Management of Common Knee Disorders:
What You “Knee’d” to Know

I have nothing to disclose
Learning objectives: in 50 minutes you will be able to...

1. List the organizational scheme for any musculoskeletal work-up
2. List the 3 key knee history questions
3. Generate a differential diagnosis for acute knee injury with effusion
4. Generate a differential diagnosis for chronic anterior knee pain
5. Treat a patient with knee OA and meniscus tear
6. QUIZ

Musculoskeletal work-up

- History
- Inspection
- Palpation
- Range of motion
- Other Tests
Knee history

- **Acute vs. Subacute-Chronic**
- **Mechanism of injury**
  - Direct fall onto patella
    - Patellar fracture or cartilage damage
  - Varus or valgus force to the knee
    - MCL or LCL
  - Noncontact with a pop
    - ACL
- **Location of the pain**


3 key knee injury questions

1. **Locking** = meniscus or intra-articular loose body
2. **Instability** = ligament
3. **Swelling** = intra-articular derangement
   1. Immediate: due to blood (ACL, fracture, patellar dislocation)
   2. Subacute: 8-24 hours, due to synovial inflammation (meniscus, MCL)
Case #1: House of Air

- 35 y/o woman on trampoline half-pipe. Jumped down and felt a pop with immediate knee pain and swelling.
- Went to ER: placed in knee immobilizer and given hydrocodone/APAP for pain relief.
- Now, 3d later, has posterior pain and tightness with bending.
- Knee feels unstable if not in the brace.
Ddx acute traumatic knee injury with effusion

- Intra-articular derangement
  - (+) instability → ligament
  - (+) locking → meniscus
  - Dislocation
    - Patella
    - Knee
  - Cartilage damage
  - Patellar or quad tendon rupture


Musculoskeletal exam order

- History
- Inspection
- Palpation
- ROM
- Other
- Tests
Knee exam case #1: Inspection

Significance of acute traumatic effusion

- Intra-articular derangement
- You will likely be ordering xray +/- MRI
- The patient will not be returning to sport today
Knee exam case #1: Palpation

Ballottement

Palpation: patellar facet

Video courtesy of Dr. Anthony Luke
Knee exam case #1: Palpation

- Supine, knee fully extended
  - Ballotement to evaluate for effusion
  - Medial patellar facet (patellar dislocation)
  - Patellar apprehension (patellar dislocation)
- Straight leg raise intact
  - If not - Quad tendon or patellar tendon rupture -> urgent ortho
- Knee flexed to 90 degrees
  - Joint line (meniscus)
  - Lateral femoral condyle (patellar dislocation)
  - Above and below medial and lateral joint lines (MCL, LCL)
- Our patient: tender medial joint line, can do straight leg raise
  - Rules out patellar dislocation, LCL, tendon rupture

Knee exam case #1

- ROM: 5-90, limited due to pain (normal 0-135)
  - Determine if knee is locking or if ROM is limited due to effusion
  - Locking: think bucket handle meniscus.
    - Urgent x-rays, MRI
    - Urgent referral to sports surgeon for arthroscopy
Knee exam case #1

• Strength 5/5 hip flexion, knee extension, PF, DF.
  – (+) active knee extension rules out quad or patellar tendon rupture
• 2+ dorsalis pedis pulses bilaterally
• Sensation intact to light touch over legs bilaterally
• Reflexes 2+ at patella and achilles bilaterally

Other Tests: Lachman to evaluate ACL

Video courtesy of Dr. Anthony Luke
PCL: Sag sign

PCL: Posterior Drawer

Video courtesy of Dr. Anthony Luke
MCL and LCL

Video courtesy of Dr. Anthony Luke

4 tests for meniscus tear

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

These tests not needed in patients with knee OA. Do these tests in patients < 50 with isolated joint line tenderness.
Meniscus: McMurray

Sensitivity medial 65%, Specificity medial 93%


Meniscus: Thessaly

Video courtesy of Dr. Anthony Luke
Meniscus: squat

Case #1 special tests

- (+) pain with medial McMurray, (-) lateral
- (+) Thessaly – medial pain
- (+) Squat – medial pain
- (-) laxity to varus or valgus at 0 and 30
- (+) Lachman without endpoint
- (-) Posterior drawer
Case #1 diagnosis

A. Patellar tendon rupture 
B. PCL tear 
C. ACL tear 
D. MCL tear 
E. Meniscus tear 
F. ACL + meniscus tear 


Case #1 treatment

- Knee brace +/- crutches depending on pain and instability 
- Xrays to r/o fracture 
- MRI to confirm diagnosis 
- Pain medication 
- PT to restore normal ROM, decrease swelling, strengthen quad 
- Orthopaedic surgery referral to discuss +/- reconstruction 

