Clinical Knee Exam
Goals & Objectives

1. Review the anatomy of the knee
2. Practice your hands-on skills
3. By the end of the workshop:
   - Be able to categorize knee injuries
   - Understand the significance of an effusion
   - Realize the importance of the history towards making a diagnosis in knee pain
   - Describe an interesting feature found while examining the knee of your partner (limited to the knee)
Systematic Approach to Joint Examinations

- Inspection
- Palpation
- Range of Motion
- Strength/Stability Testing
- Special Tests
Inspection of the Knee

- Swelling or Effusion
- Redness, Ecchymosis, Scars, Abrasions
- Patellar position (alta or baja)
- Symmetry of Quad muscles
- Leg alignment (straight, bowed, knock-knee)
- Leg length
Inspection
Inspection
Patellofemoral Anatomy

- Functions as main extensor of the knee

- Factors that affect its ability to function:
  - 1. Alignment (Q-angle)
  - 2. Rotation:
    » (femoral anteversion)
  - 3. Quad strength:
    » stabilizes patella
  - 4. Hamstring flexibility:
    » decreases forces across joint
  - 5. High Impact Activity
    » Increases force across joint

\[\text{Patello-Femoral Pain}\]
Knee Extensors and Flexors

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Palpation of the Knee

• Warmth
• Effusion
• Tenderness (systematic palpation)
  – Tendons: patellar & quadriceps
  – Bursa: prepatellar & pes anserine
  – Joint lines: meniscus
  – Bones: tubercles & patella
  – Soft tissues: plica & patellar retinaculum
• Crepitus (with ROM)
Knee Bursa and the Plica

Right knee in extension

- Vastus intermedius muscle
- Vastus lateralis muscle
- Iliotibial tract
- Lateral patellar retinaculum
- Lateral condyle of femur
- Fibular collateral ligament and bursa
- Biceps femoris tendon and bursa
- Broken line indicates bursa under iliotibial tract
- Insertion of iliotibial tract to Gerdy’s tubercle and oblique line of tibia
- Common peroneal nerve
- Head of fibula
- Peroneus longus muscle
- Extensor digitorum longus muscle
- Tibialis anterior muscle
- Femur
- Articularis genus muscle
- Vastus medialis muscle
- Quadriceps femoris tendon
- Patella
- Medial condyle of femur
- Medial patellar retinaculum
- Tibial collateral ligament
- Semitendinosus, Gracilis and Sartorius tendons
- Pes anserinus
- Anserine bursa
- Patellar ligament
- Tuberosity of tibia
- Gastrocnemius muscle

Patella
Plica
Range of Motion of Knee

• Normal ROM: 0 to 135 degrees
  • check for decreased ROM or hyperextension

• Assess patellar tracking
  • feel for crepitus
  • pain with ROM?

• Assess Quad tone for symmetry
Ligament Injuries

- You have to have mechanism of injury!
Knee Ligaments

- Medial Collateral (MCL)
- Lateral Collateral (LCL)
- Anterior Cruciate (ACL)
- Posterior Cruciate (PCL)
Medial/Lateral Ligament Testing
ACL Testing
(Anterior drawer & Lachmans)
PCL Testing
(Posterior Drawer and Sag Sign)
Knee Meniscus
McMurray’s & Apley’s Grind
Effusion associated with Injury

• **Acute**: 1-2 hrs
  – Bleeding occurring within the joint (hemarthrosis)

• **Subacute**: 24hrs
  – Reactive effusion or slow bleeding
    • Small meniscal tear
    • PCL injury

• **DDx of Acute Hemarthrosis:**
  • 1. Bone (fracture)
  • 2. Meniscus (peripheral tear)
  • 3. ACL injury
  • 4. Patellar dislocation

• **Redness/Warmth**
  – Without trauma
    • Infectious
    • Inflammatory
      – Gout
      – Systemic Inflammatory disease
Categorizing Knee Conditions

• 1. **Overuse Knee Pain** (insidious onset)
  – Patellofemoral pain syndrome
  – Patellar or Quadriceps tendonitis
  – Plica syndrome
  – Pes Anserine bursitis
  – Ilio-Tibial Band syndrome

• 2. **Meniscal Injury**
  – Acute traumatic (twisting injury)
  – Chronic degenerative (sudden worsening of DJD)
    • Reactive effusion usually present
Categorizing Knee Conditions

• 3. **Ligamentous Injuries** (traumatic)
  - MCL: blow to outside of knee
  - ACL: deceleration and rotation or hyperextension
  - LCL: blow to inside of knee
  - PCL: dash board injury or landing on hyperflexed knee

• 4. **Bony Injury**
  - DJD (chronic insidious)
  - Osteochondritis dessicans (adolescents)
  - Fracture (high velocity trauma)
Symptoms associated with knee injury

- **Catching or Locking**
  - Symptoms associated with meniscal tear
  - Can happen with loose bodies in the knee due to OCD

- **Giving way**
  - Go to ground
    - Associated with pivoting
  - Unstable knee due to:
    - ACL tear (primarily)
    - Patellar subluxation

**Pseudo-giving way**
- Reflex inhibition of the quad muscle
  - Spinal reflex
  - Secondary to acute pain
  - Shuts off quadriceps muscle momentarily
  - You don’t go to ground
- Can occur with
  - Patellofemoral pain
  - Meniscal tears
Case #1

- 42 yo PE teacher c/o posterior medial knee pain.
  - Racing a student in the shuttle run 3 days ago
  - Noticed some swelling the following day
  - It’s painful to walk and he is unable to squat down due to pain
  - Feels stiff
  - Denies catching or locking or giving way
Case #2

- 28 yo female c/o knee pain
  - Recently started running again
  - Pain is worse after running and walking up steps
  - Pain is generally around her knee cap
  - Denies swelling, locking or catching
  - Feel popping underneath her knee cap
Case #3

- 26 yo female playing softball
- Ran to catch a pop fly
- As she changed directions she felt a pop and pain in her knee then fell
- Had to be helped from the field
- Noted significant swelling within an hour
- Presented one week later due to it “not feeling right”
Case #4

- 34 yo female involved in front impact MVA
  - C/o severe knee pain immediately after the impact
  - Can’t recall what happen
  - Had swelling almost immediately
  - Unable to bear weight
  - Xrays were negative for fracture

  - At follow up
  - C/o severe pain with wt. bearing
  - Still with large effusion
  - Unable to examine due to pain and effusion
  - Very limited ROM
Case #5

- 58 yo male was walking up steps
  - Felt a pop in his knee and immediate pain
  - Had to limp back to his office
  - Continued to have pain the following day on medial side
  - Also noted some swelling
  - He thinks he tore his ACL
  - He wants an MRI