Hip Joint
Lecture Objectives

• Describe the components of the hip joint.
• List the ligaments associated with the hip joint and their attachments.
• Describe the muscles acting on the hip joint according to the type and movement they perform.
• Describe the bursae in relation to the hip joint.
• Describe the stability of the hip joint.
• Describe the blood supply and nerve supply of the hip joint.
• Describe the major palpable bony prominences of the hip joint.
Sacroiliac Joint

- Auricular surfaces of the sacrum and the iliac bone
- No movement; transmit body weight from vertebral column to pelvis
- In elderly people synovial cavity disappear and becomes fibrous joint
- Nerve supply: sacral spinal nerves
Sacroiliac Joint

• Associated ligaments
  – Posterior sacroiliac ligament
  – Interosseous sacroiliac ligament (between tuberosities of sacrum and iliac bone)
  – Anterior sacroiliac ligament
Sacroiliac Joint

- Accessory ligaments
  - Sacrotuberous ligament
    - Greater sciatic foramen
  - Sacrospinous ligament
    - Lesser sciatic foramen
  - Iliolumbar ligament
Hip Joint

- Head of the femur and the acetabulum
- Type
  - Ball and socket joint
- Movements
  - All movements
  - Most movable joint next to shoulder
- On standing transmits body weight through hip bone to head & neck of femur
- Nerve supply
  - femoral, obturator, and sciatic nerves and nerve to the quadratus femoris m.
Hip Joint: Components

- Head of femur
  - Fovea for lig. of femoral head
    - No articular cartilage
- Neck of femur
- Acetabulum
  - Lunate surface
    - Articular part
  - Acetabular fossa
    - No articular part
  - Acetabular rim
    - Acetabular notch
Hip Joint: Components

- Acetabular rim
  - Acetabular labrum
    - Transverse acetabular ligament
- Acetabular fossa
  - Fat pad
Hip Joint: Capsule

- **Proximal attachment**
  - Acetabular labrum
  - Transverse ligament
- **Distal attachment**
  - Anteriorly
    - Intertrochanteric line
  - Posteriorly
    - Free edge
Hip Joint: Ligaments

- **Intracapsular ligaments**
  - Transverse acetabular ligament
    - Bridge the notch
    - Entrance of BVs
  - Ligament of the head of the femur
    - Transverse lig. & edges of notch
    - Fovea capitis
Hip Joint: Ligaments

• Extracapsular ligaments

  • Iliofemoral ligament
    • The Strongest
    • inverted Y-shape
    • Attachments
      • AIIS
      • Intertrochanteric line (ITL)
    • Superior – anterior
    • Function
      • Prevent hyperextension during standing
Hip Joint: Ligaments

• Extracapsular ligaments
  
  • Pubofemoral ligament
    • Triangular shape
    • Attachments
      • Superior ramus of pubis
      • Inferior part of intertrochanteric line
    • Function
      • Limits extension and abduction
    • Anterior - inferior
Hip Joint: Ligaments

• Extracapsular ligaments

  • Ischiofemoral ligament
    • The weakest
    • Spiral shape
    • Attachments
      • Ischial part of acetabular rim
      • Greater trochanter
    • Limits extension and medial rotation
Hip Joint: Ligaments

- Relative strength of ligaments compared to muscles
  - Anteriorly
    - Strong ligament and weak muscles
  - Posteriorly
    - Weak ligament and strong muscles
Hip Joint: Synovial Membrane

- Attached to articular surfaces
- Lines capsule
- Covers
  - Transverse lig.
  - Ligament of head of the femur
  - Pad of fat in acetabular fossa
  - Neck of femur
- Synovial fold (retinaculum)
  - At free edge of capsule
• Psoas bursa
  • Anterior continuation of synovial membrane

• Bursa for obturator externus
  • Posterior synovial protrusion
    • Through the free capsule edge

• Obturator internus bursa
Hip Joint: Movements
Hip Joint: Relations

- **Anteriorly**
  - Content of femoral triangle
- **Posteriorly**
  - Sciatic nerve
- **Superiorly**
- **Inferiorly**
Hip Joint: Stabilizing Factors

- Acetabular labrum & transverse lig.
  - Deepens the socket
- Intracapsular lig.
- Extracapsular ligaments
- Muscles traversing hip joint
- Orientation of acetabulum to head of femur
  - Superiorly located
<table>
<thead>
<tr>
<th>Movement</th>
<th>Limiting Structures</th>
</tr>
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<tbody>
<tr>
<td>Flexion</td>
<td>Soft tissue apposition</td>
</tr>
<tr>
<td></td>
<td>Tension of joint capsule posteriorly</td>
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<tr>
<td></td>
<td>Tension of gluteus maximus</td>
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<tr>
<td>Extension</td>
<td><em>Ligaments</em>: iliofemoral, ischiofemoral, and pubofemoral</td>
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<tr>
<td></td>
<td>Tension of iliopsoas</td>
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<tr>
<td>Abduction</td>
<td><em>Ligaments</em>: pubofemoral, ischiofemoral, and inferior band of iliofemoral</td>
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<tr>
<td></td>
<td>Tension of hip adductors</td>
</tr>
<tr>
<td>Adduction</td>
<td>Soft tissue apposition (thighs)</td>
</tr>
<tr>
<td></td>
<td>Tension of iliotibial band, superior joint capsule, superior band of iliofemoral ligament, and hip abductors (especially when contralateral hip joint is abducted or flexed)</td>
</tr>
<tr>
<td>Internal rotation</td>
<td><em>Ligaments</em>: ischiofemoral and posterior joint capsule</td>
</tr>
<tr>
<td>External rotation</td>
<td><em>Ligaments</em>: iliofemoral, pubofemoral, and anterior joint capsule</td>
</tr>
</tbody>
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Hip Joint: Blood Supply

- Medial & lateral circumflex
  - From profundal femoris
- Artery to the head of the femur
  - From obturator artery
- Retinacular arteries
  - Mainly from medial circumflex
  - Inter from free edge of capsule
Hip Joint: Arterial Anastomosis

- Trochanteric anastomosis
  - Superior gluteal a.
  - Inferior gluteal a.
  - Medial femoral circumflex a.
  - Lateral femoral circumflex a.

- Cruciate anastomosis
  - Inferior gluteal a.
  - Medial femoral circumflex a.
  - Lateral femoral circumflex a.
  - 1\textsuperscript{st} perforating a. from profunda
Hip Joint: Fracture

- Fracture of femoral neck
  - Disruption of blood supply to the head
  - Avascular necrosis
    - Blood supply from artery to the head of the femur usually is not enough
  - In elderly
  - Female > Male
    - Osteoporosis
Surgical Hip Replacement

- In traumatic injuries or degenerative diseases
- Replace head and neck of femur
- Often acetabulum lined by metal or plastic socket
Dislocation of Hip Joint

- Congenital dislocation of hip joint
  - Common 1.5/1000
  - Female > Male
  - Affected limb looks shorter
    - Superior displacement
  - Positive Trendelenburg sign
    - Hip appear to drop to one side during walking
    - Inability to abduct hip
Dislocation of Hip Joint

• Acquired hip dislocation
  – Rare
  – Posterior dislocation more common
  – In car accidents
  – When femur is flexed, adducted, and medially rotated
  – Sciatic nerve injury