

Hip Joint

The hip joint is a multiaxial synovial ball-and-socket joint between the head of the femur and the acetabulum of the pelvic bone. Unlike the ball-and-socket shoulder joint, the hip joint is designed for stability and support at the expense of some mobility. Similar to the shoulder joint, the acetabulum is rimmed by a fibrocartilaginous "lip" called the acetabular labrum that deepens the socket. The features of the hip joint are summarized in the table below. The primary hip joint ligaments include three major ligaments that surround the hip joint and one internal ligament to the head of femur.

LIGAMENT	ATTACHMENT	COMMENT
Hip (Multiaxial Synovial Ball-and-Socket) Joint		
Capsular	Acetabular margin to femoral neck	Encloses femoral head and part of neck; acts in flexion, extension, abduction, adduction, circumduction
Iliofemoral	Iliac spine and acetabulum to intertrochanteric line	Is strongest ligament; forms inverted Y (of Bigelow); limits hyperextension and lateral rotation
Ischiofemoral	Acetabulum to femoral neck posteriorly	Limits extension and medial rotation; is weaker ligament
Pubofemoral	Pubic ramus to lower femoral neck	Limits extension and abduction
Labrum	Acetabulum	Fibrocartilage, deepens socket
Transverse acetabular	Acetabular notch anteriorly	Cups acetabulum to form a socket for femoral head
Ligament of head of femur	Acetabular notch and transverse ligament to femoral head	Artery to femoral head runs in ligament

COLOR the following ligaments of the hip joint, using a different color for each ligament or feature:

- 1. Iliofemoral ligament (Y ligament of Bigelow): positioned anteriorly
- 2. Pubofemoral ligament: positioned anteriorly and inferiorly
- 3. Ischiofemoral ligament: positioned posteriorly
- 4. Acetabular labrum: fibrocartilage around the rim of the socket
- 5. Articular cartilage on the head of the femur
- 6. Ligament of the head of the femur: attaches to the acetabular notch and transverse acetabular ligament

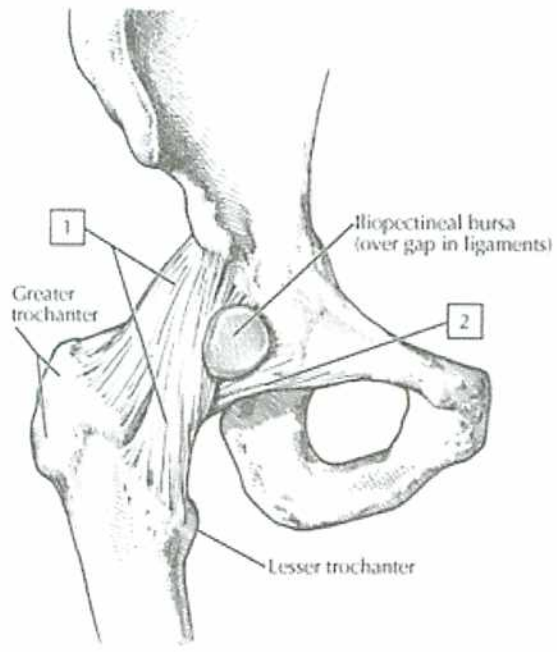
Clinical Note



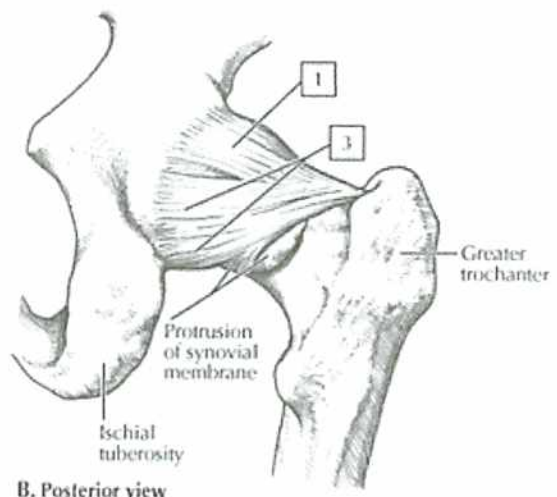
Figure 2-17

Hip fractures are common injuries. In the young, the fracture often results from trauma, whereas in the elderly the cause is often related to osteoporosis and associated with a fall. The neck of the femur is a common site for such fractures.

