Chapter 6
Assessment of Acute Knee Injuries

Objectives
- Discuss the common forces that produce acute injuries
- Identify and discuss the common acute injuries to the knee
- Review the following components of injury assessment related to the acute knee injuries
  - Mechanism of injury
  - Signs
  - Symptoms
  - Stress tests
  - Special tests

Forces Acting on the Knee to Produce Acute Injuries
- Compressive
- Tensile
- Shear
- Rotational

Common Acute Knee Injuries
- Sprain
- Strain
- Meniscal injury
- Chondral lesion
- Fracture
- Dislocation

Common Chronic Knee Injuries
- Tendinitis
- Bursitis
- Osgood-Schlatter disease
- Sinding-Larsen-Johansson disease
- Iliotibial band syndrome
- Baker’s cyst
- Osteoarthritis

History

<table>
<thead>
<tr>
<th>Location of pain</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>Patellofemoral syndrome</td>
</tr>
<tr>
<td></td>
<td>Patellar/quadriceps tendinitis</td>
</tr>
<tr>
<td></td>
<td>Osgood-Schlatter disease</td>
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<tr>
<td></td>
<td>Sinding-Larsen-Johansson disease</td>
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<tr>
<td></td>
<td>Degenerative joint disease (OA)</td>
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<tr>
<td></td>
<td>Osteochondral defect (OCD)</td>
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</tbody>
</table>

Anterior
History

<table>
<thead>
<tr>
<th>Location of pain</th>
<th>Differential Diagnosis</th>
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</thead>
<tbody>
<tr>
<td><strong>Medial</strong></td>
<td>MCL sprain</td>
</tr>
<tr>
<td></td>
<td>Medial meniscus tear</td>
</tr>
<tr>
<td></td>
<td>Pes anserine bursitis/tendinitis</td>
</tr>
<tr>
<td></td>
<td>OA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location of pain</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lateral</strong></td>
<td>LCL sprain</td>
</tr>
<tr>
<td></td>
<td>Lateral meniscus tear</td>
</tr>
<tr>
<td></td>
<td>Iliotibial band syndrome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location of pain</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Posterior</strong></td>
<td>Meniscal tears in the posterior horns</td>
</tr>
<tr>
<td></td>
<td>PCL tear</td>
</tr>
<tr>
<td></td>
<td>Baker’s cyst</td>
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<tr>
<td></td>
<td>Popliteus tendinitis</td>
</tr>
</tbody>
</table>

- **Mechanism of injury**
  - Direct blows $\Rightarrow$ fx, dislocation, MCL/LCL/ACL/PCP tears
  - Pivot injury $\Rightarrow$ patellar dislocation, ACL tear, meniscus injury
  - Non-contact deceleration injury $\Rightarrow$ ACL tear

**History**

- Acute vs. chronic
- Locking?
- Instability?
- Recent treatment
- Previous injury/previous treatment

**Observation**

- Deformity
- Effusion
  - Large effusion $\Rightarrow$ ACL tear, intraarticular fx, peripheral meniscal tear
  - 4-12 hours: ACL tear
  - 12-36 hours: meniscal tear
Observation

- Knee alignment
- Genu valgum
- Genu varum
- Genu recurvatum
- Muscle asymmetry or atrophy

Observation

Palpation

- Anterior
  - Patella
  - Patellar tendon
  - Quadriceps tendon
  - Joint line
  - Tibial tubercle

Palpation

- Medial
  - MCL
  - Meniscus
  - Pes anserine tendons
  - Pes anserine bursa
  - Medial femoral condyle
  - Medial facet of patella
  - Medial retinaculum

Palpation

- Lateral
  - LCL
  - Lateral meniscus
  - Iliotibial band
  - Gerdy's tubercle
  - Lateral femoral condyle
  - Lateral retinaculum
Palpation
- Posterior
  - Hamstring tendons
  - Posterior joint line (posterior horns of menisci)
  - Popliteal fossa

ROM
- Flexion
- Extension

Stress Tests
- Valgus
- Varus
- Lachman
- Anterior drawer
- Posterior drawer
- Slocum rotary drawer

