The Knee
Orthopedics and Neurology
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The Knee
Internal derangement of the knee (IDK)
• This a common provisional diagnosis for any patient with mechanical symptoms of the knee. (Evans)
• IDK might also stand for “I don’t know”
• An appropriate diagnose enhances the patient’s opportunity to heal with less disability and improved function

The Knee
Anatomy of the anteromedial aspect

The Knee
• Consists of two joints
  1. Patellofemoral
  2. Tibiofemoral

The Knee
Anatomy of the anterolateral aspect

The Knee
• Knee pain may rise from:
  1. Joint
  2. Periarticular tissues
  3. Hip
  4. Femur
### The Knee

- Pain is the most common presenting symptom of knee pathology and the causes tend to be related to age, according to Evans.

### The Knee

Knee stability depends on the following four ligaments:
1. Tibial collateral
2. Fibular collateral
3. Anterior cruciates
4. Posterior cruciates

### The Knee

- Lacks stability
- Not a hinge joint
- Minor derangements in knee cause “traumatic arthritis” better known as degenerative joint disease or DJD
- Menisci provide very little stability

### The Knee

Stability is provided by soft tissues:
- Ligaments
- Capsule
- Muscles

### The Knee

Parts of knee that might be injured:
- Ligaments
- Muscle tendons
- Capsule
- Meniscus
- Cartilage
- Bone
- Bursae
- Any combination of these

### The Knee

Articulations:
- Femur
- Patella
- Tibia
- Not the fibula
The Knee

Motions

- Flexion (130-150 degrees)
- Extension (0 degrees)
- Rotation (Internal/External) with flexion but not extension (10 degrees)

The Knee

Thigh muscles that attach to medial side of tibia near the pes anseurine

- Gracilis (obturator n)
- Sartorius (femoral n)
- Semitendinosus (tibial n)

The Knee

Thigh muscles that attach to medial side of tibia near the pes anseurine

The Knee

Palpation of tibial tubercle and pes anseurine insertion and bursa

The Knee

Clinically significant bursae
The Knee
Sciatic nerve innervates

- Hip joint
- Biceps femoris
- Semitendinosus
- Semimembranosus
- Ischial head of the adductor magnus

Normal Knee Joint
Femoral nerve neuropathy

- Quadriceps weakness and atrophy
- Loss of patellar reflex
- Sensory changes over anterior thigh and medial aspect of lower leg
- Neurological examination should include mensuration of quadriceps (4 inches or 10 cm superior to the knee Evans and 3 inches Hoppenfeld)

The Knee
Mensuration of quadriceps for atrophy

Knee Joint Disease

- May present weakness and atrophy of the quadriceps

The Knee
Clinically significant bursae

- Prepatellar
- Superficial infrapatellar
- Deep infrapatellar
- Pes anserine or anseurine

Knee Joint Disease

- Knee pain with young athletes
- Tenderness at insertion of infrapatellar tendon into the tibial tubercle
- Avulsion of tibial tubercle
- Infrapatellar tendon loses rigidity and a palpable defect is palpable

The Knee
Osgood-Schlatter’s Syndrome

The Knee
Abduction Stress Test
Also known as Valgus Stress Test
- Assessment for medial collateral ligament injury
- Medial meniscus may also be injured with MCL injury
- Valgus stress to the extended knee
- Positive test with pain above, below, or at medial joint line

The Knee
Adduction Stress Test
Also known as the Varus Stress Test
- Assessment for lateral collateral ligament
- Mechanism of injury = varus force with flexed knee
- Usually ruptures at fibular insertion or it may avulse at fibular styloid
- Possible peroneal palsy

The Knee
Adduction Stress Test
- Usually torn in conjunction with posterolateral ligament complex
  1. Lateral capsule
  2. Arcuate ligament
  3. Popliteus tendon
The Knee
Apley’s Compression Test
Also known as Apley’s Distraction Test and Apley’s Grinding Test
- Assessment for collateral ligament injury and meniscus tears
- Medial meniscus is injured more often than the lateral
- Apley’s and McMurray tests are most commonly used to diagnose meniscal tears

The Knee
Apley’s Distraction Test

The Knee
Palpation of the medial meniscus anterior portion and the coronary ligaments

The Knee
Childress Duck Waddle Test
- Assessment for medial and lateral meniscus tears
- Most common type of meniscal tear is the “bucket-handle” along the longitudinal axis
- The second most common is a tear along its transverse axis.

