



Management of Patellar Dislocations

Anthony A. Schepsis M.D.
Coastal Orthopedics
Beverly, Mass.
Professor of Orthopedic Surgery
BU Medical Center

Work Related Injuries Workshop
May 2 & 3, 2016

Patellofemoral Disorders

- One of the most common problems seen in the knee surgeons office
- They remain oftentimes difficult and frustrating to manage
- Anterior knee pain is very common in the workplace setting

Work Related Injuries Workshop
May 2 & 3, 2016

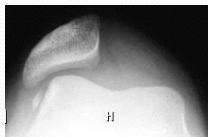
Classification of Patellofemoral Pathology

- TRAUMA
 - direct impact (e.g. dashboard knee)
 - Fracture
 - Tendons rupture (quadriceps, patellar tendon)
 - **DISLOCATION**
- MALALIGNMENT
 - patellar compression syndrome
 - OCD
 - **Patellar instability**
- ARTICULAR CARTILAGE DISORDERS INCLUDING ARTHRITIS
- TENDONITIS, APOPHYSITIS

Work Related Injuries Workshop
May 2 & 3, 2016

Patellar Dislocation: Define

- Patella Completely leaves the trochlear groove
- It dislocates laterally
- it can be traumatic as a result of an acute injury
 - it can also be relatively atraumatic in someone with congenital factors
 - it can be partial or a **SUBLUXATION**



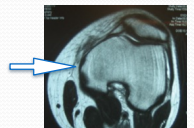
Work Related Injuries Workshop
May 2 & 3, 2016



Work Related Injuries Workshop
May 2 & 3, 2016

ACUTE TRAUMATIC PATELLAR DISLOCATION (APD)

- Can be as a result of a twisting injury such as change of direction, similar to ACL tear
- Can be a result of direct impact
- Acute swelling in knee from bleeding
- (HEMARTHROSIS)
- Pain usually more medial



most common in second decade of life
tearing of medial restraints

Work Related Injuries Workshop
May 2 & 3, 2016

Acute traumatic hemarthrosis without fracture

- Knee swelled within hours after injury (has to be blood)
- ACL most common
- **PATELLAR DISLOCATION** second most common
- Other causes: Osteochondral fracture not seen on X-ray, deep MCL tears, PCL, peripheral meniscal detachments
- can easily be confused with MCL or other injuries

Work Related Injuries Workshop
May 2 & 3, 2016

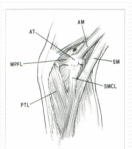
Acute Patellar Dislocation

- Be suspicious, may be confused with MCL sprain, beware associated injuries
- Hemarthrosis/ medial epicondyle and/ or medial patellar border tenderness
- Suspect displaced osteochondral damage
- X-rays, MRI

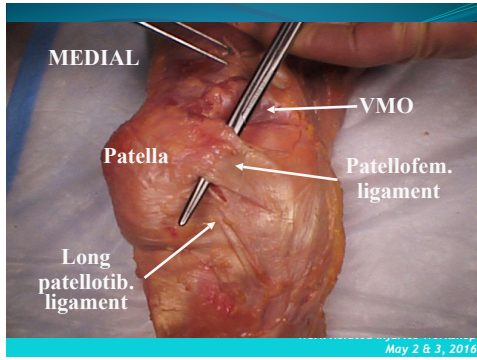
Work Related Injuries Workshop
May 2 & 3, 2016

What's typically injured?

- Medial patellofemoral ligament
- Medial patellar avulsion (margin) fracture
- Non-displaced articular injury
- Displaced articular injury



Work Related Injuries Workshop
May 2 & 3, 2016



Radiographs

- In addition to normal AP and lateral, always get axial or "sunrise" views of patella

Work Related Injuries Workshop
May 2 & 3, 2016

Osteochondral injury

- Patellar bone bruise/avulsion fx 28-41%
- Contusion lat femoral condyle 31-100%
- MY opinion:
 - ALWAYS GET MRI after acute traumatic dislocation

Work Related Injuries Workshop
May 2 & 3, 2016

Why MRI???