Valgus Stress Test
- 30° flexion
- Full extension

Varus Stress Test
- 30° flexion
- Full extension

Lachman & Anterior Drawer
- Anterior Drawer
- Lachman
Slocum Rotary Drawer
- Foot in internal rotation
  - Posterior lateral instability
- Foot in external rotation
  - Posterior medial instability

Posterior Drawer

Special Test
- Posterior sag (Godfrey’s)
- Pivot shift
- McMurray
- Apley’s compression & distraction

Posterior Sag (Godfrey’s)

Specific Knee Injuries
- Acute Ligamentous Injuries
- Meniscal Injuries

MCL Sprains
- History
  - MOI
- Signs
- Symptoms
MCL Sprains

- Observation
- Palpation

MCL Sprains

- Stress tests
- Special tests

MCL Sprains

- Stress tests
- Special tests

MCL Sprains

- Management
  - 1st degree
    - PRICE
    - NSAIDs
    - Early ambulation is recommended (use crutches if patient walks with limp)
    - Early ROM
    - Strengthening (closed chain)
    - Usually out for 1-2 wks
    - Should be protected when returned to play

MCL Sprains

- Management
  - 2nd degree
    - PRICE
    - NSAIDs
    - Hinged brace
    - Crutches w/PWB when necessary
    - Early ROM
    - Strengthening (closed chain)
    - Usually out for 3-4 wks
    - Should be protected when returned to play

MCL Sprains

- Management
  - 3rd degree
    - PRICE
    - Knee immobilizer
    - Crutches - NWB
    - NSAIDs
    - Usually out for 6 wks or longer
    - Must be protected when returned to play
LCL Sprains

- **History**
  - MOI

- **Signs**

- **Symptoms**

Arcuate Ligament Complex

LCL Sprains

- **Stress Tests**

- **Special Tests**

LCL Sprains

- **Management**
  - Similar to MCL sprains
  - May heal slower to different collagen structure of ligament

ACL Sprains

- **Females are 2-8 times more likely to tear their ACL than their male counterparts.**
- **72% are non-contact mechanisms**

ACL Sprains

- **MOI**
  - Foot strike with knee near full extension
  - Sudden deceleration
  - Landing
  - Rapid change in direction

What sports are associated with a high frequency of landing, deceleration, and rapid change of direction?
ACL Sprains

■ MOI

The “position of no return”


Predisposing Factors

■ Intrinsic
  ■ Anatomical
  ■ Arthrokinematic
  ■ Hormonal factors

Predisposing Factors

■ Extrinsic
  ■ Position of no return
  ■ Muscle strength & conditioning (quad to ham ratios)
  ■ Neuromuscular factors
    ■ Recruitment
    ■ Less joint stiffness
    ■ Longer electromechanical delay

ACL Research: Landing & Cutting Mechanics

■ Females tend to land with less knee flexion and less internal rotation.

ACL Research: Landing & Cutting Mechanics

■ Females take less time to reach full knee flexion.
  ■ Not attenuating force
ACL Research: **Landing and Cutting Mechanics**

- Females land with more knee valgus (knocked knees) in vertical and backward stop-jump tasks.

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ACL Sprains

- **Signs**
  - Hemarthrosis (within 4-12 hours)
- **Symptoms**
  - Patient reports a “pop”
  - Pain (extreme at first)
  - Patient may report “giving way of knee”

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ACL Sprains

- **Stress Tests**
- **Special Tests**

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ACL Sprains

- **Management**
  - Initial
    - PRICE
    - NSAIDs
    - Crutches – PWB
    - Hinge brace

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ACL Sprains

- **Management**
  - Surgical options
    - Autografts (taken from the patient’s body)
      - Bone-patellar tendon-bone
      - Semitendinosus/gracilis tendons
    - Allograft (taken from cadaver)
      - Patellar tendon
      - Achilles tendon

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PCL Sprains

- **Anatomy**
PCL Sprains

- MOI

Knee Sprains in Adolescents

- Remember that epiphyseal fxs may mimic knee ligament sprains

PCL Sprains

- Signs and Symptoms

PCL Sprains

- Stress Tests

- Special Tests

PCL Sprains

- Management

Meniscal Injuries

- Function of menisci?
Meniscal Injuries

- MOI
- Signs
- Symptoms
- Stress tests
- Special tests

Meniscal Injuries

Other types of tears

Flap tear

Meniscal Injuries

Management?
Meniscal Injuries