Pediatric Knee Pain: Diagnosis and Management

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Knee Pain

- Apophyseal injuries
- Patellar tendonitis
- Anterior knee pain
- Meniscal injuries
- Ligament injuries
- Articular cartilage injuries
Knee Anatomy

- **Bony Structure**
  - Femur
  - Patella
  - Tibia/Fibula

- **Ligaments**
  - Anterior Cruciate
  - Posterior Cruciate
  - Lateral Collateral
  - Medial Collateral
Knee Anatomy

- Soft Tissue Structures
  - Pes Bursa (Hamstring Insertion)
  - Quadriceps Tendon
  - Patellar Tendon
  - Iliotibial Band
History

- Traumatic vs Atraumatic evaluation
History - Traumatic

- Mechanism of Injury
  - Sport/Activity
  - Position of Knee
  - Contact or Non-contact

- Timing
- Swelling
- Stiffness
- Numbness
- Inability to bear weight
- Location of Pain
- Catching, Locking, Giving way
History - Atraumatic

- Timing of Symptoms
- Pain
  - Location
  - Activity
  - Rest
- Swelling
- Improvement
  - NSAIDs/Ice
  - Rest
- Catching, Locking, Giving way
## History

<table>
<thead>
<tr>
<th>Noncontact injury with “pop”</th>
<th>ACL tear</th>
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<tbody>
<tr>
<td>Contact injury with “pop”</td>
<td>MCL or LCL tear, meniscus tear, fracture</td>
</tr>
<tr>
<td>Acute swelling</td>
<td>ACL tear, PCL tear, fracture, knee dislocation, patellar dislocation</td>
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<tr>
<td>Lateral blow to the knee</td>
<td>MCL tear</td>
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<tr>
<td>Medial blow to the knee</td>
<td>LCL tear</td>
</tr>
<tr>
<td>Knee “gave out” or “buckled”</td>
<td>ACL tear, patellar dislocation</td>
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<tr>
<td>Fall onto a flexed knee</td>
<td>PCL tear</td>
</tr>
</tbody>
</table>
Physical Examination

- Inspection
- Palpation
- ROM
- Strength testing
- Special tests
Patella

Hollow

Indented
Medial Collateral Ligament (MCL)*

Pes anserine bursa**

Medial joint line
Lateral Collateral Ligament (LCL)**

Lateral joint line
Physical Examination

- Inspection
  - Alignment
  - Swelling
Physical Examination

- Palpation
  - Evaluate for an Effusion
Physical Examination

- Range of Motion
  - Extension
  - Flexion

- Strength Testing
  - Quadriceps
    - Straight leg raise
Physical Examination

- Ligamentous Evaluation
  - Lachman
Physical Examination

- Ligamentous Evaluation
  - Anterior Drawer
Physical Examination

- Ligamentous Evaluation
  - Posterior Drawer
Physical Examination

- Ligamentous Evaluation
  - Valgus stress
Physical Examination

- Ligamentous Examination
  - Varus stress
Physical Examination

- Meniscal assessment
  - Joint line tenderness
  - McMurray’s Test
  - Apley’s Grind Test
Radiographic Evaluation

- Always start with X-rays
Radiographic Evaluation

- MRI for acute knee injury with effusion/lack of motion
When is it a concern?

- Inability to straight leg raise
- Effusion or stiffness related to an injury
- Ligamentous laxity
- Catching, Locking, Giving way
- Inability to fully straighten the knee related to injury
Knee Pain

- Apophyseal injuries
- Patellar tendonitis
- Anterior knee pain
- Meniscal injuries
- Ligament injuries
- Articular cartilage injuries
Apophyseal Injury

- Secondary ossification centers where tendons insert
- Growth spurt: bones grow faster than muscle
- Overuse, training changes
- Symptoms
  - Pain
  - Swelling
Apophyseal Injury

- **Treatment**
  - Rest
  - Ice
  - Anti-inflammatory
  - Knee strap
  - Rehab
  - Correction of training errors
Patellar Tendonitis

- Inflammatory process at the lower pole of patella
- Typically caused by overuse
- Symptoms
  - Pain
  - Swelling
  - Difficulty with steps and walking on inclined surface
Patellar Tendonitis

- Treatment
  - Period of Rest
  - Ice
  - Anti-inflammatory
  - Knee strap
  - Injections
  - Rarely Surgery
Anterior Knee Pain

- Patellofemoral pain
- Runner’s knee
- Multi-factorial
- Females
- Symptoms
  - running
  - theatre sign
  - stairs
Anterior Knee Pain

- Treatment
  - Rest/activity modif
  - Ice
  - Anti-inflammatories
  - Physical Therapy
  - Knee sleeve
  - Rarely Surgery
Meniscal Injuries

- Extremely common
- Traumatic vs atraumatic
- Lateral vs medial
- Cartilage loss as we age leads to degenerative meniscal tears
- Symptoms
  - Pain with activity
  - Catching and Locking
  - Minor Swelling
Meniscal Injuries

- **History**
  - Traumatic
  - Twisting activity
  - Catching, Locking

- **Physical Exam**
  - Minimal swelling
  - Joint Line Tenderness
  - McMurray’s/ Apley’s +
Meniscal Injuries

- **Treatment**
  - Physical Therapy
    - Strengthening
    - Compensates for tear
    - Does not heal injury
  - Surgery
    - Meniscal repair
    - Mechanical symptoms
    - Recovery ranges from 4-8 weeks
Ligament Injuries

- Anterior Cruciate
- Posterior Cruciate
- Lateral Collateral
- Medial Collateral
ACL Injuries

- **Anterior Cruciate Ligament**
  - Resists anterior translation of tibia against femur
  - Low capacity for healing

- **History**
  - Injury – noncontact or contact
  - Swelling, Stiffness, Pain
  - Chronic – giving way, buckling of knee
ACL Injuries

- **Exam**
  - Lachman/Ant Drawer positive
  - Effusion
  - Chronic Tear – Pivot Shift

- **Radiology**
  - Xrays
  - MRI

- **Treatment**
  - Often times surgical for return to sport
  - 6-9 month recovery
PCL Injuries

- **Posterior Cruciate Ligament**
  - Prevents posterior translation of the tibia against the femur
  - Greater Capacity for healing

- **History**
  - Injury more often contact or with multi-ligament injuries
  - Swelling, Pain, Giving Way
PCL Injuries

- Exam
  - Posterior Drawer Positive
  - Positive Tibial Sag

- Radiology
  - Xrays
  - Mri

- Treatment
  - Low grade injuries – nonoperative
  - Grade III/Multi-ligament injuries - Reconstructed
Medial/Lateral Collateral Injuries

- Allow for medial and lateral stability
  - Good Healing potential
- History
  - Contact or Non-contact
  - Minimal Swelling
  - Medial/Lateral Pain
- Exam
  - Pain over origin/insertion of ligaments
  - Opening Varus/Valgus stressing (0/30 degrees)
- Treatment
  - Rest, Ice, Bracing, advancement of ROM
Articular Cartilage Injuries

- Can be Acute or Degenerative
- Difficult to Diagnose
- Symptoms
  - Pain, Catching
  - Swelling
  - Pain specific location/activity related
Articular Cartilage Injuries

- **Radiology**
  - Xrays/MRI (Cart Seq.)

- **Treatment**
  - Nonoperative
    - Rest, Ice
    - Compression
    - PT
  - Operative
    - Microfracture
    - OATS
    - Carticel
    - Osteochondral Allograft