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Diagnosis-Driven Physical Examination of the Knee
Small Group Exam Knee Cases

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KNEE PHYSICAL EXAM SMALL GROUP CASES

ACP Musculoskeletal Medicine Teaching Group

2025 ACP National Conference

1

CASE #1: HISTORY

- Chief complaint: 35 year-old with bilateral knee pain.
- Onset: 2 years ago while in military service, hiking with heavy pack. No specific injury or event.
- Location: Anterior knee pain, around the patellae.
- Associated factors: No swelling. No locking or clicking. Reports painful knee "giving way" episodes, and feelings of painful instability when going downstairs*. No falls.
- Exacerbating factors: Squatting, lunging, prolonged driving or sitting (theater sign), downhill/stairs worse than up. Gave up running because of pain.

2

CASE #1: PHYSICAL EXAM

- Observation: Normal gait, no abnormality
- ROM: Full extension, full flexion but **pain anteriorly with terminal flexion.**
- Palpation: **Tenderness localized to the patellar facets**, otherwise no other tenderness. No effusion.
- Stability Testing: No laxity on anterior/posterior drawer, Lachman's, or varus/valgus stress testing.
- Provocative Testing: **Pain reproduced with squatting and patellar grind test**.

3

PATELLOFEMORAL PAIN SYNDROME = ANTERIOR KNEE PAIN = RUNNER'S KNEE

Most common cause of knee pain in patients under 50 years old

- Definition
  - Diffuse, aching pain and stiffness in the anterior knee that increases with activities that place additional loads across the PF joint (squat, stairs, getting up from chair)
- Etiology
  - Multifactorial – malalignment, overuse, overloading
  - Degenerative changes = Patellofemoral OA (not PFPS)

Thomee R, et al. Patellofemoral pain syndrome: a review of current issues. Sports Med 1999; 28:245

Dixit S, et al. Management of patellofemoral pain syndrome. Am Fam Physician 2007; 75:194

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4

PFPS: PHYSICAL EXAM

KEY: Diagnosis is based primarily on **history**

- Mechanism of injury: Rarely an acute injury, more often overuse or introduction of a new activity
- Pain: Behind or around patella, often bilateral. Mild to moderate
- Mechanical symptoms: Occasional popping sensation, "giving way"
- Exam
  - Often normal. Usually no atrophy or effusion
  - Patellar signs (facet tenderness and + grind test)
- Exacerbating factors – run, squat, stairs, sitting (theater sign).

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5

PFPS: INITIAL PLAN

- Avoid exacerbating activities – squatting, lunging, running
- Find exercises that don't exacerbate knee pain – often elliptical, cycling or swimming is tolerable
- Pain relief – Icing, NSAIDs, or Tylenol
- PT to optimize patellofemoral tracking – through strengthening of the core/hips, glutes, hamstrings, quads. Also, lower extremity stretching to correct flexibility issues.
- Weight-loss if indicated (10x force factor through PF joint)
- X-rays – usually not necessary. Only indicated initially if hx trauma or surgery, or presence of effusion. Consider in patients older than 50 to assess for PF OA

6

PFPS: IF DOES NOT IMPROVE

- The prognosis is very good
- Referral to sports medicine physician if pain continues despite the above
- X-ray if not improving
- If x-rays unrevealing, consider MRI to evaluate the articular cartilage at the PF joint

7

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8

CASE #2: HISTORY

- Chief complaint: 60 year-old slightly obese female with complaint of deep aching pain and stiffness in both knees.
- Onset: 3-year history of progressively worsening pain in both knees. Initially felt at work when lifting heavy materials, but more recently she has experienced pain in the absence of any physical activity or exertion.
- Location: medial knee pain bilaterally
- Associated factors: Intermittent swelling. Creaky, crackly sounds when knees move,not associated with increased pain. Occasionally feels as though one of her knees will give out. Denies knee catching or locking. Denies redness but sometimes experiences warmth or fullness in the knees.
- Exacerbating factors: Damp weather, kneeling, squatting, and stairs all worsen her pain. Her knees are stiff for about 20 minutes upon awakening and for a few minutes once getting up from a chair after prolonged sitting. She has difficulty walking > 30 minutes so no longer walks her dog.

