Academy of PHYSICAL MEDICINE

Broadcast Summary

Knee Examination

With Mr Andrew Unwin BSc MRCS (Orth)

First broadcast on 27th November 2014

Basics

- 90% Diagnosis is the history - patients often acute and difficult to examine, therefore history is vital
- Examination should be confirmation of what the history suggests
- Examining the knee without history may reveal problems, but these may not be of relevance
- History can take 90 seconds:
  - Pain
  - Swelling
  - Stiffness
  - One joint or multiple joints
  - Giving way
  - Locking
- By the time you examine you know what you're looking for

Examples:

- Patient twisted knee 3 months prior
- No swelling at time, but swelled following day
- Tenderness on medial joint line

Probably cartilage tear

- Twisted knee
- immediate swelling
- could not continue activity
- felt unstable

Suspect ACL rupture or patellar-femoral dislocation

Rule of thumb:

If loss of extension and significant quads wastage, probably something structurally wrong with the knee (but may not need surgery)

Examination

Active

- Unlikely to be diagnostic, but may refine diagnosis
- Always watch patient walk – usually sufficient as an active exam
- Limping may indicate acute injury

- Brisk walk is non-acute
- Look for "thrust" (moving from side to side on knee) – instability
- gluteus medius/minimus weakness can cause core stability issues

Passive

- Examine patient on couch with back raised – no need to be supine
- History directs the testing
- If respect referred pain – need to examine back and conduct neuro exam
- In 10% patients – knee pain is from hip (OA in adults or slipped upper femoral epiphysis in children)
- Hip exam is quick:
  - Flex to 90, check internal/external rotation
  - Extend knee on table, roll into internal/external rotation
  - If problem found, then conduct a more detailed exam

- Knee exam:

  - Because exam determined by history – don't subject patient to barrage of tests
  - 90% of patients with knee problem will be unable to get knee straight.
  - Instruct to push knees into table and get heels off table – assess hyperextension
    - most adults, esp females have 5 deg hyperxtension.
    - Loss of hyperextension indicates likely pathology

  - effusion/cartilage tear – knee likely to be flexed
  - instruct patient to flex knee, extend knee, lift straight leg: this tests extensor mechanism and rules out ruptured quadriceps and ruptured patellar/quadriceps tendons
  - Examine quadriceps - within 3 days of injury atrophy is likely:
    - Usually vastus medialis. This is easily seen at medial knee.
    - If rectus femoris is atrophied, normally a chronic problem
    - If no VMO atrophy and extensor mechanism OK – probably no serious pathology

  - History of instability:
    - look at ligament s and pat-fem joint
    - Think logically: lateral, medial anterior, central compartments (ACL/PCL), posterior structures

- Anterior Compartment (patello-femoral joint):
  - Patients will dislike straightening leg
  - Pain on kneeling, squatting, going up/down stairs
  - Possible instability

  - flex and extend knee to observe patellar tracking (if unclear, sit patient over end of table)
  - check both knees - most patello-femoral problems are bilateral.
  - Assess patellar mobility: commonly too lax, or tilted.
    - Assess laxity with patient's knee over thigh (20^o flexion).
    - Assess tilt with leg straight, try to get fingers under borders – often bound down by lateral retinaculum (Excess Lateral Patellar Pressure Syndrome or Ficat syndrome)

  - Elderly patients, with patello-femoral OA often have fixed flexion deformity due to patella being permanently in contact with trochlea. Pain is eased by mobilization of patella to straighten leg

  - Patella tendonitis (runner's knee/jumper's knee): with knee at 20^o flexion – press distal pole of patella at tendon insertion. This will produce pain.
  - Osgood Schlatter's in children: may produce a lump at tibial tuberosity (lump persists through adulthood)
  - Lump on distal pole of patella likely to be epiphysitis (Sinding Larsen Johansson Syndrome)

- Medial Compartment (80% knee pathology arises here):

  - Joint line is significant: tenderness indicates medial meniscus in 90% cases.
  - Older patients more likely to have chondral pathology.
  - But the 2 can co-exist – torn medial meniscus will normally produce wear on condyle.

- Meniscal tear in young pt normally from trauma. In older pts less likely.
- Medial meniscal tear at posterior horn gives tenderness on joint line due to inflammation of overlying synovium (the meniscus has no nerve fibres).

