Acute Knee Ligament Injuries in Athletes

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Acute Knee Dislocations

- Uncommon, but... May be underdiagnosed
- If knee opens up to varus/valgus stress testing in extension, assume a knee dislocation
- Direction of dislocation
  - Anterior: hyperextension mechanism
  - Posterior: direct blow anterior proximal tibia
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KNEE

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Knee Dislocation

- Happens on fields – not often, but:
- Don’t miss
- Assess vascular status
  - Physical exam
  - Pulse ratios
  - MRI scan
  - Arteriogram
Marcus Lattimore, running back, MOI: South Carolina vs. Tennessee
Knee dislocation ACL/PCL/MCL tears
Skin only stabilizing medial side of the knee
Medial meniscus
Knee Unstable in Extension...
Willis McGahee, Univ. of Miami 2003

NFL Football
Left Knee Contact MOI
Instabilities

- Anteromedial rotatory instabilities (AMRI)
- Combined AMRI and ALRI
- Anterolateral rotatory instabilities (ALRI)
- Straight posterior
- Posterolateral rotatory instabilities (PLRI)
- Combined ALRI and PLRI
- Straight instabilities
Knee Dislocations

- Most knee dislocations reduce spontaneously
- Refer to center with vascular surgeon
- Communicate with ER
  - Use your cell phone to call the ER
  - Put a note on the patient
  - Transfer to facility with angiography suite and vascular surgeon on call
- If high suspicion, do arteriogram
Vascular Injury

Arteriogram Gold Standard

Injury ranges from:
Thrombus
Tear:
Intimal
Partial
Complete

Late Vascular compromise from:
Thrombus
Propagation of Intimal Tear
**History**

- 16YO white male, high school football player
- Football game, valgus twisting blow to body injury
- Unable to keep playing
- Evaluated on sideline, seen in ER
- Seen in office 3 days later
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[Diagram of knee anatomy with labeled structures: Sartorius, Superficial medial ligament, Deep medial ligament, Gracilis, Semitendinosus, Gastrocnemius medial head, Meniscofemoral lig., Tibial collateral lig., Medial meniscus, Meniscotibial lig., Femur, Semimembranosus, Tibia]
Surgery: Arthroscopy
Surgery: MCL Repair
Gymnastics
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ACL Tear
Basketball
Basketball
Basketball: non-contact, unexpected, not thinking
Knee Instability

Diagnosis

1+

Involved Anatomic Structures

ACL
Lateral Capsule

Antero-Lateral Rotatory Instabilities (ALRI)
Knee Instabilities

ALRI

1+ ALRI

2+ ALRI

ANTERIOR

LATERAL

MEDIAL

POSTERIOR

LATERAL

ANTERIOR

POSTERIOR
EUA:
Correlate mechanism of injury, anatomy, surgical findings to study design in the lab
Pivot Shift
Lateral tibial plateau internally rotating, anteriorly subluxing at 30 to 0 degrees
Medial compartment: compressive forces posterior medial meniscus, typical tear pattern vertical, posterior
Injury Mechanisms – Body Positions

**POSITION OF SAFETY**

**MUSCLE ACTIVITY**

**BODY ALIGNMENT**

**BACK**
- Normal lordosis

**HIPS**
- Flexed
  - Neutral Abduction/Adduction
  - Neutral Rotation

**KNEE**
- Flexed

**TIBIAL Rotation**
- Plantar Flexors

**LANDING PATTERN**
- Gastrocnemius
- Posterior Tibialis

**POSITION OF NO RETURN**

**MUSCLE ACTIVITY**

**BODY ALIGNMENT**

**BACK**
- Forward flexed, rotated opposite side

**HIPS**
- Adduction
  - Internal Rotation

**KNEE**
- Less flexed, valgus

**TIBIAL Rotation**
- Dorsiflexors

**LANDING PATTERN**
- One foot Out of Control
- Unbalanced

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UK HealthCare Sports Medicine
Team Handball

Olsen OE,
Myklebust G,
Engebretsen L,
and Bahr R,
ACL Injury occurred,
Foot fixed and externally rotated
Wide stance, 15° knee flexion,
20 ° valgus, tibia IR 10 °
ACL injury occurred
Foot fixed and externally rotated, knee 20°, tibia ER 10°, valgus 10°

Off-balance, in the air
Soccer
Knee Instabilities

1+ PLRI
Combined ALRI and PLRI

Antero-Lateral Rotatory Instabilities (ALRI)
Normal Knee Exam: PCL Exam
PCL – 22 YO Offensive Lineman
**PCL**

- **Mechanism**
  - Low velocity – sports blow to anterior tibia, foot plantarflexed

- **Exam**
  - Grades I-II-III based on relation to medial femoral condyle
  - Assess collateral ligaments
    - Most commonly posterolateral instability
    - Greater tibial external rotation

- **Acute reconstruction**
  - Knee dislocation
  - Grade III collateral ligament injuries
Sideline Assessment of Injuries

To Make the Diagnosis:

Use observation of mechanism, physical exam skills, and talk to the athlete
Non-contact ACL tear, professional football athlete

Injuries occur at all levels of talent and experience

Jerry Rice
Who is driving the sideline decision and return to play train?

Trainers

Young Athletes

Coaches

Parents

Docs
ACUTE KNEE LIGAMENT INJURIES IN ATHLETES

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