9

CASE #2: PHYSICAL EXAM

- Observation: **genu varum (bow-legged); mild antalgic gait; quadriceps atrophy.** No skin changes.
- ROM: **Passive ROM of both knees demonstrates palpable, painless crepitus. She is unable to flex or extend her knees completely. Maximum flexion is to about 120 degrees with pain.**
- Palpation: **Tenderness over medial joint lines and patellar facet bilaterally; right knee effusion**
- Stability Testing: No laxity on anterior/posterior drawer, Lachman's, or varus/valgus stress testing.
- Provocative Testing: (-)McMurray's test (painful but no pop/click). (-) Noble test.

10

KNEE OSTEOARTHRITIS

- Metabolically active joint disease affecting:
  - Cartilage, bone, synovium/capsule and muscle
- Knee has 3 compartments – OA can affect one, some or all compartments
- Physical exam keys
  - Inspection: enlargement of bones, varus > valgus knees
  - Palpation: +/- effusion, lack of warmth, + crepitus, tender medial or lateral bony prominences (can also be tender at joint line)
  - ROM may be limited due to effusion or stiffness

11

KNEE OA: INITIAL PLAN

- Avoid exacerbating activities – i.e. squatting, sitting for prolonged periods
- Weight loss – losing even a small amount of weight can significantly decrease knee pain from osteoarthritis (1 lb. wt. loss = 3-5 lbs. of decreased knee pressure)
- Exercise – strengthening the muscles around the knee makes the joint more stable and decreases pain. Stretching exercises help keep the knee joint mobile and flexible.
- Topical NSAIDS (diclofenac gel), oral NSAIDS, acetaminophen
- X-Ray – MUST be weight-bearing
- MRI not indicated in setting of OA without catching or locking symptoms.
- Consider intra-articular steroid injection
- Consider therapies – i.e. topical creams with capsaicin, acupuncture
- PT to strengthen muscles and increase flexibility
- Consider bracing if arthritis is in only one compartment
- Discuss referral to surgery when above measures are insufficient to allow maintenance of function.

12

CASE #2 FURTHER HISTORY

After you explain the diagnosis of knee OA, the patient tells you that last week she actually had an MRI of the knees on the outside showing a medial meniscus tear. She brings in a copy of the report which shows a right degenerative medial meniscal tear. Does this change your management?

13

CASE #3: HISTORY

- Chief complaint: 45 year-old with knee pain and swelling
- Onset: 4 weeks ago, walking and stepped off curb wrong and twisted knee
- Location: Medial joint line
- Associated factors: Swelling noted that evening, not immediately following injury. Swelling worse after activity. Clicking sensation with twisting. Denies instability or locking.
- Exacerbating factors: Squatting, twisting/pivoting on affected leg, walking long distances (swells).

14

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15

CASE #3: PHYSICAL EXAM

- Observation: **Mild effusion of affected knee**. No atrophy, skin changes, valgus/varus deformity.
- ROM: Full extension, full flexion but **pain over medial knee with deep knee flexion.**
- Palpation: **Tender over the medial joint line**, otherwise non-tender over patellar and quad tendons, lateral joint line, MCL/LCL, pes anserine bursa and patellar facets.
- Stability Testing: No laxity on Lachman's, varus/valgus stress testing or posterior drawer.
- Provocative Testing: **(+) McMurray's Test with pain medially**. **(+) Squat and Thessaly tests**.

16

MENISCUS TEAR

- Mechanism of injury
  - Acute – twisting or squatting injury
  - Chronic – degenerative with minimal or no trauma
- Pain - joint line pain, sharp; may have popping, catching
- Effusion
  - 2-3 days after initial injury
  - Common after physical activity
- Exacerbating factors
  - Twisting, squatting, deep knee flexion

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17

MENISCUS TEAR PHYSICAL EXAM

- Inspection: might notice effusion
- Palpation: small – moderate effusion
- ROM: effusion or bucket handle tear can limit ROM
- Palpation: isolated joint line tenderness of affected side
- Provocative Tests
  - Squat
  - McMurray
  - Thessaly