- Test normal knee first (serves to reassure patient as well as provide comparison):

  - Flex knee to 90°
  - Compress on medial joint line
  - Apply varus stress through leg (medial compression test (less cruel than McMurray's))
  - If tear is displaced (eg bucket-handle), will be painful and will clunk
  - Chondral lesion on medial femoral condyle or medial tibial plateau produces pain in a similar place. Hard to differentiate from meniscus without MRI.

- Lateral Compartment

  - Most meniscal problems are medial.
  - If on lateral side, always consider ACL rupture - pre-injured ACL more likely to cause lateral tear. (many patients may be unaware of prior ACL injury)
  - In young patients, discoid meniscus can present – usually lateral

- Ligaments

  - ACL
    - History will suggest ruptured ACL (twisting force)
    - Anterior drawer test tells you nothing about the ACL, just laxity (but it's easy for small hands!)
    - Lachmann's Test is preferred:
      - knee in 20° flexion
      - test for movement of tibia on femur – normally more palpable than observable
      - positive test usually obvious, but always compare.
      - should not be painful (nerve fibres of ACL very tolerant of extension)
      - if painful, it's likely to be coexistent meniscal tear or muscle injury
    - Pivot shift test– to be avoided as it's painful (usually only done under anaesthetic)

  - PCL
    - Assess with both knees in 90° flexion – look for sag
    - Posterior drawer – normally laxity is very obvious

  - MCL: if ruptured, unlikely to see laxity, but will cause pain on valgus stress
    - Cause is usually valgus trauma
    - Most injuries will heal on own

  - LCL: similar process, varus stress
    - Severe injury will be evident in extension
    - less severe assess in 20° flexion

  - Further assessment: postero-lateral corner (part of LCL)
    - popliteofibular ligament and popliteus muscle - use Dial test:
      - Knees at 90° flexion
      - Exterally rotate feet: greater ext rot = laxity of popliteofibular ligament.
      - Some ACL injuries also involve postero-lateral structures.

Problem Areas

- Bursae
  - Pre patella
  - Pre Patella tendon
  - Pes anserinus bursa (often missed)
  - Popliteal bursa (source of Baker's cyst)
    - burst popliteal bursa can cause pain in calf - differential for DVT

    - more likely in elderly
    - can occur in rheumatoid disease due to synovitis.
    - Burst bursa is normally non-traumatic (think of popliteal bursa as oil sump – with a one way valve from knee)

  - Treatment:
    - have to treat cause not cysts
    - treat OA with physio/osteo/steroid to decrease fluid in knee

- Popliteal fossa (a minefield!)
  - in elderly/smoker consider popliteal aneurysm (pulsatile mass)
  - in children consider possible lymph node (lymphoma): needs ultrasound scan to indicate
  - most posterior knee pain is due muscle pain (eg gastrocs)

- Distal neurovascular exam

  - check pulses
  - resist ankle dorsiflexion/plantar flexion
  - common peroneal nerve injury will cause foot drop, with possible sensory loss over dorsum of foot

- Effusion (fluid in knee)
  - assess by looking and palpating
  - pain generally around patella
  - problem can be opposite side to pain, when pain is caused by excess fluid

- Medial plica syndrome (plica is a normal structure, where the synovium has doubled up)
  - 99% assoc with poor core stability
  - patient adducts knee in flexion
  - can be palpated medial to patellar like guitar string (painful!)

- DVT

  - many occur post-surgery
  - consider whether a true DVT or a burst cyst
  - Homan's sign very poor diagnostic tool
  - if calf is red and hot – DVT is likely
  - good rule: if possibility of DVT occurs to you, get ultrasound scan
  - many are silent, presenting without signs/symptoms
  - traumatic onset relatively uncommon – usually immobility
  - major trauma to leg can cause DVT.

- Virchow's triad – why things go wrong:
  - obese, cancer, on pill (blood thicker – hyper coagulability)
  - stasis (immobility post surgery)
  - endothelial injury

- Tests and Imaging

  - Ultrasound/Doppler test is good for bursa and it's cheap
  - Evidence to support ultrasound for meniscal tears is thin
  - Often Xray more use than MRI: usually possible to diagnose cartilage tear clinically, but cannot assess OA changes without XRay
  - Xray is weight bearing – good for displaying change in medial compartment
  - MRI conducted supine, so can be less helpful