

COLLATERAL LIGAMENT INJURY

Matthew Murray, M.D.
UTHSCSA Sports Medicine



Financial Disclosure

Dr. Matthew Murray has no relevant financial relationships with commercial interests to disclose.

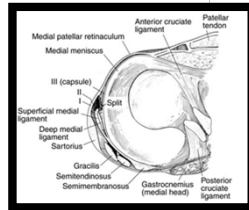
Medial Collateral Ligament

- Most commonly injured ligament in the knee
 - Diagnosis and management important to doctors, trainers, coaches
- Prophylactic bracing effective among amateur and professional athletes
- Treatment usually non-operative for isolated MCL injuries
- Controversy regarding treatment with combined ligament injuries

Anatomy of the Medial Knee

◎ Three layer concept

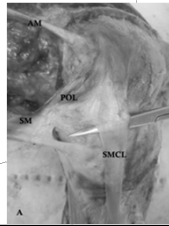
- Layer I
 - Sartorial fascia layer
- Layer II
 - Superficial MCL
 - Posteromedial Corner
 - MPFL
- Layer III
 - Knee capsule
 - Deep MCL



Anatomy of the MCL

◎ Superficial MCL

- Femoral attachment
 - 1cm anterior/distal to the adductor tubercle
- Tibial attachment
 - Anteromedial tibial crest
 - 4.5 cm distal to the medial joint line
 - Posterior to the pes anserinus



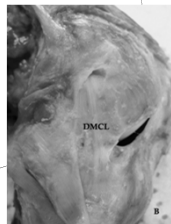
Anatomy of the MCL

◎ Deep MCL

- Thickening of knee capsule deep to sMCL
- Meniscofemoral/meniscotibial ligaments

◎ Posteromedial capsule

- Posteriorly 3 layers blend together
- Combine with sheath of semimembranosus



Function



- ◎ sMCL
 - Primary restraint to valgus stress
 - Transection results in 3-5mm laxity
 - sMCL and PMC = 5-10mm laxity
 - Secondary role in external rotation resistance
- ◎ dMCL
 - Secondary stabilizer against valgus stress

Etiology/MOA



- ◎ Grade I & II sprains underreported
- ◎ Grade III sprains
 - 80% have associated injuries
- ◎ Valgus stress
 - Contact & noncontact sports
- ◎ External rotation pivoting
- ◎ Blow to anterolateral knee
- ◎ Frank knee dislocation



Bracing



- ◎ Knee most frequently injured body part in HS and collegiate athletics
 - Effectiveness
 - Commercial knee braces
 - 20-30% increased strain relief
 - 20-30% increased resistance to valgus failure load
 - Useful in preventing low grade MCL injuries
 - No compromise in performance
 - No limitation of function
 - Despite athletes' perceptions

Diagnosis

- Careful attention to history
 - Valgus blow to the knee
- Thorough exam to rule out associated injuries
- Careful palpation over course of ligament
 - Adductor tubercle – proximal injury
 - Proximal medial tibia – distal injury
 - Medial joint line – MMT



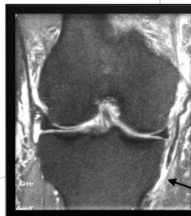
Diagnosis

- Valgus stress at 30deg of flexion
 - Grade I < 5mm joint line opening
 - Grade II 5-10mm
 - Grade III > 10mm
- Valgus stress at full extension
 - Tests the integrity of the MCL and POL
 - Increased opening = CRUCIATE INJURY



Diagnosis

- Hemarthrosis - not just soft tissue swelling
 - CRUCIATE INJURY
- X-rays – can show calcification in MCL
 - chronic injury (Pelligrini-Stieda lesion)
- MRI – key study for diagnosis
 - Rule out associated pathology
 - Bone bruise - trabecular microfracture
 - 45% incidence with MCL injuries
 - 50% with ACL injury
 - Lateral femoral condyle



Treatment

- Grade I & Grade II injuries
 - NONOPERATIVE
 - Early ROM
 - WBAT
 - Progression to strengthening
 - Functional hinged bracing
 - Return to Play as pain allows
 - Grade I – average of 10.6 days
 - Grade II average of 19.5 days

Treatment

- Grade III MCL injuries
 - Isolated – still trial of non-operative management
 - Recovery 10-12 weeks
 - Combined ACL/MCL injuries
 - Debate over early versus late ACL reconstruction
 - Early
 - Enhance knee stability for MCL healing
 - Late
 - Avoid risk of postoperative arthrofibrosis
 - Usually after 4-6 weeks bracing
 - Multiple Ligament injuries
 - Typically 4-6 weeks of bracing
 - ACL/PCL reconstruction
 - MCL reconstruction if valgus laxity persists