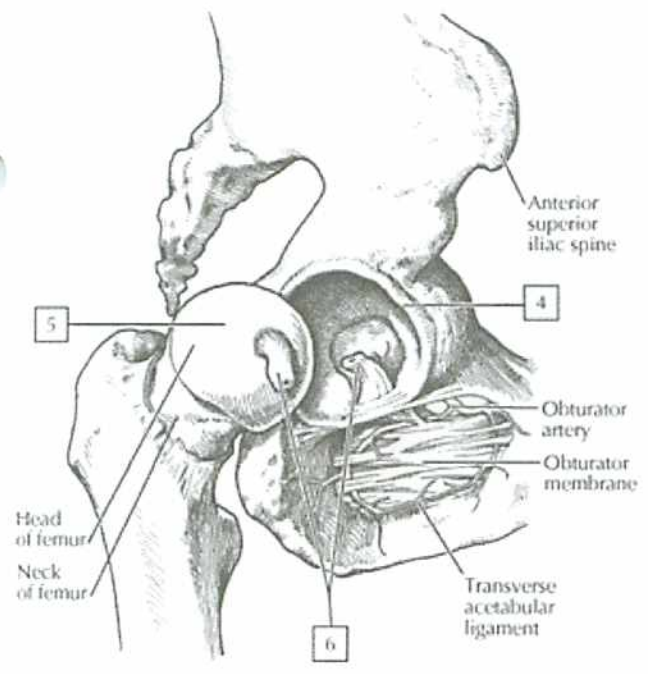
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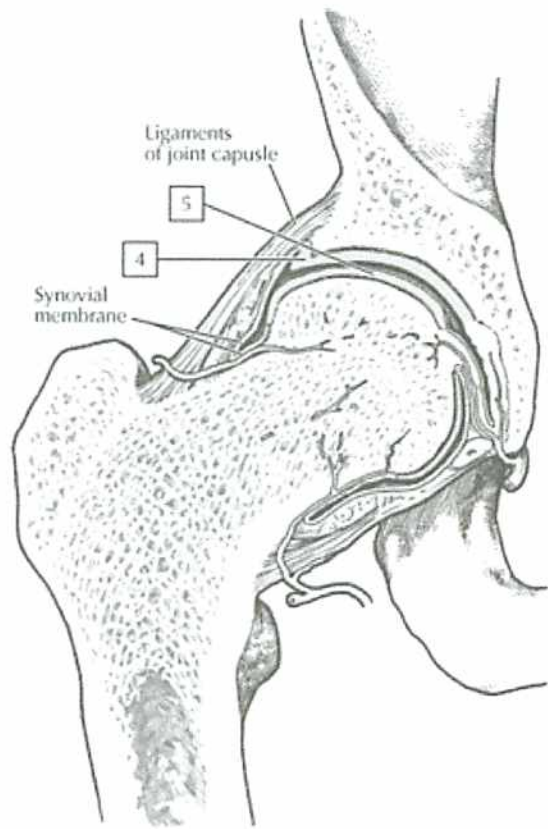
A. Anterior view



B. Posterior view



C. Joint opened: lateral view



D. Coronal section

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- 5. **Infraspinatus tendon**
- 6. **Teres minor tendon**

Clinical Note

Movement at the shoulder joint, or almost any joint, can lead to inflammation of the tendons surrounding that joint and secondary inflammation of the bursa that cushions the joint from the overlying muscle or tendon. At the shoulder, the supraspinatus muscle tendon is especially vulnerable because it can become pinched by the greater tubercle of the humerus, the acromion, and the coracoacromial ligament.



