3\)


Case #3

60 y/o woman presents with 3 months of medial knee pain, (+) swelling, and instability. No frank locking. Pain is worse with weight bearing. Better with rest, ice, and NSAIDs.

Exam: Neutral knee alignment when standing. Knee is not warm. There is tenderness of the medial joint line + medial femoral condyle + medial tibial plateau. Small effusion. ROM 0-120, limited by pain. (+) crepitus. (+) medial McMurray, medial knee pain with squat and Thessaly tests. No ligamentous laxity.

Diagnosis?

A. Medial meniscus tear
B. ACL tear
C. Medial compartment osteoarthritis
D. Gout
E. Septic arthritis
F. Medial meniscus tear and medial compartment osteoarthritis

Case #3

60 y/o woman presents with 3 months of medial knee pain, (+) swelling, and instability. No frank locking. Pain is worse with weight bearing. Better with rest, ice, and NSAIDs.

Exam: Neutral knee alignment when standing. Knee is not warm. There is tenderness of the medial joint line + medial femoral condyle + medial tibial plateau. Small effusion. ROM 0-120, limited by pain. (+) crepitus. (+) medial McMurray, medial knee pain with squat and Thessaly tests. No ligamentous laxity.
What do you recommend?

A. Refer for arthroscopic debridement of cartilage and meniscus
B. Nonoperative knee OA program
C. Refer for total knee arthroplasty

Surgery vs PT for meniscal tear and OA

- Multicenter RCT
- 351 patients with meniscal tear + mild-moderate OA
- Meniscal sx (clicking, popping, catching, giving way, joint line pain, pain with twisting)
- Avg. age 60 years
- 50% men, 50% women
- Primary outcome = change in WOMAC physical-function score between groups at 6 mo


Interventions

- **Control (PT)**
  - Usually 6 weeks
  - 3-stage program
  - APAP, NSAIDs, intraarticular steroid injections as needed

- **Arthroscopic partial meniscectomy (APM)**
  - Trim damaged meniscus back to stable rim
  - Remove loose cartilage and bone
  - PT protocol
  - APAP, NSAIDs, intraarticular steroid injections as needed

Conclusions

- 30% crossed over from PT to APM at 6mo
  - These people had WOMACs that didn’t improve until crossover
- No sig difference in adverse events
- PT and APM are reasonable options with similar outcomes for these patients (with allowed cross over if not achieving relief with PT)
- Starting with conservative approach is reasonable

What if this same patient had an isolated degenerative meniscus tear and no clinical signs or symptoms of knee OA?
Arthroscopic Partial Meniscectomy versus Sham Surgery for a Degenerative Meniscal Tear

- 35-65 y/o (n = 146)
- Inclusion: > 3 months medial joint line pain, tried conservative care first, exam consistent with MMT, MRI with MMT confirmed on arthroscopy
- Exclusion: traumatic onset of symptoms, locked or unstable knee, previous surgery, OA by ACR criteria or x-ray

Results

- Improvement in both groups at 12 mo
- No significant between-group differences in 3 primary outcomes

Degenerative Meniscus Tear, No OA

- FIDELITY studies suggest no benefit from arthroscopic partial meniscectomy, even with mechanical symptoms (locking/catching), over sham arthroscopic surgery.
- Limitations
  - Definition of degenerative meniscus tear?
  - No radiographic OA but these patients had some mild cartilage wear

Osteoarthritis with Meniscus Tear

- Degenerative meniscus tear is part of the natural history of osteoarthritis
- Treat as osteoarthritis initially
- Imaging: Start with x-ray. Consider referral vs MRI if exam c/w meniscus tear and not improving with PT
- Could consider arthroscopic meniscus surgery if weight loss, PT, medications, injections not helping or if patient prefers surgical treatment.
Who to refer for knee arthroscopy?

- Younger patients (case #1)
- Traumatic onset of symptoms
- Bucket handle meniscus tears
  - Knee locked due to meniscus blocking joint movement
- Locking (knee stuck, cannot move it) \(ightarrow\) Loose body
- Not improving despite conservative treatment
- Patient prefers surgery to conservative treatment

Case #4

40 y/o woman with sharp anterior knee pain x 1 month. Might have some swelling. No locking but the knee is popping. Feels unstable when walking down stairs. Pain worse up/down stairs. Painful when gets up from sitting. Exercise: started a walking program for New Year’s resolution, walking more hills than usual. No squats/lunges. Doesn’t wear orthotics.

