Weak in the Knees
Acute Knee Injuries

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DISCLOSURES

None of the planners or presenters of this session have disclosed any conflict or commercial interest.
OBJECTIVES

1. Discuss the anatomy of the knee and shoulder.
2. Discuss common injuries to the knee and shoulder including typical presentation and mechanism of injury.
3. Demonstrate and allow for audience participation in the examination of the shoulder and knee and discuss appropriate use of imaging.
4. Discuss operative and non-operative approaches for the management of these injuries.
Knee Anatomy

- Patellofemoral joint
  - Articular cartilage

- Tibiofemoral joint
  - Articular cartilage
  - Meniscus
  - Ligaments
Knee Anatomy

Ligaments:

- Anterior cruciate ligament (ACL)
- Medial collateral ligament (MCL)
- Posterior cruciate ligament (PCL)
- Lateral collateral ligament (LCL)
Knee Anatomy

- patella (knee cap)
- lateral collateral ligaments
- lateral meniscus
- articular cartilage
- medial meniscus
- medial collateral ligaments
- anterior cruciate ligament (ACL)
- posterior cruciate ligament (PCL)
- lateral meniscus
- medial meniscus

the right knee
Knee Anatomy
Articular Cartilage

- Normal
- Abnormal
Acute Knee Injuries

- When evaluating, timing is important
- Earlier is better
- Muscle spasm and swelling can make examination difficult
Acute Knee Injuries

- Mechanism of Injury
- Location of Pain
- Effusion
Meniscus Injury
Meniscus Injury

- Most common knee injury
- Bimodal distribution
  - Teenagers (usually with ACL tears)
  - Those who think they are teenagers (Older Crowd)
Meniscus Anatomy

- Healthy Meniscus
- Torn Meniscus
Meniscus Anatomy

- **Vascular Supply**
  - At horn attaches to the tibia
  - Outer 1/3 or meniscal rim
Meniscus Anatomy

- Vascular Supply
Meniscus Injury

- Episodic, sharp pain
- NOT a dull throbbing pain (articular cartilage pain)
- Worse with deep bending
- Mechanical symptoms
  - Don’t confuse with patellofemoral
Meniscus Exam

- Effusion
- Pain with hyperflexion
- Pain along joint line
- McMurray’s positive
- Ask them to squat or “duck
Meniscus Exam

- McMurray Exam

During a McMurray test, the examiner simultaneously extends and rotates the lower leg. When a "click" is felt or heard at approximately 90 degrees, the test is positive and a meniscal tear may exist.
Meniscus Tear MRI

- MRI to confirm PE
  - Tear pattern
  - Concomitant injury
Meniscus Tear
 MRI
Meniscus Tear-Treatment

- Surgical (arthroscopy)
  - Ability to repair based on tear pattern, size, location, blood supply
Anterior Cruciate Ligament Injury (ACL)
ACL Tear-Mechanism

- **Contact**
  - Hit from either side with rotation

- **Non-contact**
  - Deceleration, rotation, hyperextension
ACL Tear-History

- Hear a “pop”
- Immediate large effusion (1 hour)
- Unable to return to play
- Patient feels like knee shifts
ACL Anatomy
ACL Tear Examination

- Often limited by pain and guarding
  - Effusion
  - Hemarthrosis
  - Lachman
  - Anterior drawer
  - Pivot shift
ACL Examination

Lachman

- Most sensitive
- Knee in 30 degrees of flexion
- Hang heel off side of bed
- Stabilize femur with one hand
- Translate tibia with other hand
ACL Examination

- **Anterior Drawer**
  - Knee flexed to 80 degrees
  - Hamstrings are palpated
  - Proximal tibia moved anteriorly
  - Compare to contralateral knee
ACL Examination

- **Pivot Shift**
  - Hardest to do
  - Place a valgus stress
  - Internal rotation of foot
  - Flex knee beyond 30°
  - Should feel the tibia reduce from anteriorly subluxated position
ACL Tear - MRI
ACL Tear - MRI

bone bruise from direct impact of the 2 areas
ACL Tear- Treatment

- Generally surgical
  - Some exceptions
- ACL Reconstruction
ACL Reconstruction

- Patella Tendon
Posterior Cruciate Ligament Injury (PCL)
PCL Tear
History and Physical