18

MENISCUS TEAR: INITIAL PLAN

- Avoid exacerbating activities – squatting, twisting
- Continue or change NSAID, consider APAP
- May obtain imaging at first visit as patient has failed 4 weeks of home conservative care and continues to have mechanical clicking symptoms and pain/swelling
- -X-ray – MUST be weight-bearing: Normal as above
- -MRI – only AFTER x-ray is obtained to rule out any OA: meniscus tear as above
- Referral to Orthopedics for consideration of knee arthroscopy with partial meniscectomy vs meniscus repair
- PT for LE conditioning prior to surgery if pt. also has OA
- Obtain urgent MRI and refer urgently to Orthopedics if bucket handle meniscus tear or meniscal root tear

19

CASE #3B

- WOULD YOU CHANGE YOUR MANAGEMENT IF THE X-RAY SHOWED:

Bilateral mild/moderate joint space narrowing, worse medially. Subchondral sclerosis, peaking of tibial spines, and several osteophytes.

- WHAT WOULD YOU DO DIFFERENTLY?

20

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21

CASE #4: HISTORY

- Chief complaint: 47 year-old with right knee pain
- Onset: 2 weeks ago after a fall on a paddle board. His foot slipped out from under him and he felt a pop and acute pain at the medial knee when his knee fell into valgus
- Location: medial joint line
- Associated factors: no swelling, clicking or catching. Denies locking. **Reports that his knee "feels loose," particularly when changing direction or turning to his left.**

22

CASE #4: PHYSICAL EXAM

- Observation: **abnormal, antalgic gait, cautious**. He prefers to sit with his hip in external rotation with weight on the lateral foot and a varus load on the knee
- ROM: full ROM, painful medially with full flexion
- Effusion: none
- Palpation: **point tenderness at the MCL, both proximal and distal to the medial joint line.** Not tender elsewhere on the joint lines or other parts of the knee
- Stability Testing: **(+) Laxity on valgus stress at 30 degrees**; No laxity with valgus stress at 0 degrees. No laxity on Lachman's, varus stress testing or posterior drawer
- Provocative Testing: (-) McMurray's test.

23

MCL TEAR

- History
  - Force hits outside of the knee causing MCL to stretch and possibly tear (valgus stress to knee)
  - Pain medial knee
  - Knee feels stiff, pain with terminal flexion due to tension on ligament
  - Mild swelling
  - +/- instability

24

MCL TEAR: SEVERITY GRADED BY DEGREE OF LAXITY WITH VALGUS STRESS AT 30 DEGREES

Grade	Injury	Translation compared to unaffected side	Patient response
I	Strain	Minimal laxity, firm endpoint	Pain
II	Partial tear	Some laxity, firm endpoint	Pain, may feel loose
III	Complete tear	Obvious laxity, no endpoint	Minimal pain, may feel very loose

25

MCL SPRAIN, GRADE 2: INITIAL PLAN

- Double-hinged knee brace, restricted ROM (i.e. 0-80 degrees) via brace for 3 weeks
- PT referral
- NSAIDs, ice – to control pain and decrease inflammation
- Avoid exacerbating activities

26

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27

CASE #5: HISTORY

- Chief complaint: 35 year-old woman with acute knee pain during trampoline half-pipe.
- Onset: 3 days ago jumped down and felt a pop with immediate knee pain and swelling. Went to ER: placed in knee immobilizer and given NSAIDS.
- Location: Posterior and lateral knee pain with terminal extension, tightness with bending.
- Associated factors: Knee feels unstable if not in the brace, especially with cutting or pivoting.
- Exacerbating factors: Instability with squatting, pivoting, walking down stairs, and stepping laterally (entire body weight on affected leg)

28

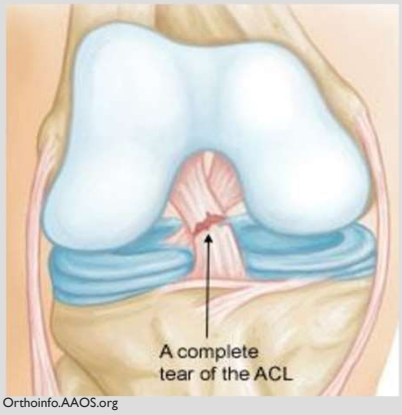
CASE #5: PHYSICAL EXAM

- Observation: **Using crutches, leg in immobilizer, large knee effusion**. No skin changes, no valgus/varus deformity.
- ROM: **Lacks 5 degrees of extension, can only flex the knee to 100 degrees, limited due to pain** (*teaching point: determine if knee is locking–suggests concomitant meniscal tear- or if ROM is limited due to effusion)*
- Palpation: **tender to palpation on the lateral femoral condyle and lateral tibial plateau**
- Stability Testing: **(+) Lachman's**, **+Anterior drawer**.
- Provocative Testing: (-) McMurrays. Deferred Thessaly and squat 2/2 instability