Ddx subacute-chronic anterior knee pain

1. Patellofemoral pain syndrome
2. Patellar chondromalacia
3. Osteochondral lesion
4. Osteoarthritis of patellofemoral joint
5. Patellar or quadriceps tendinitis or tendinopathy
6. Pes anserine bursitis

Case #4: Inspection

![Image of knee](https://joelvanderlugt.files.wordpress.com/2012/11/med-retinaculum.jpg)
Patellofemoral pain syndrome: miserable malalignment syndrome

- Femoral anteversion (inward rotation of femur)
- Squinting patella (inward patellar rotation)
- Patella alta
- Increased Q-angle
- Excessive outward tibial rotation


Case #4: Other tests identify tightness and weakness

- Ober (too tight?)
- Hip abduction strength (weak?)
- One-legged standing squat (weak? Pain?)

Ober's Test for tight IT Band

Passive hip abduction and extension.

Hip extension → ITB positioned over greater trochanter of femur.

http://www.youtube.com/watch?v=9ly-QyczGno&feature=player_detailpage

Hip abduction strength

http://www.youtube.com/watch?v=9ly-QyczGno&feature=player_detailpage
One-legged standing squat

- Patient standing on unaffected leg
- Do 3 slow 1-legged squats
- Watch for stability, valgus angulation of knee, ask about pain
- Switch and perform on affected leg
- Sign of weak hip abductors, weak core
- Can bring out pain of patellofemoral pain

---

Case #4: Physical exam

- Valgus knees while standing
- No effusion
- Tender lateral patellar facet
- Nontender joint lines
- ROM 0-135
- Meniscus testing (-)
- No ligamentous laxity
- (+) Ober bilaterally
- 4/5 hip abductor strength bilaterally
- Unstable 1-legged squat with valgus knee angulation

http://www.kneeguru.co.uk/KNEEnotes/node/763
Case #4 diagnosis

A. Patellofemoral pain syndrome
B. Patellar chondromalacia
C. Osteochondral lesion
D. Osteoarthritis

Case #4 treatment

- Physical therapy rx
  - Strengthen hip abductors
  - Strengthen quadriceps
  - Stretch ITB, quads, hamstrings
- Correct alignment: consider OTC orthotics with arch support if pes planus
- Activity: avoid running, squats, lunges, stair-running, downhill hiking until improved.
- If not improved with above → x-rays and if those normal then MRI (or refer to sports medicine)

Take home points

1. 4 tests for meniscus tear
   1. Joint line tenderness
   2. McMurray
   3. Squat
   4. Thessaly

2. Diagnostic criteria for knee OA

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Clinical</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>Test</td>
<td>Test</td>
</tr>
<tr>
<td>E. Patellar abrasion</td>
<td>T. Patellar abrasion</td>
<td>Chondral</td>
</tr>
<tr>
<td>E. Patellar buckling</td>
<td>T. Patellar buckling</td>
<td>Osteophytes</td>
</tr>
<tr>
<td>E. Patellar pain</td>
<td>T. Patellar pain</td>
<td>Osteophytes</td>
</tr>
</tbody>
</table>

- 40% sensitive
- 80% specific
- 80% sensitive
- 40% specific

- RA = rheumatoid arthritis
- OA = osteoarthritis
- SF = synovial fluid
- MRI = magnetic resonance imaging
Take home points

3. 5 options for non operative treatment for knee OA
   - Weight loss
   - Acetaminophen
   - NSAIDs: oral or topical
   - Cane
   - Corticosteroid injection

Take home points

4. Identify indications for surgery for patient with meniscus tear
   - Without knee OA
     - Degenerative tear → try non operative treatment first
     - Acute tear → refer for surgical consult
     - Bucket handle tear → urgent MRI, surgical consult, NWB
   - With knee OA → non operative treatment first

Take home points

5. Differential diagnosis for anterior knee pain
   - Patellofemoral pain syndrome
   - Patellofemoral chondromalacia
   - Osteochondral lesion
   - Osteoarthritis of patellofemoral joint
   - Patellar or quadriceps tendinitis or tendinopathy

Thank you!

Carlin Senter, MD
Carlin.Senter@ucsf.edu