THE KNEE JOINT
BONES OF THE KNEE

Knee In Extension

patella
femur
articular cartilage
ACL
meniscus
collateral ligaments
fibula
tibia

Knee In Flexion
FEMUR

- Lateral condyle (6 left)
- Medial condyle (8 left)

- Intercondylar fossa (7 left)
FEMUR
FEMUR

- Bone
- Articular Cartilage
- Patella
- Patellar Groove
- Articular Cartilage
TIBIA

- Medial condyle
- Lateral condyle
- Tibial Tuberosity
- Medial Malleolus
• Anterior medial surface
  • Insertion for semitedonosis, semimembranosis, gracilis and sartorius

• Gerdy’s tubercle
  • IT band insertion
FIBULA

- No connection with the femur
- Head
- Lateral malleolus
PATELLA

- A ‘sesamoid’ (floating) bone
- Protection
- Mechanical advantage to quads.
- Without the patella, 30% more force would be required by the quads
PATELLA
THE KNEE

1. Femur - medial condyle
2. Femur - lateral condyle
3. Tibia - medial condyle
4. Tibia - lateral condyle
5. Anterior medial surface
6. Tibial tuberoscity
7. Gerdy’s tubercle (IT band insertion)
8. Head of fibula
9. Patella
KNEE LIGAMENTS AND CARTILAGE
COLLATERAL LIGAMENTS

- They are important in controlling...
  - Tibial rotation
  - Anterior and posterior tibial displacement.
  - Valgus (knocked kneed)
  - Varus (blow legged)
MEDIAL COLLATERAL

- Medial aspect of the knee
- Attached to medial meniscus,
LATERAL COLLATERAL

- Lateral aspect of the knee
- Is not attached to lateral meniscus.
Valgus – lateral force; Stress to the medial collateral ligament

Varus – Medial force; Stress to the lateral collateral ligament
VALGUS AND VARUS

Flexion-Valgus-Rotation externe
(pied bloqué au sol)

Impact
Stretch

Flexio-Varus-Rotation interne
(Le pied bloqué au sol)

Impact
Stretch
CRUCIATE LIGAMENTS

- POSTERIOR CRUCIATE LIGAMENT
- ANTERIOR CRUCIATE LIGAMENT
- FEMUR
- FIBULA
- TIBIA
- LATERAL VIEW
- MEDIAL VIEW
- RIGHT KNEE
- LATERAL MENISCUS
- TIBIA
- MEDIAL MENISCUS
ANTERIOR CRUCIATE LIGAMENT

- Inferior end: proximal, anterior tibia
- Superior end: distal posterior femur
- Prevents excess anterior motion of the tibia and posterior motion of the femur
ACL
POSTERIOR CURCIATE LIGAMENT

- Inferior end: proximal posterior tibia
- Superior end: distal posterior to middle femur
- Prevents excessive posterior movement of the tibia and anterior movement of the femur
Figure 1. One of the mechanisms of injury for a posterior cruciate ligament (PCL) tear is a fall onto a flexed knee with the foot plantarflexed, which applies posterior force to the proximal tibia.
Sliding of the tibia with respect to the femur, a condition referred to as the *drawer sign*, is an indication of the integrity of the cruciate ligaments.

The anterior *drawer sign* is tibial displacement beneath the femur in an anterior direction and reflects the integrity of the *anterior cruciate*. The posterior *drawer sign* is posterior displacement and reflects the integrity of the *posterior cruciate*. The PCL is shorter and stronger than the ACL.
MENISCI

- Two on each of the tibia, loosely attached, thicker to the outside.
- Functions:
  1. Stabilization
  2. Shock absorption
  3. Lubrication
MEDIAL MENISCUS

- Broader in front, most frequently injured
- The medial meniscus is “C” shaped.
- Attached to the medial collateral ligament.
LATERAL MENISCUS

- The lateral meniscus is “O” shaped.
- Not attached to the lateral collateral ligament.
LATERAL MENISCUS

- Medial meniscus
- Lateral meniscus
- Anterior cruciate ligament
- Posterior cruciate ligament
- Meniscofemoral ligament
Movements of the Knee

Flexion

Extension
Actions of the Knee

- Function of the knee
- Flexion
- Extension
MECHANICAL APPLICATIONS TO THE KNEE
Mechanical Advantage from the Patella

- The patella moves the insertion of the quadriceps muscles further down the tibia.
- This increases the folcrum of the quads
- A longer folcrum increases the leverage of the quads making them a strong muscle group

- No patella: Folcrum \( {\wedge}_F^{_____} R \).
- Patella: \( {\wedge}_{_____} F^{_____} R \).
Patellar ligament

What landmark of the tibia does the patella tendon insert on?
Q-Angle.

- The deviation between the line of pull of the rectus femoris and the patellar ligament.
- It is usually measured from the anterior superior iliac spine and the center of the patella.
- A Q-angle of 10° is considered normal.
- Angles greater than this can result in lateral patellar dislocations when contractions of the quadriceps reduces the angle.
Q Angle

Rectus Femoris

Tibia / Patellar Ligament

Rectus Femoris

Tibia / Patellar Ligament

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