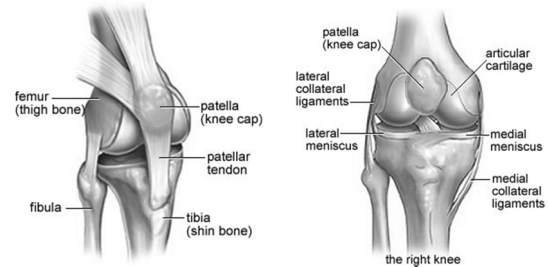


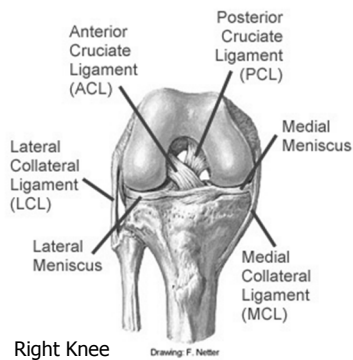
Sports Medicine & Ambulatory Orthopedics

- By the end of this session, you will:
 - Understand the anatomical and mechanical factors of knee injuries
 - Become familiar with the common presenting complaints
 - Learn to use appropriate history and physical exam skills to evaluate patients with common knee problems

Anatomy

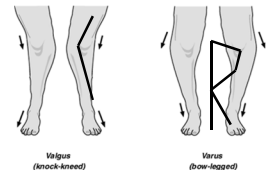


Knee Anatomy



PE Knee – general points

Valgus – Knock Knees
Varus – Bow Legged



Strain – injury to a muscle
Sprain – injury to a ligament

Degree of Sprain	Injury
1 st	Stretching of ligament
2 nd	Stretching of ligament with partial tearing
3 rd	Complete tear of ligament

Approach to Knee Examination

- I. History
- II. Observe: Effusion
- III. Palpation
- IV. ACL/PCL Evaluation
- V. Mensical Evaluation
- VI. Collateral Ligament Evaluation
- VII. Consider:
 - ITB, Anserine Bursa, Patella, L4, Hip

I. History

- Mechanism of Injury:
 - Timeline of pain and swelling
 - History of Trauma or injury
 - New Activities
 - Location of pain (MED/LAT, Patellar)
 - Timing of Pain Onset: New Activities
 - Modifiers: WORSE- ↑ ↓ Stairs

DDX of Acute Knee Pain

- Meniscal Injury
- ACL/PCL Injury
- Med/Lat Collateral Injury
- Anserine Bursitis
- Iliotibial Band Syndrome
- Patellar Dysfunction

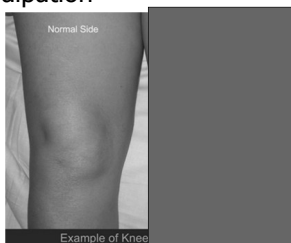


II & III. Physical Exam



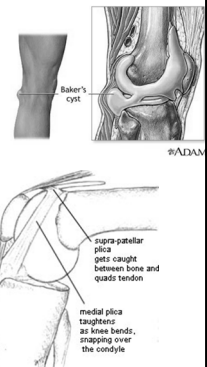
II & III. Physical Exam Acute Effusion

- Observe: Effusion ACL/PCL Injury (< 2 Hr)
- Palpation Meniscal Injury (> 2 Hr)



Chronic Effusion

- DDX: Baker's Cyst, Meniscal Damage, Plica
- Baker's Cyst
 - Synovial Irritation
 - Increase in Synovial Fluid
 - OA, Meniscus tear
- Plica: embryonic synovial remnant; Medial common



IV. Lachman's Test ACL/PCL Injury



Lachman's Test: Normal



Lachman's Test: Abnormal



Anterior/Posterior Draw



Anterior/Posterior Draw: Normal



Anterior/Posterior Draw: Abnormal



V. McMurray's Test for Meniscal Injury



Medial Meniscus



Lateral Meniscus

•Medial Meniscus (Opposite foot rotation)

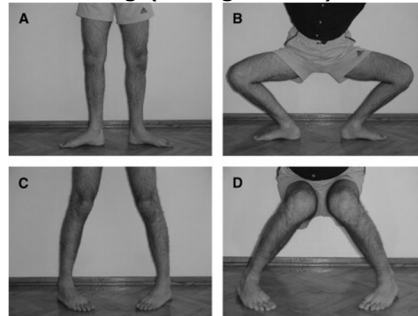
- Valgus stress & external rotation of foot
- Extend knee.
- Audible or palpable snap during extension → + MM Tear