- Blow to the anterior knee with the knee flexed
- Reports of instability are rare
- Large effusion, positive posterior sag
PCL Tear
Exam: Posterior Sag Sign
PCL Tear - MRI

- MRI to confirm diagnosis, check for concomitant ACL or posterolateral corner injury
PCL Tear - MRI

- Controversial
  - Young active patients
  - Avulsion injuries
- Most treated non-operatively
- Concomitant posterolateral injury requires surgery
Medial Collateral Ligament Injury (MCL)
MCL Injury

- Most common ligament injury
- Usually caused by hit to the outside of the knee (valgus force)
MCL Injury - History

- Patients often describe feeling something give, but not a true pop
- Painful to flex the knee
- Ask them to point to location of pain - often exquisitely tender over medial epicondyle
MCL Injury - Examination

- No or small effusion
- Tenderness medial epicondyle
  - Usually torn from femur
- Valgus stress testing
MCL Injury
Location of Pathology

- Femoral tear (65%)
- Tibial tear (25%)
- Joint line tear (10%)
- Combined tear (Occasional)
MCL Injury - MRI

- If questionable laxity
- Large effusion
- Rule out other ligament injury
MCL Injury - MRI

Normal Medial Collateral Ligament
MCL Injury - Treatment

- Almost always non-surgical
- 95% will heal with support
- With concomitant ACL injury usually do not need to fix MCL
MCL Injury - Treatment

- Treatment based on severity
  - Grade I: no brace, early rehab
  - Grade II: brace 2-3 weeks
  - Grade III: brace 4-6 weeks
MCL Injury - Treatment

- Average return to full activity
  - Grade I = 5 days
  - Grade II = 17 days
  - Grade III = 33 days
Patella Dislocation
Patella Dislocation

- Usually twisting injury with valgus stress
- May have abnormal alignment
- Tear of medial patellofemoral ligament
Patient describes kneecap out lateral

Usually have a HUGE effusion

- Won’t bend knee
- Tender medial epicondyle
- May be tender medial facet patella
Patella Dislocation
Exam: Mal-alignment
Patella Dislocation
Exam: Apprehension Test
Patella Dislocation
MRI
Patella Dislocation Treatment

- RICE
- Brace or tape to hold patella
- PT for quadriceps training
- Return to play after completing functional rehab / running program
Patella Dislocation Treatment

- 1st time dislocation treat non-operatively
  - 80% will heal

- MRI to look for loose fragments in the knee if persistent effusion
Patella Dislocation
Treatment

- Multiple dislocations will require operative treatment

- Each time patella dislocates, the articular cartilage can be injured on the femur or patella
Quadriceps Contusion
Quadriceps Contusion

- Direct blow to the thigh (quad)
- Hematoma in muscle
- Painful knee flexion
- Watch for compartment syndrome!
Quadriceps Contusion

Grade based on knee flexion at 24 hours

- Grade I: > 90 degrees
- Grade II: 45-90 degrees
- Grade III: < 45 degrees
Quadriceps Contusion Treatment

- Ice
- Keep knee maximally flexed
- +/- compression wrap
- NSAIDs controversial
Dreaded complication is myositis ossificans in quad muscle
- 9% incidence
- Higher when poor initial ROM, delayed treatment

Immobilization increases chance of it
- Early ROM
Iliotibial Band (ITB) Friction Syndrome
ITB Friction Syndrome
History and Physical

- Overuse injury
- Worse with increased activity
- Dull, throbbing pain
- No effusion
- Pain over lateral epicondyle
- Tight ITB
ITB Friction Syndrome
Differential Diagnosis

- Popliteus tendonitis
- LCL sprain
- Lateral meniscus tear
ITB Friction Syndrome Treatment

- Rest
- Ice
- Anti-inflammatory medication
- Ultrasound or massage therapy
- Stretching
- Gradual return to exercise
- Correct any biomechanical/training errors
Thank You!

Questions?