Chondral, osteochondral injury
Associated Injuries
Location of soft tissue damage
Exact position of patella
Associated factors that led to a dislocation

Work Related Injuries Workshop
May 2 & 3, 2016

MPFL and Medial Restraints Tear after Acute Dislocation

Work Related Injuries Workshop
May 2 & 3, 2016

MPFL avulsion

Work Related Injuries Workshop
May 2 & 3, 2016

Bone bruise

Medial retinaculum avulsion

MPFL femoral injury

Work Related Injuries Workshop
May 2 & 3, 2016

Non-operative treatment

Author	F/U	# Knees	Subjective	Recurred
Cofield 1977	11.8 yrs	48	67% satisfied	44%
Hawkins 1986	40 mos.	20	50% mod/severe	15%
Cash 1988	8.1 yrs.	103	58% good/ex	29%
Garth 1996	46 mos.	69	66% good/ex	26%
Nikku 1997	2 yrs.	55	71% good/ex	27%

Work Related Injuries Workshop
May 2 & 3, 2016

Highest recurrence rates

- Young, skeletally immature patients
- Young females
- Occurs with minimal trauma
- Patients with history of instability in other knee
- Predisposing factors: patella alta, trochlear dysplasia, bony malalignment
- Not as high in middle aged work place injury, but still significant

Work Related Injuries Workshop
May 2 & 3, 2016

Preferred treatment

Consider arthrocentesis to allow possible reduction of medial soft tissue injury

Immobilization in extension to allow early ligament healing and minimize swelling, WBAT

MRI for traumatic dislocations with hemarthrosis

Work Related Injuries Workshop
May 2 & 3, 2016

Preferred treatment

After 2 weeks gradually increase motion and strengthening while protecting vs. lateral displacement with brace/taping

Structured PT program

Be vigilant for signs/symptoms of loose bodies

Athletes return to sport in 6- 8 weeks

In workplace: 3- 4 months for strenuous professions and heavy manual labor

I am a fan of FCE's, for these patients, to simulate workplace conditions, since recurrence rate is significant



Work Related Injuries Workshop
May 2 & 3, 2016

Why Treat Non-Operatively When There Is An Acute Tear and Recurrence Rate is High?

Non-operative treatment has similar results to operative treatment of primary dislocation

Since we can't predict who will do well with non-operative treatment, we should avoid operative treatment unless there is a displaced articular surface fragment

"First, do no harm"

Work Related Injuries Workshop
May 2 & 3, 2016

Exception

Unstable osteochondral fragments require early surgery for ORIF or excision, medial repair



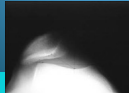
Work Related Injuries Workshop
May 2 & 3, 2016

Is repair/realignment warranted after an acute patellar dislocation?

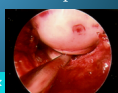


My indications for MPFL repair

1. Large osteochondral/chondral fractures requiring fixation
2. Asymmetrical static lateral displacement of the patella with massive sleeve avulsion off patella



Work



Workshop
2016

Other Possible Roles for Acute Repair

Patients who cannot afford the chance of recurrent instability due to work or sport considerations

Poor reduction of the patella S/P dislocation

Work Related Injuries Workshop
May 2 & 3, 2016

Patellar Dislocation/Instability strategy

Non-op treatment 70% good or excellent leaves 30% considering more treatment

Of those 30%, surgery later for recurrent instability would have 80% success

Total satisfied pts 70%+24%=94% of patients initially injured with this strategy

Work Related Injuries Workshop
May 2 & 3, 2016

Anatomic Consequences

MPFL (80%)

Inferomedial Patella Avulsion Fx. (80%)

Medial Retinaculum (60%)

Patella Sided Injuries- MPML

Femoral Sided Injuries- MPFL

Burke et al '98
Work Related Injuries Workshop
May 2 & 3, 2016

Causes of Instability in Addition to Loss of Medial Restraints

Trochlea Dysplasia (85%)