•Lateral Meniscus

- Varus stress & internal rotation of foot
- Extend knee → +LM Tear

McMurray's Test: Mensicus

- Supine
- Standing (aka Ege's Test)



VI. Collateral Testing

- Hx: Clipping Injury
- Patient Supine, Knee flexed at 10-20 degrees,
- Apply Medial (vaRus) force to test Lateral Collateral Ligament,
- Apply Lateral (vaLgus) force to test Medial Collateral Ligament
- (+) Pain or laxity



Approach to Knee Examination

- I. History**
- II. Observe: Effusion**
- III. Palpation**
- IV. ACL/PCL Evaluation**
- V. Meniscal Evaluation**
- VI. Collateral Ligament Evaluation**

VII. Other: ITB, Anserine Bursa, Patella, L4

Case # 1 "I Felt a Pop"

- 22 yo female basketball player made a cut during practice and felt a "pop" in her knee with sharp pain.
- Significant knee swelling over 2 hours
- Over the last week the swelling has gone down
- She notes it feels like it "gives way"

ACL Injury

- Foot planted, rotary injury
- **Pop**
- Swell within first 2 hours
- Sense leg is ***lax***
- **+ Ant. Draw or Lachman**
- Evaluation: Plain Xrays
 - MRI if Surgical Candidate
- Treatment:
 - Effusion Drainage
 - Repair: Transplant or Just Rehabilitation

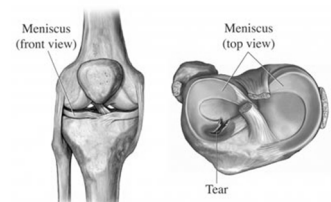


Case #2. Lateral Knee Pain

- 44 year old male playing pick up basketball with some friends
- Doesn't recall any injury, but **next day** noted some swelling and pain over the lateral knee
- "Hurts to go down stairs"

DX: Meniscus Injury

- Rotary Injury
- Unilateral Pain
- May feel "Locking"
- **Pain ↓ stairs**
- **+ McMurry, EGE**

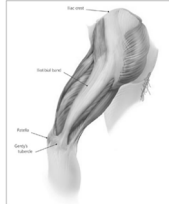


- Eval: X Rays
- Tx: Rehab; Surgery if rehab fails or young
- Caveat: With edema comes atrophy of the VM

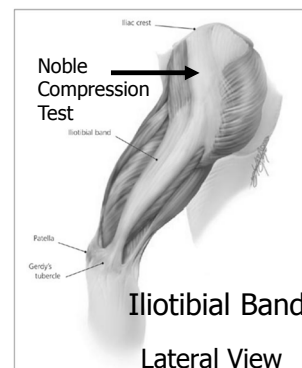
Palpate Joint Line & Below: **Lateral Knee Pain**



- **Ilio-tibial (Friction) Band Syndrome ???**
- Most common cause of Lat Knee pain in Runners
- Sloping road (Right in US)
- Insidious Onset with Running
- Evolves to pain with ADL
- Tx: Run Flat Surface
- Ice Massage, NSAIDs



VI. Other: Iliotibial Band Syndrome



Case 3: "Time to get in Shape"

- 53 year old male decides its time to get into shape; runs 3 miles first day out
- Presents next day with Medial Knee pain that seems *worse at rest*
- Does not recall any trauma or pain with the run

Anserine Bursa

- New Activity
- Medial Pain
- Pain at Rest
- Tight Hamstrings
- ? Related to DJD



Attachment of insertion of tendon formed by Gracilis, Sartorius, & Semitendinosus Tendons

Pes Anserine Bursitis

- Diagnosis: History and PE
- Evaluation: No X Rays needed
- Treatment:
 - NSAIDS, Ice Massage
 - Rehab after acute injury
 - Patient Education about new activities

Case #4: *Hot Knee*

- 74 year old male presents with an acutely swollen, painful knee. No history of trauma, no new activities.
- "Hurts all over"
- Had too much Shrimp and wine at last night's social



Case #5: 50 year old Male

- No Recent Injury
- Knee Swells by end of day
- Very stiff and hard to walk when 1st OOB
- Hx: recurrent trauma/surgeries

Osteoarthritis Medial > Lateral

6 commonly found Issues:

1. >50 years of age;
 2. Morning stiffness < 30 minutes
 3. Crepitus
 4. Bony tenderness
 5. Bony enlargement
 6. No Erythema
- X-rays (Wt Bearing): decrease joint space, osteophyte.
 - MRI: If considering surgery; Meniscal tears common; unclear if clinically relevant

Noises of the Knee

- "Crepitation", "Clicking", "Grinding", Popping, and "Snapping" sounds.
- Associated with:
 - osteoarthritis,
 - patellofemoral syndrome,
 - meniscal tears and
 - iliotibial band syndrome.

