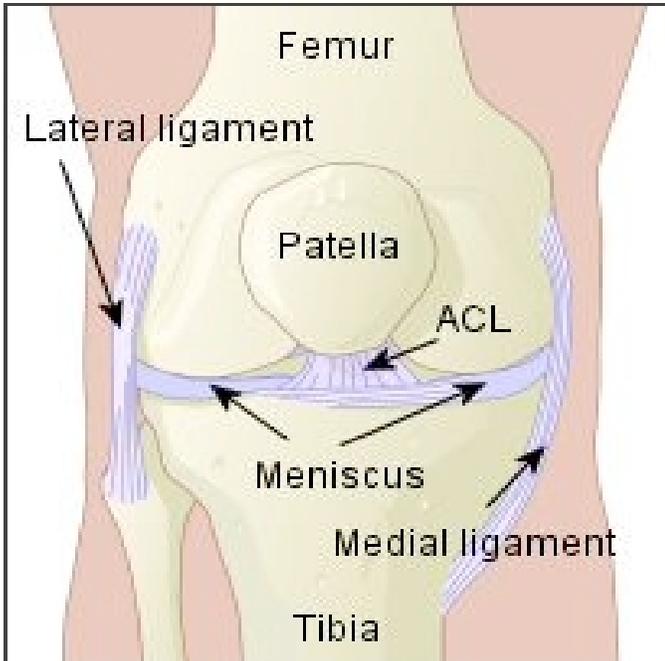
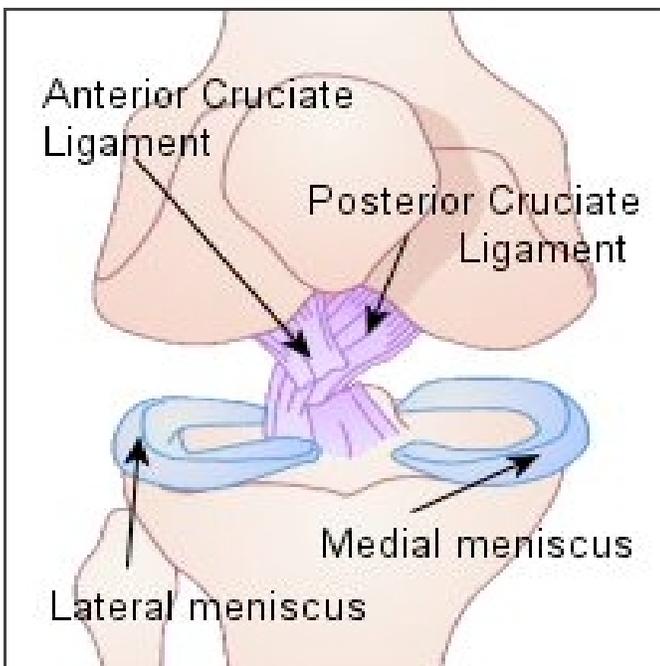


Introduction to knee joint anatomy

The knee joint is the largest joint in the body, consisting of 4 bones and an extensive network of ligaments and muscles. Injuries to the knee joint are amongst the most common in sporting activities and understanding the anatomy of the joint is fundamental in understanding any subsequent pathology.



Anatomy of the knee joint



Close up of ACL and meniscus

Bones of the knee joint

The knee is made up of four main bones- the femur (thigh bone), the tibia (shin bone), fibula (outer shin bone) and patella (kneecap). The main movements of the knee joint occur between the femur, patella and tibia.

Each are covered in articular cartilage which is an extremely hard, smooth substance designed to decrease the frictional forces as movement occurs between the bones.

The patella lies in an indentation at the lower end of the femur known as the intercondylar groove. At the outer surface of the tibia lies the fibula, a long thin bone that travels right down to the ankle joint.

The knee joint capsule

The joint capsule is a thick ligamentous structure that surrounds the entire knee. Inside this capsule is a specialized membrane known as the synovial membrane which provides nourishment to all the surrounding structures.

Other structures include the infrapatellar fat pad and bursa which function as cushions to exterior forces on the knee. The capsule itself is strengthened by the surrounding ligaments.

Ligaments of the knee joint

The stability of the knee owes greatly to the presence of its ligaments. Each has a particular function in helping to maintain optimal knee stability in a variety of different positions.

1. Medial Collateral Ligament (MCL) - This band runs between the inner surfaces of the femur and the tibia. It resists forces acting from the outer surface of the knee- valgus forces.
2. Lateral Collateral Ligament (LCL) - This ligament travels from the outer surface of the femur to the head of the fibula. It resists impacts from the inner surface of the knee- varus forces.
3. Anterior Cruciate Ligament (ACL) - The ACL is one of the most important structures in the knee- not least because injury to it may require extensive surgery and rehabilitation. The cruciate ligaments are so called because they form a cross in the middle of the knee joint. The ACL, travels from the anterior (front) of the tibia to the posterior (back) of the femur and prevents the tibia moving forward. It is most commonly injured in twisting movements.
4. Posterior Cruciate Ligament (PCL) - This ligament travels from the posterior surface of the tibia to the anterior surface of the femur and in doing so wraps around the ACL.

Menisci (knee cartilage)

Each knee joint has two crescent-shaped cartilage menisci. These lie on the medial (inner) and lateral (outer) edges of the upper surface of the tibia bone. They are essential components, acting as shock absorbers for the knee as well as allowing for correct weight distribution between the tibia and the femur.

Muscle Groups surrounding the knee joint

The two main muscle groups of the knee joint are the quadriceps and the hamstrings. Both play a vital role, both moving and stabilizing the knee joint.

- **Quadriceps-** The quadriceps muscle group is made up of four different individual muscles which join together forming the quadriceps tendon. This thick tendon connects the muscle to the patella which in turn connects to the tibia via the patellar tendon. Contraction of the quadriceps, pull the patella upwards and leads to knee extension.
- **Hamstrings-** The hamstrings function in flexing the knee joint as well as providing stability on either side of the joint line.