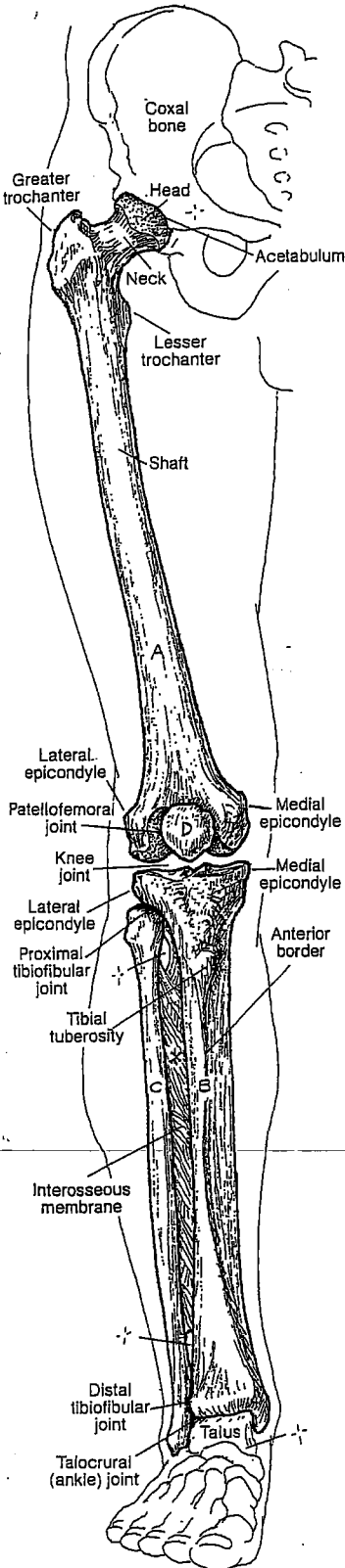


# THIGH & LEG BONES

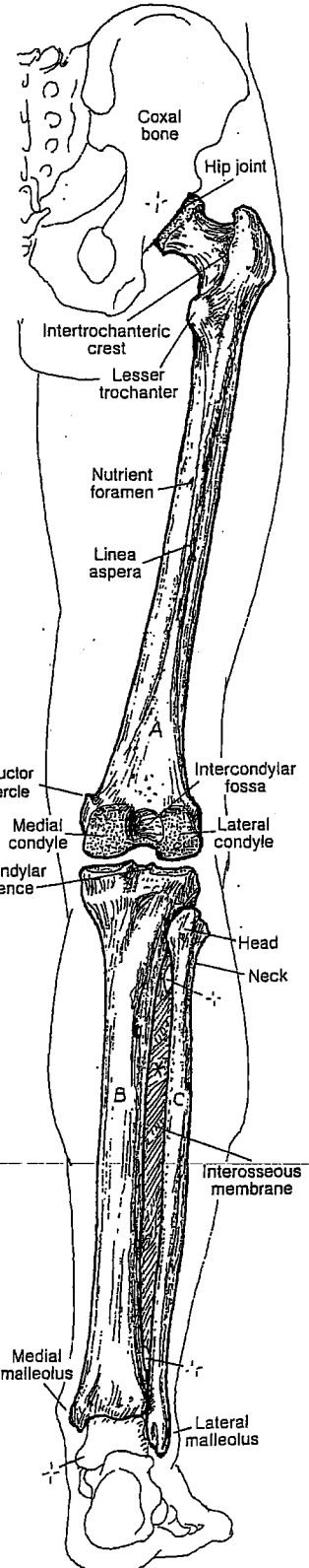
FEMUR<sub>A</sub> TIBIA<sub>B</sub>  
FIBULA<sub>C</sub>  
PATELLA<sub>D</sub>

**CN:** Use light colors on the four bones in order to study surface detail. (1) After coloring the two main views, color gray many of the more superficial ligaments, tendons, and muscle attachments that stabilize the region of the knee. Although not distinguishable in the illustrations, the ligaments tend to be less thick and well defined compared to the tendons and muscles—important underlying structures that are introduced in the knee joint plate that follows.

