Collateral Ligament Injuries of the Knee

Hockey Injuries Breaking the Ice
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Sport Medicine Centre: From high performance sport and evidence based medicine to the whole community

Disclosure Information
TRIA Hockey Injuries: Breaking the Ice
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I have no financial relationships to disclose.

I will not discuss off label use and/or investigational use in my presentation.

Outline and Objectives

• Review
• Clinical characteristics (MCL)
  – History
  – Physical examination
  – Investigations (MRI)
• LCL
• Treatment Algorithms
• Hockey specific examples
• Questions
Review

• Sprain
  – Grade 1 or First degree sprain
    • Stretching of the ligament but not loose
  – Grade 2 or Second degree sprain
    • Partial damage to the ligament abnormal laxity
  – Grade 3 or Third degree sprain
    • Complete disruption of the ligament
• Not to be confused with “strain”
• Not to be confused with the physical examination

Review

• MCL
  – Typically refers to the superficial ligament that originates on the medial femoral epicondyle and attaches to the metaphysis of the tibia deep and distal to the pes
• LCL (Fibular collateral Ligament)
  – Lateral femoral epicondyle to the conjoined insertion, with biceps tendon on the fibular head

Review

• Extra-articular structures
• Therefore have the potential to heal
• Tightest in full extension
Review: Ligament Healing

- Three overlapping and sequential stages
  - Injury; Bleeding and inflammation
    - Hours to days to a few weeks
  - Cell proliferation and matrix production
    - Days to weeks to a few months
  - Matrix remodelling
    - Weeks to months to a few years

SCAR TISSUE

Clinical Characteristics

- Did they feel something “rip,” “pop,” or “tear”? If the answer is yes!
- Hockey three mechanisms
  - Goalie down in butterfly position
  - Direct blow to the knee with valgus force
  - Hit against the boards while bracing for the hit with the inside limb/skate
  - Land on inside edge...other

Physical Examination

- No hemarthrosis only secondary effusion
- May be bruising
- Valgus stress testing in 0° and 20-30° of flexion
- Compare to the other side
Physical Examination

• Point of maximal Tenderness (PMT) indicates where the injury has occurred

Physical Examination

• Alignment
  – Varus
  – Valgus
  – neutral

Physical Examination

• Valgus stress testing in 0° and 20-30° of flexion
• Compare to the other side
Physical examination

• Grading of Laxity
  – Grade 1
    • 0 mm to < 5 mm ssd
  – Grade 2
    • 5 mm to < 10 mm ssd
  – Grade 3
    • 10 mm or greater ssd
• End point assessment

Valgus Stress

• Knee is unstable to valgus stress in the fully extended position (0°)
  – You must look for an associated cruciate ligament injury!
• Knee is stable at 0° and opens at 20-30° < 5 mm ssd
  – The superficial MCL is damaged but not likely complete
• If opens > 5 mm ssd
  – Then likely complete superficial MCL tear

Valgus Stress

• What if the knee opens in flexion > 10 mm ssd?
  – Superficial MCL completely torn
  – Likely the deep MCL fibres (meniscotibial and meniscofemoral)
  – Possibly the posterior oblique ligament i.e. the posteromedial corner
  – Likely would open in full extension
MRI

- Knee injury clinic in Calgary (AKIC)
  - Last year we saw 2340 new knee injuries
  - MRI utilization was 10%

  - 100-200 new knee injuries
  - MRI utilization was 100%
Lateral Collateral Ligament

- Same principles apply to the LCL
  - Grading, extra-articular etc.
- Not nearly as common an injury
  - Usually associated with posterolateral corner and cruciate ligament injury
- Easy to palpate the entire ligament
  - Superficial structure, taught, pencil-like
  - Compare to other side

Lateral collateral ligament

- More difficult to assess relative laxity on Varus stress testing
  - Need to assess alignment
  - Particularly in the varus aligned knee
  - Poorer prognosis if missed
  - Classify
    - Mild
    - Moderate/severe
    - Complex

Treatment Algorithms

- Based on knee Alignment, abnormal laxity, pain and associated injuries
- Classification MCL sprain
  - Mild
  - Moderate
  - Severe
  - Complex
**Mild MCL Injury**

- Pain only
- Stable knee
- Symptomatic treatment
- Protection and prevention of re-injury

**Moderate MCL Injury**

- **Description:** The knee is stable with valgus stress in full extension but opens in flexion.
- **Management:**
  - Follow initial treatment protocol
  - Crutches protected weight bearing
  - Knee strengthening exercises
  - Knee (proprioception) balance exercises
  - Bracing optional depending on symptoms and activity
  - **Follow-up:** 2-week intervals to re-examine the knee

**Moderate MCL Injury * **

- * Follow severe MCL sprain bracing protocol if patient described a pop, rip or tear with their mechanism of injury or if they have valgus alignment.
Severe MCL Injury

- **Description:** The knee opens with valgus stress in full extension and greater in flexion in a neutral or varus aligned knee OR the knee is stable in extension but opens in flexion in a valgus aligned knee.

- **Management:**
  - Follow initial treatment protocol
  - Range of Motion (ROM) brace with 30° to 90° of motion worn 23.5 hours a day
  - **Follow-up:** 2 week intervals to assess range of motion and MCL healing.
  - **Management:** Based on quality of healing of MCL, adherence (compliance) with bracing and range of motion.
  - Return to sport

**Bracing Protocol**

- **23.5 hours per day at 30-90°**
- **Initial goal is to get the knee stiff**
  - Assess adherence with ROM
  - If they can straighten out their knee they have not been wearing the brace
- **Physical examination**
  - at 2 week intervals
Bracing Protocol

• Minimum Goal
  – Knee stable to valgus stress in full extension
  – Adjust brace accordingly
• 3-8 weeks return to play
• Functional knee brace for remainder of the season
• Think of future injury prevention

Complex MCL injury

• MCL + ACL
  – Bracing protocol for MCL
  – Then reconstruct ACL
• MCL + PCL
  – Brace in extension to ensure that the knee is reduced
  – Allow MCL to heal
  – Non-op Rx for PCL

LCL Treatment Algorithms

• Parallel the “MCL” algorithms; Adjust for Varus knee
  – Mild LCL no Laxity
    • Symptomatic Rx
    • Protection from re-injury
  – Moderate/severe LCL
    • Bracing protocol 30° to 90°
  – Complex LCL
    • Consider surgery
Treatment

• Role of Surgical treatment
  – Rare
  – Avulsions
  – Complex injuries
  – Patient who had delayed treatment of their collateral ligament injuries
  – Reconstruction usually with posterolateral corner

Hockey Examples

• Two players (Centre and Goalie)
• Injured 2 days apart
• Both had severe MCL injuries
  – MRI confirmed

Forward and Goalie

• How should they be treated?
  – Bracing protocol
  – Added treatment (PRP; Stem cells)
• When should they return to play?
• Protect with taping or bracing?
Summary

• MCL common injury in hockey

• Clinical
  – Mechanism of injury and physical exam
  – MRI not necessary for majority of patients

• Consider limb alignment
  – MCL in Valgus knee = severe
  – LCL in Varus knee = severe

Summary

• Adherence to Bracing protocol
  – Almost universally successful

• Adjuvant treatment with PRP or Stem cells not proven

• Surgery rarely required
  – Only in multiple ligament injured knees
  – Repair early
  – Reconstruct late