THE HIP

Cooler than cool, the pinnacle of what is "it". Beyond all trends and conventional coolness.
Objectives

- Hip anatomy
- Causes of hip pain
- Hip exam
Anatomy

- Bones

- Lumbar Spine
- Sacrum
- Coccyx
- Sacroiliac joint
- Anterior Superior Iliac Spine
- Ilium
- Femoral head
- Greater Trochanter
- Ischium
- Anterior Inferior Iliac Spine
- Pubis
- Pubic symphysis
- Femur
- Lesser Trochanter
Anatomy

- Joint

- Femoral head
- Acetabulum
- Acetabular labrum
- Ligament of head of femur
Anatomy

- **Muscles: hip flexion**

  - Iliopsoas Muscle
  - Pectineus Muscle
  - Tensor Fasciae Latae Muscle
  - Rectus Femoris Muscle
  - Gluteus Maximus Muscle
  - Vastus Lateralis and Illiotibial Tract
  - Biceps Femoris Muscle
  - Semitendinosus Muscle
  - Gracilis Muscle
  - Adductor Magnus Muscle
  - Semimembranosus Muscle
  - Patella (Knee Cap)
  - Patella Ligament

*Adapted from Corel Draw 9 Library*
Anatomy

Muscles: hip extension

- Inguinal Ligament
- Tensor Fasciae Latae Muscle
- Rectus Femoris Muscle
- Vastus Lateralis Muscle
- Quadriceps Femoris Tendon
- Patella (Knee Cap)
- Patella Ligament
- Iliopsoas Muscle
- Pectineus Muscle
- Adductor Longus Muscle
- Gracilis Muscle
- Sartorius Muscle
- Vastus Medialis Muscle
- Semimembranosus Muscle
- Adductor Magnus Muscle
- Semitendinosus Muscle
- Gracilis Muscle
- Vastus Lateralis and Iliotibial Tract
- Gluteus Maximus Muscle
- Biceps Femoris Muscle
- Plantaris Muscle
- Gastrocnemius Muscle

Adapted from Corel Draw 9 Library
**Muscles: hip adduction**

- Iliopsoas Muscle
- Pectineus Muscle
- Adductor Longus Muscle
- Gracilis Muscle
- Sartorius Muscle
- Vastus Lateralis Muscle
- Vastus Medialis Muscle
- Quadriceps Femoris Tendon
- Patella (Knee Cap)

**Additional Muscles**

- Adductor Magnus Muscle
- Semitendinosus Muscle
- Semimembranosus Muscle
- Biceps Femoris Muscle
- Plantaris Muscle
- Gastrocnemius Muscle
- Gluteus Maximus Muscle
- Vastus Lateralis and Iliotibial Tract
- Biceps Femoris Muscle
- Patella Ligament

Adapted from Corel Draw 9 Library
Anatomy

- **Muscles**: hip abductors along with Glut med and min

- **Inguinal Ligament**
- **Tensor Fasciae Latae Muscle**
- **Rectus Femoris Muscle**
- **Vastus Lateralis Muscle**
- **Vastus Medialis Muscle**
- **Quadriceps Femoris Tendon**
- **Patella (Knee Cap)**
- **Iliopsoas Muscle**
- **Pectineus Muscle**
- **Gracilis Muscle**
- **Sartorius Muscle**
- **Adductor Magnus Muscle**
- **Semitendinosus Muscle**
- **Semimembranosus Muscle**
- **Gluteus Maximus Muscle**
- **Vastus Lateralis and Iliotibial Tract**
- **Biceps Femoris Muscle**
- **Plantaris Muscle**
- **Gastrocnemius Muscle**

