Disclaimer

• Neither I nor any of my family members have any financial conflicts to disclose relevant to this talk.
Patella Dislocation

- Anatomy
- Biomechanics
- Presentation
- PE
- Radiographic exam
- Treatment
Acute Dislocation

- Displacement of patella from trochlea.
- Usually lateral.
- Occurs with quad contraction, IR of femur and ext rotation of tibia.

Common Mechanisms

• Posterior leg in baseball, softball
• Push off leg in “suicide” drills

www.2008nbcolympics.com
www.incirlik.af.mil
Acute Dislocation

- 2% of all knee injuries
- Younger pt (peak incidence 14-16yo)
- male = female
- 20-45% recurrence rate

Patellar Anatomy

• Heart shaped.
• Thick posterior cartilage for pressure dissipation.
• Protects trochlea and femoral condyles.

Hungerford, CORR 144:9 1979.
Biomechanics

- Acts to increase quadricep lever arm
Biomechanics

- Forces acting on patella produce a laterally-directed force vector.
- Approaching full extension, tibia ext rotates and Q-angle incr.

Biomechanics

• Contact between trochlea and patella varies throughout arc of motion.

• Lateral condyle acts as a lateral restraint to subluxtion.

Aglietti, CORR 107: 175, 1975.
Biomechanics

Dynamic stabilizers
- Quads

Static Stabilizers:
- Patellar trochlear articulation
- Capsule tension.
Medial Patellofemoral Ligament

- medial aspect of femoral condyle to superomedial aspect of patella.
- Primary static stabilizer providing ~50% of restraint
- patellomeniscal and patellotibial ligaments

MPFL Tear

- Medial structures damaged vs. torn by necessity in lateral dislocation.
- Usually tears off femur, not patella

Sallay et al.
Acute Dislocation

• During lateral dislocation medial patellar facet and lateral femoral condyle impact.

Risk Factors

Increased Q-angle
- Femoral anteversion
- External tibial torsion
- Lateral position of tibial tubercle

- Dysplastic LFC
- Vastus medialis atrophy
- Over-strengthened vastus lateralis
- Patellar dysplasia
- Generalized ligamentous laxity
- Tight lateral retinaculum
- Previous dislocation
“kissing lesion”
Risk Factors

• Those suffering indirect dislocation more likely to have anatomic predisposition compared with traumatic mechanism.
Anatomic Predisposition

- Patella alta
- Hypoplastic trochlea
- Excessive femoral antversion
- Large Q angle
- Large TTTG
Presentation

- Acute dislocation
  - Hx of pain and gross deformity, usually spontaneous reduction

- Recurrent
  - Knee giving way, apprehension, difficulty with stairs, anterior knee pain, overlay of chondral injury symptoms
Physical Exam

• Acute
  – Effusion
  – Apprehension
  – Quad inhibited
  – TTP medial facet and lateral trochlea, adductor tubercle
  – Check femoral anteversion, tubercle offset, patellar glide
Physical Exam

• Recurrent/chronic
  – Crepitus
  – Apprehension
  – More long standing VMO atrophy
  – Easier to assess J sign than in acute setting
Apprehension Test

- Performed with knee relaxed and flexed 20-30°.

Campbell’s Operative Orthopaedics
Patellar Glide

- Patella divided into 4 quadrants.
- Lateral glide of patella >2 quadrants indicates incompetent medial restraints.
Alignment

- Tibial tubercle should be found directly inferior to inf pole of patella.
Alignment

- To anterior superior iliac spine
- Mid-patella
- Tibial tubercle
Radiographic Exam

- Evaluate for fracture and loose bodies.
- 40-50% acute dislocations have an osteochondral fx.
- Plain film demonstrates <50% of these.

Halbrecht
Patellar Congruence

- Indicator of patella centralization in sulcus.
- Nml negative 6-8°+/- 6° @ 45° flexion.

MRI

- Assess for chondral injury
- Identify injury to MPFL
- Clarifies diagnosis if uncertain
- Assess tibial tubercle offset
TTTG
Tibial Tubercle Trochlear Groove Distance
TTTG

- Ave approx. 10 mm
- 2 st dev 14.6 mm
  - Wittstein et al
  - Schottle and others with similar numbers
- Original data from CT studies, MRI has added advantage of looking at cartilage
Treatment algorithm

• First time dislocator
  – Primary MPFL repair no better than nonop
  – PT for ROM, quad, hip abd/ER strengthening
  – Scope for loose body, chondral injury

• Recurrent dislocator
  – Tubercle osteotomy if indicated (high TTTG)
  – MPFL repair vs reconstruction
    • Reconstruction recommended if unstable intraop after osteotomy
Primary repair in 1\textsuperscript{st} time dislocator?

- N=80
- No significant difference in recurrence rate
  - 17\%, 20\%
• 94% of MPFL tears off femur
• MPFL repaired primarily in 1st time dislocators
• Only 58% good-excellent results
• No recurrent dislocations, many subluxations preventing return to sport
Distal Realignment

- **Fulkerson**
  - Anteromedializes tibial tubercle
  - Theoretical advantage of off loading cartilage never demonstrated
  - Loose stability groove may provide
- **Elmslie Trillat**
  - Straight medialization

Fulkerson JP. Disorders of the Patellofemoral Joint, 2004
Distal Realignment

- Multiple case series with good results in literature, low recurrence rates
- Lack of prospective, comparative studies
- Benefit to addition of MPFL reconstruction or even MPFL reconstruction as alternative?

Tjoumakaris et al AJSM 2010
MPFL reconstruction

• Wantanabe et al 2008
  – Equivalent results w/ and w/o tubercle transfer
• Many smaller series report low recurrence rates, good outcomes with MPFL recon +/- tubercle transfer
MPFL reconstruction techniques

- Most use allograft semitendinosis
- 2 or one point of fixation in patella
- Radiographic landmarks to identify femoral insertion

Schottle et al Knee Surg sports traumatol arthrosc 2010
Landmarks for femoral insertion

- Palpate groove between adductor tubercle and medial epicondyle
- Radiographic

Wijdicks et al JBJS 2009

Schottle et al AJSM 2007
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Pearls

• No role for isolated lateral release in setting of patellar instability

• Beware of medial patellar instability
  – Always iatrogenic
  – Usually due to lateral release extending into vastus
  – May need vastus lat repaired and LPFL repair
Anatomy of MPFL
Radiographic Landmarks
Schottle’s Lines
Femoral Tunnel Position

Good

High

The American Journal of Sports Medicine, Vol. 39, No. 1
Questions?