29

ANTERIOR CRUCIATE LIGAMENT (ACL) TEAR

- Main stabilizing ligament of the knee
- MOI
  - Twisting injury to knee (non-contact)
- Rate is higher in women in certain sports



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30

ACL TEAR

- History
  - Often feel a pop
  - Swelling develops soon after the injury
  - May be unstable upon pivoting
- PE
  - Effusion
  - Tenderness
    - +/- medial or lateral
  - +Lachman test
    - Very high sensitivity (0.87) and specificity (0.98)

31

ACL TEAR: INITIAL PLAN

- Rest, ice, compression, elevation
- X-rays (to quickly evaluate for a fracture), MRI (has a sensitivity of 0.97 and specificity of 1.0 for detecting ACL injuries)
- Discontinue knee immobilizer to prevent muscle atrophy, but consider double-hinged knee brace.
- If knee is unstable, crutches to avoid weight-bearing if intolerant of double-hinged brace
- OTC analgesics sufficient for most cases: Tylenol and NSAIDS
- Consider aspiration +/- steroid injection to relieve effusion/hemarthrosis and help with pre-op goals of 1) walking without a limp, 2) return of full extension ROM, and 3) no effusion
- Operative vs non-op management:
  - Most active, younger patients and high-level athletes opt for surgery.
  - For older patients and/or poor surgical candidates, trial non-op is reasonable
  - Ortho referral for most patients who are surgical candidates to discuss options.
  - Patients who decide not to pursue surgical management should be referred to PT or primary care sports medicine

32

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33

CASE #6: HISTORY

- Chief complaint: 27 year-old presents with right knee pain
- Onset: 2 weeks ago while training for his second sprint triathalon. Has been increasing training volume rapidly.
- Location: just above the lateral joint line
- Associated factors: no swelling, clicking or catching. Denies instability or locking.
- Exacerbating factors: climbing stairs, running downhill or long distance. Cycling makes the pain worse. Pain resolves shortly after running and cycling.

34

CASE #6: PHYSICAL EXAM

- Observation: **abnormal gait (walking with the affected knee extended)**
- ROM: full extension and flexion.
- Palpation: **point tenderness upon palpation of the lateral femoral condyle and at the lateral tubercle of the tibia (a.k.a Gerdy's tubercle).**
- Stability Testing: No laxity on Lachman's, varus/valgus stress or posterior drawer testing.
- Provocative Testing: **(+)Noble test**. (-) McMurray's, squat and Thessaly tests.

35

IT BAND FRICTION SYNDROME

- History
  - Pain at lateral femoral condyle
  - Due to repetitive flexion/extension motion of knee (i.e running, cycling)
  - As ITB becomes increasingly irritated, symptoms typically begin earlier in an exercise session
- PE
  - TTP of lateral knee approx. 2 cm above j line
  - TTP worse when patient is standing and knee is flexed to 30 degrees
  - Positive Noble, Ober's

36

ITB SYNDROME: INITIAL PLAN

- Avoid exacerbating activities – i.e. running on pavement, cycling. Consider low impact activities (swimming) to maintain cardiovascular fitness until inflammation reduced
- PT referral to correct mobility and strength deficits
- Topical or oral NSAIDs, ice
- Refresh running shoes
- Identify anatomic factors that may contribute to ITBS:
  - Leg-length discrepancy: consider a prescription heel-lift (to correct 50% of the leg length discrepancy, can do 100% if 50% doesn't help)

37

ITB SYNDROME: FOLLOW-UP PLAN

- After acute pain has resolved, start hip/core strengthening and a stretching program
- Avoid running on banked surfaces and/or hills or running in the same direction on a track.
- Cyclists: Suggest a bike fit
- If not improving consider referral to sports medicine or ortho

38

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39