**ANTERIOR VIEW**  
(Right limb)



**POSTERIOR VIEW**  
(Right limb)

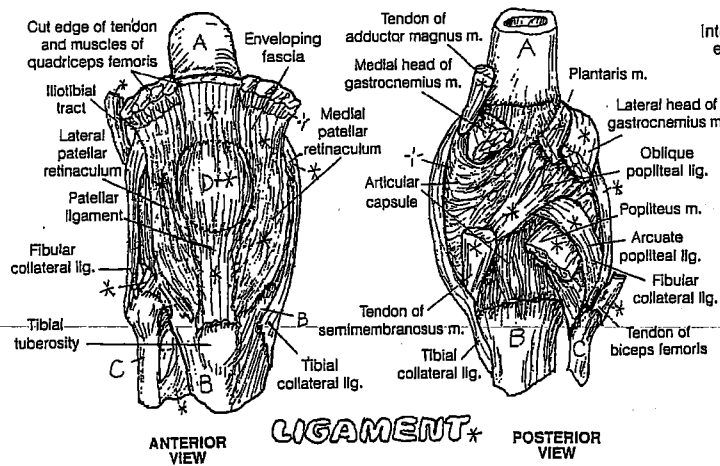


The bone of the thigh is the femur; the bones of the leg are the *tibia* and *fibula*. The *greater* and *lesser trochanters* are the site of insertion of muscles of the hip. The shaft, gently curved anteriorly along its length, is rounded circumferentially, except posteriorly where a ridge (*linea aspera*) along the long axis of the bone forms the origin and insertions of a number of muscles. Distally, the shaft widens to form the massive *condyles*, which contribute to the knee joint. The patella articulates with the cartilage of the femur between the two condyles. It is a sesamoid bone that is located within the tendon of quadriceps femoris (see next plate).

The major weight-bearing bone of the leg is the tibia. It is the only bone of the leg that contributes to the knee joint. This stout bone has large condyles proximally that articulate with the femoral condyles. The palpable tibial tubercle just distal to the condyles receives the patellar ligament. The tibial shaft is triangular in cross section; the apex is the sharp anterior border (*shin*), easily palpated. The anteromedial surface is barren of muscle; the anterolateral surface is muscle-covered. The expanded, distal extent of the tibia forms an inverted L (-); the horizontal surface articulates with the talus of the ankle, and the vertical portion is the quite palpable medial malleolus, which also articulates with the talus (see Plate 42).

Not directly weight bearing, the fibula is a site of muscular attachment along the upper two-thirds of its shaft. Its head joins with the underside of the lateral tibial condyle (proximal tibiofibular joint; synovial, plane type). The shaft of the fibula forms an intermediate tibiofibular joint (interosseous membrane; syndesmosis) with the shaft of the tibia. Distally, the fibula joins with the tibia (distal tibiofibular joint; syndesmosis). The lateral aspect of the fibula is the palpable lateral malleolus, which articulates with the talus. The distal extremities of the fibula and tibia form a joint with the talus (ankle or talocrural joint); see Plate 42.

**LIGAMENTS/TENDONS/MUSCLES AROUND RIGHT KNEE**



The bony parts of the knee joint provide little security during knee movement (see next plate). Tendons and muscles crossing and moving the joint also have the function of reinforcing the ligamentous stabilizers of the knee. Fibrous expansions from the medial and lateral members of the quadriceps muscle merge with the fibrous capsule on each side of the patella to form the medial and lateral retinacula. Muscles/tendons reinforcing knee stability can be seen on this plate and Plates 62–66.

**KNEE JOINT**

CN: The femur, tibia, fibula, and patella bones are not to be colored. (1) In the sagittal section, color (A) blue and (B) black. The synovial membrane that lines the cavity is not shown. (3) In the anterior view, color the facets on the posterior surface of the patella. (4) Color relationship between attachments and function of cruciate ligaments (E, E').

**ARTICULAR CARTILAGE<sub>A</sub>**

**SYNOVIAL CAVITY<sub>B</sub>**

**JOINT CAPSULE<sub>C</sub>**

**BURSA<sub>D</sub>**

**CRUCIATE LIG., ANT.<sub>E</sub> / POST.<sub>E'</sub>**

**MEMISCUS, LAT.<sub>F</sub> / MED.<sub>F'</sub>**

**PATELLAR LIG.<sub>G</sub>**

**COLLATERAL LIG.<sub>H</sub>, TIBIAL<sub>H</sub> / FIBULAR<sub>H'</sub>**

The knee joint consists of two condylar synovial joints between the femoral and tibial condyles, and a gliding synovial joint between the patella and the femur. Note that the fibula and the tibiofibular joint are not part of the knee joint. The movements of the knee joint, involving essentially flexion and extension with varying degrees of rotation and gliding, can be seen in Plates 62 and 64.

In the sagittal view of the joint, note the articular cartilage-lined patellofemoral articulation. The patella is a sesamoid bone that developed in the tendon of the quadriceps femoris muscle. It resists wear-and-tear stresses on the tendon during knee flexion and extension. Note the two facets of the patella in the anterior view and the corresponding patellar articular surface on the femur. The various bursae shown are variable in size. The suprapatellar bursa is an extension of the synovial joint cavity.

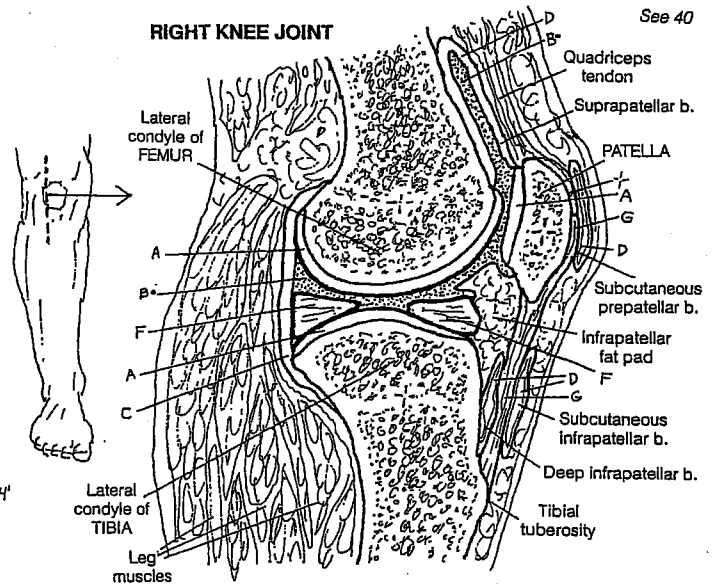
The fibrous (joint) capsule is incomplete around the joint, reinforced by ligaments where absent or deficient and replaced by the patella anteriorly. The synovial membrane (not shown) lines the internal surface of the fibrous capsule; it does not cover the menisci and the joint surfaces or the posterior fibrous capsule.