The Knee
Internal rotation enhances palpation of medial meniscus
The Knee

Palpation of the lateral meniscus and its coronary ligaments

The Knee

Childress Duck Waddle Test

- Test with patient standing with feet apart.
- Internally & externally rotate and squat.
- Positive test = pain, inability to fully flex the knee, or a clicking sound on either posterior side of the joint
- Internal test = medial meniscus tear
- External test = lateral meniscus tear

The Knee

Drawer Test

- Assessment for injury to some degree of:
  1. Anterior cruciate ligament
  2. Posterolateral capsule
  3. Posteromedial capsule
  4. Medial collateral ligament
  5. Iliotibial band
  6. Arcuate-Popliteus complex
  7. Posterior cruciate ligament

The Knee

Position for eliciting the anterior drawer sign

A positive anterior drawer test = tear of anterior cruciate ligament

The Knee

A positive posterior drawer test = tear of posterior cruciate ligament
The Knee
Lateral Pivot Shift Maneuver
Also known as Test of McIntosh
• Assessment for injury to some degree of:
  1. Anterior Cruciate Ligament
  2. Posterior capsule
  3. Arcuate-popliteus complex
  4. Lateral collateral ligament
  5. Iliotibial band

The Knee
Lateral Pivot Shift Maneuver
Also known as Test of McIntosh
• Test includes:
  1. The pivot shift test begins with knee in extension
  2. The jerk test begins with knee in flexion
  3. The Losee test begins with the knee in flexion
     (See page 789)

The Knee
McMurray Sign
• Assessment for medial or lateral meniscus injury
• Injuries to menisci are most common with males younger than 45
• Caused by a twisting force with knee flexed or semi-flexed

The Knee
McMurray Sign
• Sign is present if at some point in the arc, a painful click or snap is heard
• The arc includes both external and internal rotation with flexion and then extension of the hip and knee
• Internal rotation = lateral meniscus
• External rotation = medial meniscus

The Knee
McMurray Test

The Knee
McMurray Test
The Knee
McMurray Test

• Assessment for iliotibial band friction syndrome
• Test with patient supine
• Flex hip and knee to 90 degrees
• Thumb pressure to lateral femoral condyle
• If extension of knee with pressure over condyle produces pain near 30 degrees it is a positive test

The Knee
Noble Compression Test

• Assessment for iliotibial band friction syndrome
• Test with patient supine
• Flex hip and knee to 90 degrees
• Thumb pressure to lateral femoral condyle
• If extension of knee with pressure over condyle produces pain near 30 degrees it is a positive test

The Knee
Clarke’s Sign

• Knee fully extended
• Compress quadriceps at superior pole of patella
• Patient gently contracts quadriceps
• Sign is present when patient experiences pain and is unable to continue
• Severity may be differentiated by amount of pain and presence or absence of crepitation

The Knee
Clarke’s Sign

• Assessment for chondromalacia patellae
1. Post traumatic fracture
2. Tracking disorders with patellofemoral arthralgia
3. Primary malacia is usually bilateral with unknown etiology

The Knee
Fouchet’s Sign

• Assessment for patellar tracking disorder, peripatellar syndrome, or patellofemoral dysfunction.
• Procedure involves compression of patella against femur
• Sign is present with point tenderness and pain at the patellar margin
• Transverse rub = audible or palpable grating and pain confirm presence of sign
The Knee
Patellar femoral grinding test

The Foot
Helbing’s Sign
- Assessment for Pes Planus or flat foot
- Sign is present when there is medial curving of Achilles tendon, as viewed from the posterior aspect.
- Helbing’s sign indicates foot pronation

Pes Planus
Talar head displaces medially and plantarward

Pes Planus
1. Medial prominence of head of talus
2. Callosity of over head of talus

Helbing’s Sign Present
Os Calcis in valgus and in pes planus

The Foot
Strunsky’s Sign
- Assessment for metatarsalgia
- Sign is present when passive flexion of toes produces pain with patient supine and lower extremity extended.
- Pain is located in the anterior arch of the foot.
Palpation of the Metatarsals

Transverse Arch of Foot
Located immediately behind the metatarsal heads

Claw Toes
Frequently accompany metatarsalgia