Ep 31- Patella Instability w/ Dr. Yanke

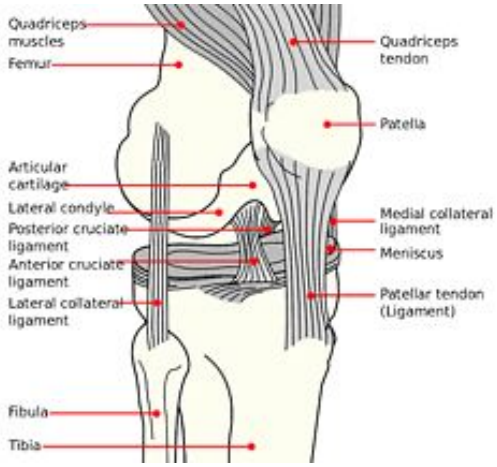
Intro

- Maltracking- when patella deviates from bony constraints of trochlea groove during ROM
- Subluxation- patella deviates from constraints n partially leaves trochlear groove
- Dislocation- patella displaced from groove
- Recurrent dislocations- 2+ occurrences
- Chronic patella dislocation- patella remains dislocated for months/years
- 2nd most common cause of hemarthrosis.

History

- Find mechanism
- Direct trauma v indirect when leg rotates around planted foot
- Most spontaneously reduce when knee extended
- Scs: knee gives way, kneecap pops or clunks in/out place. Swelling after the indecent.
- Distinguish from patellofemoral pain syndrome- anterior knee pain w/ prolonged sitting/kneeling

Physical Examination (Anatomy)



- Bony anatomy
    - Normal tib-femoral angle is 5-7 degrees of valgus- Look for genu valgum
    - Inc femoral anteversion/ external tibial torsion- inc the lateral pull on patella
    - Normal- patella engages in trochlea at 10 -20 degrees flexion- lateral trochlear ridge
        - Trochlear dysplasia dec resistance to lateral patella translation
    - Patella alta

- Soft tissue anatomy
    - Quads
    - VMO- originates off lateral inter muscular septum- inserts at high angle up to 65 degrees on prox 1/3 of patella. (Can have VMO atrophy)
    - Static stabilizers
        - MPFL, patella tibial ligament (MPTL), patella meniscal ligaments (MPML)
        - MPFL- up to 50-60% restraining force against lateral patella displacement

- MPTL + MPML- up to 46% at 90 degrees against lateral translation
- MPFL
    - Inserts btwn adductor tuberosity + medial epicondyle on femur, prox 2/3 of patella
    - Length mean- 56.9mm, width 17.8mm at substance, 26mm in patella insertion and 12.7mm in femur origin
    - Close to patella- MPFL extension insert on quad tendon. Forms a complex
- MPTL
    - Inserts prox tibia 13-14mm distal to plateau.
- MPML-
    - Inserts on anterior horn of medial meniscus
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Physical Examination

- After acute instability episode- hard
- Standing gait
- Q angle- ASIS- patella- tibial tuberosity
    - Normal males- 8-16
    - Normal women 15-19
- Core strength testing
- Sitting exam
    - Q angle can change during flexion. Greatest during terminal knee extension due to screw home mechanism- tibia ER on femur
    - J sign- w/ knee extension - patella moves laterally at near full extension
        - In patella alta- occurs earlier
- Supine exam
    - Muscle tone, active extension subluxation,
    - Patellar tilt test
    - Patella glide test- knee in extension. Use width of patella divided into quadrants- amount of patella glide is number of quadrants patella translates
        - >3 may be deficiency in medial soft tissue restraints
        - <1may suggest lateral tightness- ask operative management.

    - Examine asymptomatic knee
    - Patella apprehension- translate laterally- if pt has feeling of subluxation or dislocation episode
- Prone
    - Craigs test- for femoral anteversion

Imaging

- Patellar height- insall salvation ration- normal is .8-1.2. ratio of patella tp patella tendon
- Trochlear dysplasia- true lateral
- Normally- blumensaat line continues anteriorly like the trochlear groove line- which should stay posterior to projection of femoral condyles
    - Lines of lateral trochlear facet, medial trochlear facet, and trochlear groove coincide- which is crossing side- indicates that those landmarks are at same height and trochlea is flat
- Merchant view- sulcus angle- values >145 suggest dysplasia