Figure 2-12

About 95% of shoulder joint dislocations occur in an anterior direction. Often this can happen with a throwing motion, which places stress on the capsule and anterior elements of the rotator cuff (especially the subscapularis tendon).

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Knee Joint

The knee is a biaxial condylar synovial joint and is the most sophisticated joint in the body. It participates in flexion, extension, and some gliding and medial rotation when it is flexed. When in full extension, the femur rotates medially on the tibia, and the ligaments tighten to "lock" the knee. Features of this joint are summarized in the table below.

LIGAMENT	ATTACHMENT	COMMENT
Knee (Biaxial Condylar Synovial) Joint		
Capsule	Surrounds femoral and tibial condyles, and patella	Is fibrous, weak (offers little support); flexion, extension, some gliding, and medial rotation
Extracapsular Ligaments		
Tibial collateral	Medial femoral epicondyle to medial tibial condyle	Limits extension and abduction of leg; attached to medial meniscus
Fibular collateral	Lateral femoral epicondyle to fibular head	Limits extension and adduction of leg; overlies popliteus tendon
Patellar	Patella to tibial tuberosity	Acts in extension of quadriceps tendon
Arcuate popliteal	Fibular head to capsule	Passes over popliteus muscle
Oblique popliteal	Semimembranosus tendon to posterior knee	Limits hyperextension and lateral rotation
Intracapsular Ligaments		
Medial meniscus	Interarticular area of tibia, lies over medial facet, attached to tibial collateral	Is semicircular (C-shaped); acts as cushion; often torn
Lateral meniscus	Interarticular area of tibia, lies over lateral facet	Is more circular and smaller than medial meniscus; acts as cushion
Anterior cruciate	Anterior intercondylar tibia to lateral femoral condyle	Prevents posterior slipping of femur on tibia; torn in hyperextension
Posterior cruciate	Posterior intercondylar tibia to medial femoral condyle	Prevents anterior slipping of femur on tibia; shorter and stronger than anterior cruciate
Transverse	Anterior aspect of menisci	Binds and stabilizes menisci
Posterior meniscofemoral (ligament of Wrisberg)	Posterior lateral meniscus to medial femoral condyle	Is strong
Patellofemoral (Biaxial Synovial Saddle) Joint		
Quadriceps tendon	Muscles to superior patella	Is part of extension mechanism
Patellar	Patella to tibial tuberosity	Acts in extension of quadriceps tendon; patella stabilized by medial and lateral ligament (retinaculum) attachment to tibia and femur

COLOR the following extracapsular and intracapsular ligaments of the knee joint, using a different color for each ligament:

- 1. **Medial meniscus: fibrocartilage disc on the tibia that deepens the articular surface and acts as a shock absorber or cushion**
- 2. **Tibial (medial) collateral ligament**
- 3. **Posterior cruciate ligament**
- 4. **Anterior cruciate ligament**
- 5. **Lateral meniscus: similar disc of fibrocartilage on the lateral side of the tibia**
- 6. **Fibular (lateral) collateral ligament**

Clinical Note

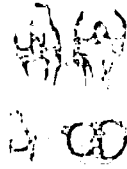


Figure 2-19

Rupture of the weaker anterior cruciate ligament (ACL) is a common athletic injury, usually related to twisting of the knee while the foot is firmly on the ground. Because the ACL prevents hyperextension of the knee, movement of the tibia forward on the femur while keeping the foot stable (anterior drawer sign) is used to assess ACL integrity. Often, ACL injuries also are accompanied by a tear of the tibial collateral ligament or the medial meniscus. The medial meniscus attaches to the tibial collateral ligament. The combination of these three ligament tears-ACL, tibial collateral ligament, and medial meniscus-is known as the "unhappy triad."

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