Osteoarthritis: Treatment

1. Analgesic:
Acetaminophen 1 Gm TID, NSAIDs & GI protection... Glucosamine?
2. Rehab: PT, Non-Wt Exercise, Wedge Insert
Water Aerobics; Appl Nurs Res. 2010 Dec 28.
3. Weight Loss
4. Steroid Injection ???
5. Off Loading Brace
6. Invasive/Arthroscopic/ Replacement

Jordan KM; Ann Rheum Dis 2003 Dec;62(12):1145-55

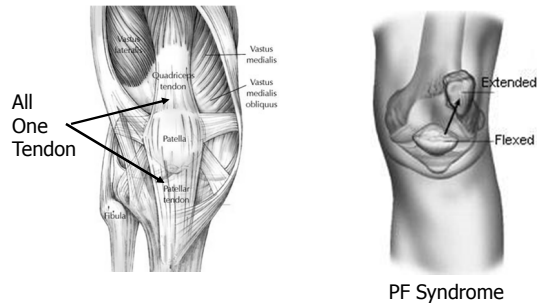
Case: #6. 15 y/o Female Volleyball Player

- No History of Trauma or acute pain
- Insidious Onset Generalized pain
- Now Pain w/ Flexion of Knee
- First, only with sports, now with walking, going up and down stairs

Generalized Knee/Patellar Pain

1. **Patello-Femoral Syndrome**
 - Proximal/Generalized Patellar Pain
 - 2° Quadriceps Dysfunction
 - Tight ITB & Weak VMO: Patella track **laterally** and compresses into the lateral femoral condyle.
2. **Jumper's Knee**
 - Distal Patellar Pain
 - Distal Patellar Tendon Inflammation 2° Tight Hamstring and Quadriceps

Patellar Tendon Anatomy



Dx: Anterior & Generalized Knee Pain

- **Patello-Femoral Syndrome:**
- **Patellar Grind Test:** applying **gentle** downward pressure w/leg extended & VMO CTX
- **Lateral Patellar Glide Test:** laterally directed pressure to patella of extended leg & VMO CTX
-Contraction of quadriceps and/or pain implies VMO-IT discrepancy
- **Jumper's Knee:**
- Downward pressure to Proximal Patella with palpation under Distal Patella
-Pain or apprehension

Tx: Generalized Knee Pain

- **Patello-Femoral Syndrome:**
- **RICE, Physical Tx. Neoprene Sleeve or Subpatellar strap w/activities**
- **Jumper's Knee (Patellar Tendonitis):**
- **RICE, Physical Therapy, Stretching (esp. of Hamstrings) & Massage**

Heat vs ICE

- Definitive Answer: None.
- Ice 1st 24 hours, then heat

Imaging: Ottawa Knee Rules

- TRAUMA or Suspicion—Films!
- 96% Sensitive; ~50% Specific
- Age 50(55) years
- Patellar tenderness
- Fibular Head Tenderness
- Inability to flex the knee to 90 degrees
- Inability to bear weight both immediately & in the E.D. for 4 steps, regardless of limp

Knee Diagnosis

History	Physical Exam	Diagnosis
POP, Sudden Swell, Rotary injury	+ Lachman; + Anterior Draw	ACL Injury
Rotary Injury, gradual swelling, "locking"	+ McMurry; +Joint Line Tender	Meniscal Injury
Clipping Injury (Valgus directed force)	+ Medial Collateral Testing	Medial Collateral Strain/Tear
New Activity; medial knee pain at rest Often assoc. with Arthritis/DJD Knee	Medial Tenderness over proximal tibia metaphysis	Pes Anserine Bursitis
Lateral Pain in runners	Pain over lateral condyle	Iliotibial Band Friction Syndrome

Evaluation of Common *Knee Injuries*

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