AAP BRS podcast: Functional Knee Anatomy, IT Band Syndrome, Patellofemoral Pain Syndrome and Differential Diagnoses

Functional Knee Anatomy Review

Iliotibial (IT) Band:

- Origin: primarily the gluteus maximus and tensor fasciae latae
- Insertion: lateral tibial plateau at Gerdy's tubercle
- Function: Slides over the lateral femoral condyle with flexion/extension activity

Popliteus muscle:

- Origin: lateral femoral condyle and the posterior horn of the lateral meniscus
- Insertion: Below the medial tibial condyle
- Function: Internally rotates the tibia during walking, provides forward stabilization of the knee, and allows the knee to flex when in full extension "Unlocks" the knee

Iliotibial Band (ITB) Syndrome

- Risk factors and Etiology: Repetitive activity. Common in runners, 5-14% incidence
- Evaluation: Tenderness at the lateral epicondyle of the femur or along the ITB tract. + Ober's test, + Noble's compression test
- Imaging: Radiographs reserved for pain refractory to conservative treatment or if avulsion at Gerdy's tubercle is present (MRI thickening of the ITB over lateral condyle, US soft tissue edema and hypervascularity of the fat pad deep to the ITB)
- Treatment:
 - Acute phase (2-7 days after Sx onset): Reduced activity, ice, NSAIDs. US guided corticosteroid injection into the bursa between the ITB and lateral femoral condyle if refractory to previous therapies.
 - Subacute phase (1 week after Sx onset): Iliotibial band stretches, soft tissue mobilization (massage/foam rolling)
 - After Sx resolve strengthen hip abductors, including gluteus medius, and evaluate for appropriate patellar tracking
- Differential Diagnoses: strains, sprains, osteoarthritis, popliteus tendonitis

Photo citations:
(1) https://commons.wikimedia.org/wiki/File:lliotibial_band_syndrome-en.svg

(2) <u>https://commons.wikimedia.org/wiki/File:Gray439-Musculus_popliteus.png</u>
 (3) <u>https://commons.wikimedia.org/wiki/File:Knee_diagram.png</u>



Patellofemoral Pain Syndrome (PFPS), "Runner's knee"

- Risk factors and Etiology: Most common cause of knee pain in adolescents. Associated with muscle imbalance and improper patellar tracking
- Evaluation: Anterior knee pain aggravated by ascending stairs or with prolonged knee flexion during sitting (+ theater sign). Dropping of the pelvis on single leg squat, weakness of hip abductors, and/or internal rotation of the femur. Pain can be acute or insidious in onset. +/- effusion or crepitus
- Imaging: Radiograph AP, lateral and sunrise views to evaluate for fracture, joint space narrowing, or osteochondritis dissecans (OCD) lesion
- Treatment: Reduced activity, ice, NSAIDs, therapeutic exercise to improve patellar tracking, and strengthening of abductors/external rotators and quadricep muscles
- Differential Diagnoses: strains, sprains, chondromalacia patella, osteochondritis dissecans, Osgood-Schlatter syndrome, osteoarthritis (juvenile inflammatory arthritis in a child)

Chondromalacia patella: Arthroscopy or MRI show evidence of rough-ended or fibrillated patellar cartilage.

Osteochondritis Dissecans (OCD): most frequently affects 10 to 15-year-olds. 75% of cases occur in the knee, most often at the medial condyle. Occurs secondary to repetitive small stressors on subchondral bone, which compromises blood supply and eventually leads to avascular necrosis. Rest is crucial to prevent progression of injury. If the fragment detaches, surgical intervention may be necessary.

4 Stages of Fracture, MRI staging of OCD

- 1. Compression of subchondral trabeculae with a preserved cartilage cap, stable
- 2. Incomplete detachment of osteochondral fragment
- 3. Complete detachment without dislocation, unstable
- 4. Complete avulsion of fragment into the joint = loose body