*Adapted from Corel Draw 9 Library*
Anatomy

- **Muscles: Internal rotators with Glut med and min**

  - Inguinal Ligament
  - Tensor Fasciae Latae Muscle
  - Rectus Femoris Muscle
  - Vastus Lateralis Muscle
  - Quadriceps Femoris Tendon
  - Patella (Knee Cap)
  - Patella Ligament
  - Iliopsoas Muscle
  - Pectineus Muscle
  - Adductor Longus Muscle
  - Adductor Magnus Muscle
  - Semitendinosus Muscle
  - Semimembranosus Muscle
  - Gracilis Muscle
  - Biceps Femoris Muscle
  - Plantaris Muscle
  - Gastrocnemius Muscle
  - Gluteus Maximus Muscle
  - Vastus Lateralis and Iliotibial Tract

Adapted from Corel Draw 9 Library
Anatomy

- **Muscles: External rotators**
  - Inguinal Ligament
  - Tensor Fasciae Latae Muscle
  - Rectus Femoris Muscle
  - Iliopsoas Muscle
  - Pectineus Muscle
  - Adductor Magnus Muscle
  - Adductor Longus Muscle
  - Gracilis Muscle
  - Sartorius Muscle
  - Semitendinosus Muscle
  - Semimembranosus Muscle
  - Vastus Lateralis Muscle
  - Vastus Medialis Muscle
  - Quadriceps Femoris Tendon
  - Patella (Knee Cap)
  - Patella Ligament
  - Gluteus Maximus Muscle
  - Biceps Femoris Muscle
  - Vastus Lateralis and Iliotibial Tract
  - Plantaris Muscle
  - Gastrocnemius Muscle

*Adapted from Corel Draw 9 Library*
Muscles: Internal rotators with Glut med and min

- Pectineus Muscle
- Adductor Magnus Muscle
- Semitendinosus Muscle
- Semimembranosus Muscle

Inguinal Ligament
Tensor Fasciae Latae Muscle
Rectus Femoris Muscle
Vastus Lateralis Muscle
Vastus Medialis Muscle
Quadriceps Femoris Tendon
Patella (Knee Cap)
Iliopsoas Muscle
Adductor Longus Muscle
Gracilis Muscle
Sartorius Muscle
Gluteus Maximus Muscle
Vastus Lateralis and Iliotibial Tract
Biceps Femoris Muscle
Plantaris Muscle
Gastrocnemius Muscle

Adapted from Corel Draw 9 Library
Anatomy

**Muscles: Flexes leg**

- Inguinal Ligament
- Tensor Fasciae Latae Muscle
- Iliopsoas Muscle
- Pectineus Muscle
- Rectus Femoris Muscle
- Adductor Longus Muscle
- Gracilis Muscle
- Sartorius Muscle
- Vastus Lateralis Muscle
- Vastus Medialis Muscle
- Quadriceps Femoris Tendon
- Patella (Knee Cap)
- Patella Ligament
- Adductor Magnus Muscle
- Semitendinosus Muscle
- Gracilis Muscle
- Semimembranosus Muscle
- Gluteus Maximus Muscle
- Vastus Lateralis and Iliotibial Tract
- Biceps Femoris Muscle
- Plantaris Muscle
- Gastrocnemius Muscle

*Adapted from Corel Draw 9 Library*
Muscles: Extends leg

- Iliopsoas Muscle
- Pectineus Muscle
- Adductor Magnus Muscle
- Semimembranosus Muscle
- Gluteus Maximus Muscle
- Vastus Lateralis and Illiotibial Tract
- Adductor Longus Muscle
- Semitendinosus Muscle
- Sartorius Muscle
- Gracilis Muscle
- Biceps Femoris Muscle
- Patella Ligament
- Patella (Knee Cap)
- Quadriceps Femoris Tendon
- Rectus Femoris Muscle
- Vastus Medialis Muscle
- Vastus Lateralis Muscle
- Inguinal Ligament
- Tensor Fasciae Latae Muscle

Adapted from Corel Draw 9 Library
Causes of Hip Pain

- Non-MSK things to rule out
  - Septic arthritis
  - Toxic synovitis
  - Osteomyelitis
  - Tumors; both benign and malignant primary tumors as well as metastasis
  - Sacroiliitis
  - Testicular pathology
  - Renal
  - Intra-abdominal
Causes of Hip Pain