CT

- Can't get axial on xray
    - Patella tilt- line thru patella axis and line tangental to posterior condyles. >20 abnormal
- Tibial tubercle-trochlear groove distance
    - Performed by superimposing an axial CT image of tibial tuberosity and trochlear groove
    - Distance btwn center of tuberosity and the groove. In a line PARALLEL to posterior femoral condyles
    - TT-TG distance >15-20mm is assoc w/ patellar instability
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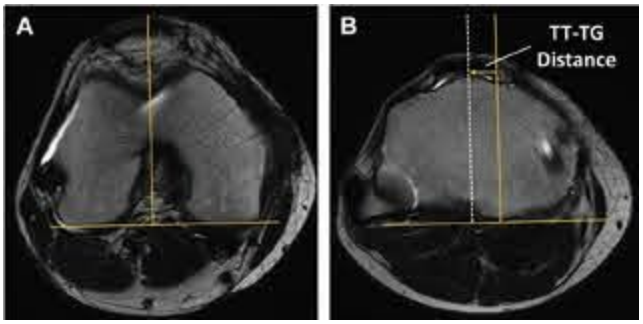

MRI

- After acute episode may see- impaction injury to lateral femoral condyle, osteochondral damage to medial patella facet, disruption of medial retinaculum, and MPFL
- Can see some of the same bony landmarks like TT-TG, trochlear depth, TT to PCL distance
- Lateral trochlear inclination- posterior condyles to lateral trochlear facet. Abnormal <11 degrees

Decision making principles

- Acute instability episode
    - Immediate goal: provide symptom relief. Rest, compression, elevation. Crutches to help w/ WB. OTC analgesics
    - Knee immobilizer followed by hinged or patellar brace.
    - Knee aspiration helps w/ pain n hemarthrosis.
    - Heel slides + quads activation exercises w/I first days
    - MRI for fx or large osteochondral or loose body. Then back to PT
    - 15-60% recurrence . ask him.

- Subacute
    - Non WB exercises w/ ROM when swelling decreases. Rehab protocols- strengthen gluteal, quads, core muscles
    - Surgical indications- irreducible patella- large osteochondral lesion
    - Some acutely reconstruct MPFL…

- Subacute recurrent patella instability
    - Surgical stabilization
    - Soft tissue procedures
        - MPFL reconstruction (autografts & allografts)
        - Lateral retinaculum lengthening: if tight retanuculum (<1 quadrant of patella), inc tilt (lifting of patella <0 degrees), inc tilt on MRI Superficial layer of fibers from IT band, and deeper transverse fiber layer. Section superficial layer as close to patella as possible, deep layer as posterior as possible
        - Medial plication- reposition soft tissue to reduce slack
        - MPTL recon w/ MPFL- (MPTL and MPML important during terminal extension -directly counteracts quads- and deeper flexion). Indications- active extension subluxation + flexion instability

    - Bony procedures
        - TTO-
            - can be for medialization or distalization r both. Medialization if large Q angle (>15-20 deg) and increased TT-TG (>15-20mm) and inc TT-PCL (24mm). CDI ration
            - Distalization if patella alta
        - Trochleoplasty-
            - prox open groove-pasty
            - deepening trochleoplasty V-shaped by Dejour
            - U shape by Bereiter
        - Femoral osteotomy- can do derotation osteotomy if excessive anteversion
- Post-op
    - WBAT w/ brace in extension. Isometric quad sets n ankle pumps
    - Gravity assisted ROM out brace
    - Formal therapy after 1st post-op visit. 2-3x weekly for months
    - D/c crutches n hinged brace for a J brace or sleeve once adequate quads strength
    - Full ROM by 6-8 wk. low impact activities
    - Jogging 3 months
    - RTP around 4-6 months

Results

- MPFL recon succes 70-100%

TTO's

- Anteromedialization of TT- aka fulkerson osteotomy
- Diagnostic arthroscopy
- Incision lateral to midline. Expose medial/lateral borders of patella tendon. Anterior compartment contents dissected from prox tibia. Medial border of tibial tuberosity defined using sharp dissection n elevation of medial periosteum
- Put cutting guide. For medicalization TTO- 0 degree guide, for AMZ, 45-60 degree angle

Sources:

DeLee and Drez- Sports Medicine