Segond fracture – avulsion of lateral tibial plateau in ACL tear
Traumatic knee effusion red flags → urgent ortho referral

• Locked knee: unable to fully extend compared to other side
  – Bucket handle meniscus
  – Make non weight bearing w/crutches
• Fracture (tibial plateau, patella)
• Unable to extend knee against gravity
  – Patellar or quadriceps tendon rupture
  – Needs urgent surgical repair

Case #2: Sketcher Shape-Ups

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, wearing new Sketcher Shape-Up shoes. No squats/lunges. Doesn’t wear orthotics.
Subacute knee history

• 3 key questions
  - Swelling
  - Locking
  - Instability
• Exercise and activity history: squats, lunges, new training program, marathon?
• Shoes: how old, what type
• Orthotics: how old, why wearing them

Ddx subacute-chronic anterior knee pain
1. Patellofemoral pain syndrome
2. Patellar chondromalacia
3. Osteochondral lesion
4. Osteoarthritis of patellofemoral joint
Case #2: Inspection

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 #2: Palpation

- Effusion: none
- Joint line, patellar facets
  - Tender medial and lateral patellar facets

http://www.kneeguru.co.uk/KNEEnotes/node/763

Case #2: ROM

- 0-135
- (+) crepitus with flexion and extension as patella moves across articular surface of femur
Case #2: Other tests

- Ligaments: no laxity
  - Lachman
  - Posterior drawer
  - MCL
  - LCL
- Meniscus: no pain
  - McMurray

Case #2: 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.

Hip abduction strength

http://www.youtube.com/watch?v=9fY-QrcuGno&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
One-legged standing squat

Case #2: Sketcher Shape-Ups
Physical exam

- Valgus angulation of the knees
- No effusion
- Tender medial and lateral patellar facets
- ROM 0-135, crepitus
- No laxity with lachman, posterior drawer, varus or valgus at 0 and 30 degrees
- (+) Ober bilaterally
- 4/5 hip abductor strength bilaterally
- Unstable 1-legged squat with valgus knee angulation
Case #2 diagnosis

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

Case #2 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 → xrays and if those normal then MRI (or refer to sports medicine)
Case #3

• 55 y/o man with h/o lateral meniscus surgery R knee.
• Lateral-sided pain and swelling of the R knee since hiking last week.
• No locking, no instability
• Exam: effusion, tender lateral joint line and above/below lateral joint line, (+) lateral knee irritation with lateral McMurray, (+) lateral pain with squat and Thessaly, no ligamentous laxity
• He brings with him xrays and MRI for your review

Radiograph

3 views for knee pain

– Weight bearing flexed PA (aka notch view)
– Lateral of affected side
– Sunrise or merchant view

MRI - report

- Menisci: complex degenerative tearing of the medial meniscus posterior horn and body.
- Cruciate ligaments: intact
- MCL/LCL: intact
- Extensor mechanism: intact
- Cartilage and bone: moderate-grade cartilage loss over the medial femoral condyle and medial tibial plateau

Diagnosis?

A. Medial meniscus tear
B. ACL tear
C. Moderate medial compartment osteoarthritis
D. Patellar dislocation
E. Septic arthritis
F. Medial meniscus tear and moderate medial compartment osteoarthritis
Initial treatment?

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

• 188 patients followed x 2 years  
• Primary endpoint WOMAC score (knee pain + fxn)  
• Avg age 60, 2/3 female, BMI 31  
• Excluded bucket handle meniscus and severe varus or valgus alignment
Interventions

- **Control**
  - PT: 1 hour/week x 12 weeks
  - Home exercise 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

Surgery vs PT for meniscal tear and OA

- Multicenter RCT
- 351 patients with meniscus tear + OA
- Meniscus 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
- 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


Results

Results


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 crossover if not achieving relief with PT)
• Starting with conservative approach is reasonable

Meniscus tears are common if ≥ 50 years old

- Seen in 35% of all people
  - 66% medial, 24% lateral, 10% both
- Increased prevalence with increased age
- 82% of people with OA had meniscus tears
- 2/3 of patients with meniscus tears had no symptoms in the prior month


Osteoarthritis with meniscus tear

- Meniscus tear is part of the natural history of osteoarthritis
- Treat as osteoarthritis initially
- Imaging: Start with xray, MRI if exam c/w meniscus tear and not improving with PT
- Consider arthroscopic meniscus surgery if PT, medications, injections not helping or if patient prefers surgical treatment

Caveats: Who to Refer

- Younger patients
- Bucket handle meniscus tears
  - Knee locked due to meniscus blocking joint movement
- Mechanical symptoms: locking, catching
- Failure of nonoperative knee OA treatment

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in 1 hour you will be able to...

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Thank you
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