Quadriceps Dysplasia (83%)

TT-TG \geq 20 mm (56%)

Patella Alta (24%)

Dejour H. et al '94
Work Related Injuries Workshop
May 2 & 3, 2016

Causes

Femoral Anteversion
External Tibial Torsion
Genu Valgum
Patella Alta
Excessive Q Angle and High TT-TG
Ligamentous Laxity
VMO Dysplasia
Tight Lateral Retinaculum

Work Related Injuries Workshop
May 2 & 3, 2016

Proximal Stabilization Procedures

Indicated for recurrent lateral instability of the patella where there is evidence that the medial soft tissue restraints are deficient

The primary stabilizers are passive

Trochlea
Medial soft tissue restraints

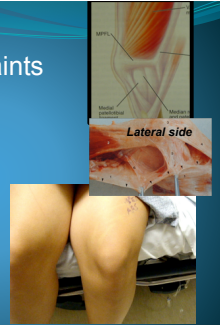


Work Related Injuries Workshop
May 2 & 3, 2016

The primary restraints are passive!

MPFL is the primary static soft tissue restraint against lateral patellar loads
Reconstruction of the MPFL restores tracking to near normal when the medial restraints are deficient

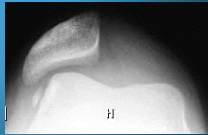
Coskun et al, JBJS 1993
Hustamann et al, Clin Orthop 1998
Burks et al, Am J Knee Surg 1998



Work Related Injuries Workshop
May 2 & 3, 2016

Why does the Patella Dislocate?

"There exists no evidence that any amount of malalignment will cause dislocation unless the passive stabilizers are damaged."
Davis and Fithian '02



Work Related Injuries Workshop
May 2 & 3, 2016

Options for Proximal Stabilization

Repairing/reefing medial restraints
Arthroscopic
Mini-open
Open

VMO advancement
Reconstructing a medial restraint

Anatomic MPFL Reconstruction
Better control over tensioning, tracking, does not depend on quality of soft tissue



Work Related Injuries Workshop
May 2 & 3, 2016

MPFL Reconstruction with Double limb Semitendinosus

Farr, Schepsis J Knee Surg 19 (4) Oct 2006
Vu-Medi
AANA Knee Surgical Techniques

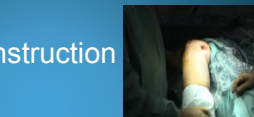
Bio-tenodesis screw on femoral side
"Reverse Loop" suture anchors in trough on patella



20
16

MPFL Reconstruction

two incision technique



Work Related Injuries Workshop
May 2 & 3, 2016

Lateral Retinacular Lengthening versus lateral release

I probably only do something laterally with MPFL reconstruction 25% of the time

I prefer lengthening for instability cases

Fine soft tissue balance

If you are a releaser, do last!



LR clinically and radiographically tight
Medial translation 1 quadrant or less
negative passive patellar tilt



Work Related Injuries Workshop
May 2 & 3, 2016

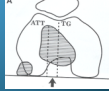
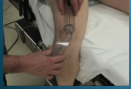
Distal realignments are for instability and/or pain/chondrosis associated with tubercle malalignment

Work Related Injuries Workshop
May 2 & 3, 2016

Assessing Tubercle Malalignment

1. Quadriceps or q-angle
2. Tuberosulcus angle
3. TT-TG Distance:

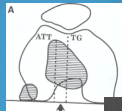
CT measurement of distance between center of trochlear groove and center attachment of patellar tendon on tubercle



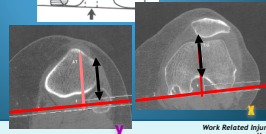
Work Related Injuries Workshop
May 2 & 3, 2016

TT-TG: distance between center of trochlear groove and center of PT attachment on tibial tuberosity

