Anterior Cruciate Ligament Injury
Case

- 31yo M who sustained an injury to L knee while playing Basketball approximately 2 weeks ago. He describes pivoting and hyperextending his knee, which swelled over the next few days. He now presents to clinic with pain on pivoting.
- L Knee PE on presentation:
  - 2+ L knee effusion.
  - Skin intact.
  - Active range of motion 0-120 degrees.
  - Increased pain with flexion past 120 degrees.
  - Severe tenderness to palpation over medial joint line down to posterior horn of medial meniscus.
  - Stable to varus and valgus stress, with pain on varus stress localized over medial meniscus.
  - Lachman negative – inadequate test because of significant patient guarding.
  - Posterior drawer negative.
  - Positive McMurray.
  - Positive Apley.
  - Soft and compressible L calf compartment.
  - Normal toe flexion and extension.
- Rest of PE WNL.
Differential Diagnosis

- Ligament injury:
  - Knee dislocation
  - Cruciate injury
  - Collateral injury
- Meniscal injury
- Patellar injury
- Fracture
Normal Knee Anatomy

- Femur
- Patella
- Posterior cruciate ligament
- Anterior cruciate ligament
- Meniscus
- Meniscal ligament
- Tibia

Other labels include:
- Electrolyte balance
- Anterior cruciate ligament
- Posterior cruciate ligament
- Medial collateral ligament
- Lateral meniscus
- Lateral collateral ligament
- Medial meniscus
- Semitendinosus, Gracilis, Sartorius tendons
- Anserine bursa
- Tibial tuberosity
Normal ACL Function
Normal Knee Plain Films

- Lateral view: adult
- Anterior-posterior view: adult

- Femur
- Fibula
- Patella
- Tibia
Normal Knee MRI
Typical ACL Injury

- Non-contact injury occurs in 70% of cases.
  - Running or jumping with sudden deceleration and direction change, or pivoting while rotating or lateral bending (valgus stress).
- Contact injury
  - Lateral blow leading to hyperextension or lateral stress while foot is planted.
In pictures...

**Culprit sports:**
Alpine skiing
American football
Rugby
Basketball
Soccer
Gymnastics
Tennis.
Closer look...
Classical Plain Film

Findings

- Segond Fracture: avulsion fracture of anterolateral tibial plateau at the site of attachment of the lateral capsular ligament.

- Avulsion fractures from femoral or tibial ACL attachments.
Continued...

- Deep Sulcus Sign: Lateral femoral condylar sulcus > 1.5mm

- Anterior translation of tibia (not shown).
Classic MRI Findings

- Irregular/wavy ACL contour with decreased angulation.
- Widespread increased signal intensity on the region of ACL (all sequences).
- Posterior displacement of lateral meniscus.
- Loss of normal curvature with increased angulation of PCL.
- Undulation of patellar tendon.
- Medullary osseous contusions of posterolateral tibial plateau and tibial spines.
Back to our case...
Radiologic Results

- Plain Films
  - Moderate joint effusion.
  - ?Deep sulcus sign.

- MRI
  - Acute full thickness L knee mids Substance ACL tear w/ moderate joint effusion and bone contusions in lateral femoral condyle and lateral tibial plateau.
  - Medial meniscocapsular injury with medial tibial plateau edema.
  - Posterolateral soft tissue and posterior capsule edema suggesting sprain.
Case Plain Films
Case MRI – T1
Case MRI - T2
10-Day Follow-Up...

- Patient returned with increased ability to bear weight and reduced pain.
- Repeat L knee PE:
  - Markedly diminished effusion.
  - Positive anterior draw and Lachman (no guarding).
  - Persistent tenderness over lateral femoral condyle.
  - Calf is soft and non-tender.
  - Good motion from 0 to 130 degrees.
- Patient referred to Orthopedic Sports for assessment by knee specialist (surgery vs. non-surgical management)