The menisci can be seen from the side in the sagittal view and from above in the superior view of the joint. They are semilunar-shaped fibrocartilaginous discs attached to the tibial condyles by ligaments; they enhance the depth of fit of the femoral condyles. The ends of the menisci (horns) are attached in the tibial intercondylar region. These horns are richly innervated, a fact reinforced to one experiencing a painful tear of the posterior horn of the medial meniscus. The medial meniscus is more fixed on the tibia than is the lateral. Thus, it is less flexible and more easily torn in the face of excessive rotation and forced abduction of the knee joint while bearing weight.

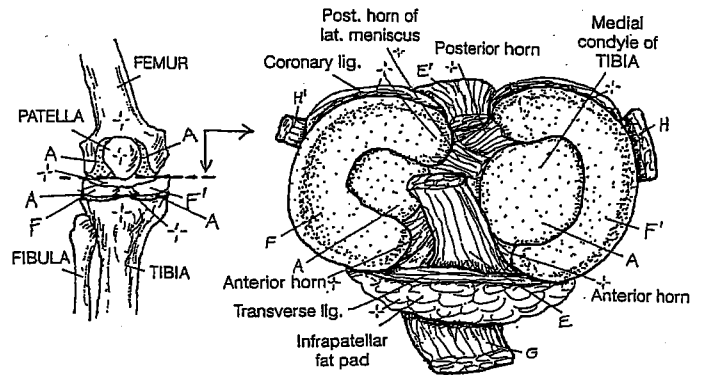
The knee joint is without bony security. It is secured by ligaments and the tendons of the muscles that cross it, including the tendon of quadriceps femoris anteriorly and the iliotibial tract and the tendon of biceps femoris laterally (Plate 62), the muscles popliteus and semimembranosus posteriorly (Plate 66), and the tendons of sartorius, gracilis, and semitendinosus (pes anserinus) medially (Plate 66). See also Plate 40.

The ligaments are particularly important in limiting ranges of motion of the knee and securing the menisci. The collateral ligaments resist unwanted sideward movements at the knee. The anterior cruciate is named for its anterior tibial attachment, the posterior cruciate for its posterior tibial attachment. In their ascent proximally, they cross (crux, cross). The anterior cruciate passes posteriorly and laterally to end on the posteromedial aspect of the lateral femoral condyle; the posterior cruciate passes anteriorly and medially to end on the medial aspect of the medial femoral condyle. The cruciates essentially resist forward/backward displacement of the tibia/femur; indeed, a torn cruciate ligament generally results in excessive anteroposterior movements of the tibia on the femur.

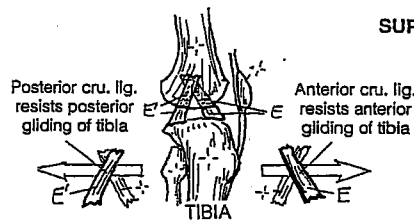
RIGHT KNEE JOINT



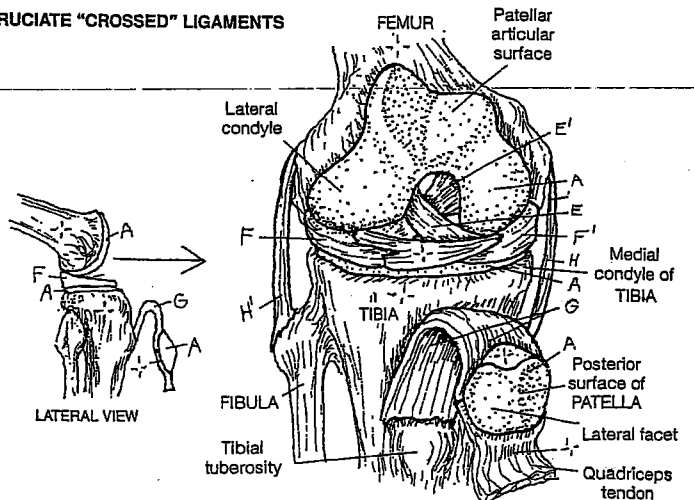
SAGITTAL SECTION



SUPERIOR VIEW OF KNEE JOINT



CRUCIATE "CROSSED" LIGAMENTS



ANTERIOR VIEW OF EXPOSED JOINT