Jones Study
 >9 mm normal
 10-19 abnormal
 >20 mm highly abn.
 Schepis study
 Normal up to 12
 Abnormal greater than 15
TIP: Pay attention to TT-TG >20 mm



Measure on MRI or CT



Work Related Injuries Workshop
May 2 & 3, 2016

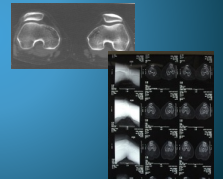
CT Tracking Study for complex instability/malalignment

Underutilized test

Mid axial image of pf joint from 0 to 60 degrees in 10 degree increments

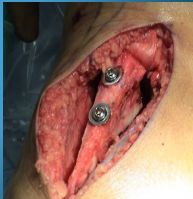
Allows tracking measurement in early flexion where the instability usually occurs

More precise anatomical measurements



Work Related Injuries Workshop
May 2 & 3, 2016

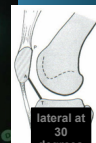
Tubercle Osteotomy



Work Related Injuries Workshop
May 2 & 3, 2016

Patella Alta

Severe cases (>1.4)
Distal tubercle transfer



Work Related Injuries Workshop
May 2 & 3, 2016

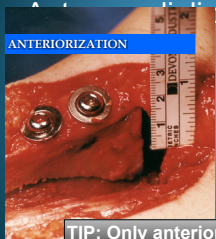
Distal Transfer (step cut)

- Step cut will have much higher stress risers
- NWB 6-8 weeks plus

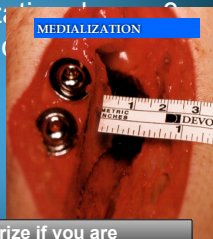


Work Related Injuries Workshop
May 2 & 3, 2016

ANTERIORIZATION



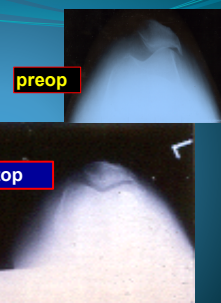
MEDIALIZATION



TIP: Only anteriorize if you are unloading distally based lesions

Workshop
May 2 & 3, 2016

Case Example: AMZ procedure



preop

postop

Work Related Injuries Workshop
May 2 & 3, 2016

Fresh OA patellar graft & AMZ : osteotomy approach with LR lengthening



17 yo female
Traumatic 2cm osteochondral defect after dislocation

Work Related Injuries Workshop
May 2 & 3, 2016

Combined proximal and distal



patellar escape at 20 degrees
trochlear dysplasia
TT-TG of 20 mm
MRI: grade 3 changes distal
medial quadrant of patella

22 yo female

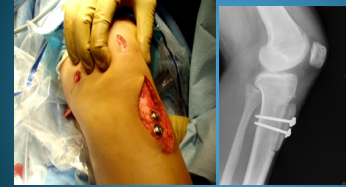
Work Related Injuries Workshop
May 2 & 3, 2016

Dislocatable Patella



Work Related Injuries Workshop
May 2 & 3, 2016

Proximal Stabilization and Distal Realignment

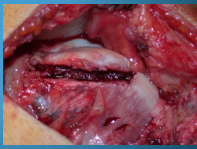
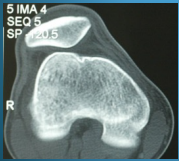


MPFL out
High TT-TG
patella alta
Trochlear
dysplasia

Work Related Injuries Workshop
May 2 & 3, 2016

Trochleoplasty

(short, flat lateral trochlea
→ raising lateral condyle



Work Related Injuries Workshop
May 2 & 3, 2016

Average Rehabilitation Times for Return to Full Duty

- MPFL Reconstruction: 4 months
- Tubercle osteotomy, with or without MPFL: 6 months
- Cartilage Restoration procedure: ACL, OATS, Allograft: 8 months to a year
- Final prognosis usually most dependent on status of articular cartilage

Work Related Injuries Workshop
May 2 & 3, 2016



schepsis@comcast.net

Thank You

Work Related Injuries Workshop
May 2 & 3, 2016