- Intra-articular
  - Slipped Capital Femoral Epiphysis
  - Legg-Calve-Perthes disease
  - Femoral acetabular impingement
  - Labral tear
  - Developmental Dysplasia
  - Dislocation
  - Osteoarthritis
  - Femoral fractures
Causes of Hip Pain

- SCFE – Slipped capital femoral epiphysis
  - Pain anywhere from groin to knee
  - Males > females, adolescents during growth spurt (11-16yo), high BMI
  - +/- history of trauma
  - Leg length discrepancy, limping, leg in external rotation
  - Refer to ortho for pinning
Causes of Hip Pain

- SCFE – Slipped capital femoral epiphysis
Causes of Hip Pain

- Legg-Calvé-Perthes Disease
  - Idiopathic AVN of the femoral head
  - Males > females, age 2-11
  - Limp, lack of internal rotation
  - Treatment involves containing the femoral head in the acetabulum
Causes of Hip Pain

- Femoroacetabular impingement
  - Risk for early cartilage damage and arthritis
  - Diagnose with MRI
Causes of Hip Pain

- Labral tear
  - Mechanism of twisting, cutting, or planting
  - Mechanical sensation or locking
  - + Scour test
  - Diagnosed with MR arthrography
Causes of hip pain

- Femoral neck stress fracture
  - Endurance athletes especially amenorrheic females
  - Antalgic gait and pain with ends of IR and ER
  - May need bone scan to diagnose
  - Compression vs tension side determines treatment
Causes of Hip Pain

- Extra-articular
  - Bursitis
  - Avulsion fracture
  - Muscle strain
  - Piriformis syndrome
  - Osteitis Pubis
Causes of hip pain

- Avulsion fractures
  - From forceful contraction of attached muscle
  - Tenderness at the site and with contraction of the involved muscle
  - Diagnosed with x-ray
    - Pelvic series
Causes of Hip pain

- Avulsion Fractures
  - ASIS
Causes of Hip Pain

- Avulsion fractures
  - AlIS
Causes of Hip Pain

- Avulsion fractures
  - Iliac crest

![Hip X-ray Image]
Causes of Hip Pain

- Avulsion fractures
  - Greater trochanter
Causes of Hip Pain

- Avulsion fractures
  - Lesser trochanter
Causes of Hip Pain

- Avulsion fractures
  - Ischial tuberosity
Causes of Hip Pain

- **Bursitis**
  - **Trochanteric**: IT band causing friction with moving from flexion to extension
  - **Iliopsoas/Iliopectineal**: Iliopsoas causes friction with hip flexion

![Diagram of hip anatomy with labels for femoral head epiphysis, iliotibial band, trochanteric bursa, iliopsoas bursa, and apophysis of ischial tuberosity.](image-url)
Causes of Hip Pain

- Piriformis syndrome
  - Presents with sciatica
  - Tender over piriformis
  - Symptoms are reproduced with stretching or activation of piriformis
Causes of Hip Pain

- Osteitis Pubis
  - Inflammation of the pubic symphysis
  - Overuse injury of adductors
  - Tenderness over the pubic symphysis
Physical Exam

- Inspection
- Palpation
- Range of Motion
  - Active
  - Passive
  - Resisted
- Provocative Tests
- Functional Tests
Physical Exam

- Inspection:
  - Bruising, sitting position, leg length, thigh circumference

- Palpation
  - ASIS
  - Pelvic crest
  - AIIS
  - SI joint
  - Greater Trochanter
  - Ischial tuberosity
  - Muscles
Range of Motion

medial rotation
lateral rotation
extension
flexion
abduct
adduct
Range of Motion

Internal Rotation

External Rotation
Provocative Tests

- Patrick’s Test; SI joint
Provocative Tests

- Clam shell; piriformis
Provocative Tests

- Impingement
Provocative Tests

- Scour test; labral tear
Functional test

- Single leg squat
Summary

- Remember anatomy
- Consider non-MSK causes of hip pain
- Use history to narrow differential
- Use physical exam to help rule diagnoses in or out

QUESTIONS???