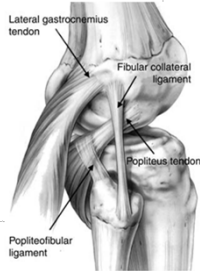
Lateral Knee Ligaments



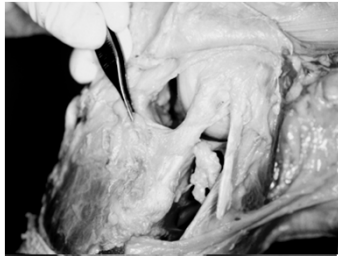
- Not just LCL
- Posterolateral Corner
- Isolated injuries are rare
 - <2% of all knee ligament injuries
 - 43-80% incidence of injury associated with ACL and/or PCL disruptions

Posterolateral Corner

- ⦿ LCL
 - Primary static restraint to varus
- ⦿ Popliteus Tendon
- ⦿ Popliteofibular ligament
- ⦿ Other stabilizers
 - IT band
 - Biceps femoris
 - Lateral knee capsule



Anatomy



PLC Biomechanics

- ⦿ Resist Varus Rotation
- ⦿ Primary stabilizer to external tibial rotation
 - Combined PCL/PLC injury shows greater external tibial rotation at 90deg
- ⦿ Secondary restraint to posterior tibial translation



Evaluation

History

- Blow to the anteromedial knee causing hyperextension
- Noncontact hyperextension, external rotation twisting injury
- Direct blow to a flexed knee
- High energy trauma
 - History difficult to elicit



Evaluation

Isolated injury is rare

- Often combined with PCL injury
- High index of suspicion for knee dislocation



Evaluation

Complete neurovascular assesment

- Popliteal artery
 - 25% injury incidence with knee dx
- Peroneal nerve
 - 30% injury incidence with knee dx



Evaluation

- Varus stressing at 0 and 30deg
 - Varus laxity at 0 = cruciate injury
 - Varus laxity at 30deg – isolated injury



Evaluation

- Dial Testing – assess external rotation
 - 30deg
 - 10deg difference reveals pathology to PLC
 - 90deg
 - Further increased rotation means PLC/PCL injury



PLC injury Classification

- Grade I
 - Sprain with little or no varus instability (0-5mm)
- Grade II
 - Partial injury with minimal laxity (6-10mm)
- Grade III
 - Complete disruption with significant laxity (>10mm)
- Must also grade rotational instability with dial testing
 - Many PLC injuries have significant rotational instability with minimal varus instability

Imaging

◎ Xrays

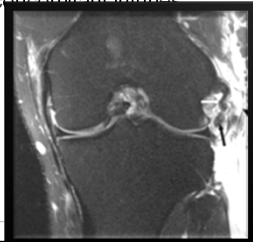
- Important to identify avulsion or tibial plateau fractures
 - Can be treated with early repair recognized early
- Standing hip/knee/ankle views essential to evaluate alignment in chronic cases



Imaging

◎ MRI

- Accurate visualization of LCL, popliteus, PFL
- Rule out concomitant injuries



Treatment

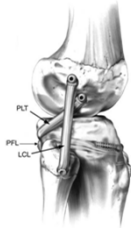
◎ Nonsurgical management

- Grade I and most Grade II injuries
- Grade II injuries
 - Recovery not as quick or predictable as MCL injuries
 - 4-6 weeks protected WB with brace
 - Can take 3-4mos for return to full activity
 - Residual laxity remains a problem

◎ Surgical Management

- Grade III injuries
- Multiple ligament injuries

Surgical Management



Early Repair vs Late Reconstruction

- After 2-3 weeks, capsular scarring and soft tissue stretching distort normal anatomy
 - Precludes ability to identify and repair anatomic structures of PLC
- Recent trend toward early reconstruction
 - Enables early aggressive therapy
 - Recent studies show significantly lower failure rate

Numerous reconstructive techniques

- Can be staged or performed simultaneously with cruciate ligament reconstruction

Summary

MCL

- Most commonly injured knee ligament
- Treatment is typically nonoperative
- Bracing is effective at preventing injury

PLC

- Isolated injury is rare
- Usually associated with cruciate injury/knee dislocations
- Surgery typically necessary in high grade and combined injuries

Thank you
