Knee joint

Type:
  Synovial
  compound
  complex
  hinge/condyloid/saddle
Knee joint- articular surfaces

Condyles of femur,
Condyles of tibia
Patella
Ligaments and cartilages

- Fibrous capsule
- Ligamentum patellae
- Oblique popliteal ligament
- Arcuate popliteal ligament
- Tibial collateral ligament
- Fibular collateral ligament
contd.

- Cruciate ligaments: Anterior & Posterior
- Menisci: Medial & Lateral
- Transverse ligament
- Meniscofemoral ligament
• Patellar ligament
  Continuation of quadriceps femoris tendon
  Extends from apex of patella to tibial tuberosity
Tibial collateral ligament

- extends from medial femoral epicondyle to medial tibial condyle.

- Firmly attached to medial lemniscus

- Prevents medial dislocation

- Taut on extension
Fibular Collateral ligament

• extends from lateral femoral epicondyle to Head of fibula.

• Separated from lateral lemniscus by popliteus tendon

• Taut on extension

• Limits extension and adduction
Oblique popliteal

- Expansion of semimembranous tendon
- Passes upwards obliquely from medial condyle of tibia.

Arcuate popliteal

- from head of fibula, arches sup. and med. To fuse with articular capsule
Cruciate ligaments (intracapsular)

Anterior:

- From ant inter condylar area of tibia up to lateral femoral condyle
- Prevents forward sliding of tibia on femur
- Taut during extension
Cruciate ligaments:

• posterior:
  • From posterior intercondylar area of tibia up to medial femoral condyle
  • Prevents backward sliding of tibia on femur
  • Taut during flexion
Menisci, transverse ligament & meniscofemoral ligaments:

Medial
Is C-shaped
Is attached to medial collateral ligament.
And interarticular area of the tibia
Menisci, transverse ligament & meniscofemoral ligaments:

**lateral**

Is nearly circular

Is separated from fibular collateral ligament by the tendon of popliteus muscle.

**Transverse ligament**: binds the anterior horns of the lateral & medial menisci
Synovial membrane
Lines the intracapsular part,
Attaches to patella and menisci.
Reflects on cruciate ligaments
Ant. Covers the infrapatellar pad of fat
Synovial membrane and bursae:
Figure 10-61  Relations of the right knee joint.
Relations:

- Anterior-
tendon of quadriceps along with ligamentum patellae and patellar retinacula
- Posteromedial-
sartorius and tendon of gracilis
- Posterolateral-
tendon of biceps, common peroneal nerve
- Posterior-
popliteal vessels, lymph nodes;
tibial nerve posterior to the vessels;
both heads of gastrocnemius and plantaris
• Bursae around knee joint

a) ANTERIOR

1) Suprapatellar (between femur & quadriceps)

2) Subcutaneous prepatellar (between patella & skin)

3) Deep infrapatellar (between tibia & patellar ligament)

4) Subcutaneous infrapatellar (between tibial tuberosity & skin)
B) LATERAL
between
1) lateral head of gastrocnemius & capsule
2) fibular collateral ligament & biceps
3) fibular collateral ligament & popliteus
4) popliteus & lateral femoral condyle
B) MEDIAL

between
1) medial head of gastrocnemius & capsule
2) tibial collateral ligament & tendons of sartorius, semimembranosus and gracilis
3) deep to tibial collateral ligament & between femur/capsule/medial meniscus/tibia/semimembranosus
4) tendon of semimembranosus & medial tibia condyle
5) tendons of semimembranosus & semitendinosus
Blood supply:

- Descending genicular br. of femoral
- Superior, middle and inferior genicular br. of popliteal
- Anterior and posterior recurrent genicular br. of anterior tibial
- Circumflex fibular and descending br. of lateral circumflex femoral
Nerve supply:

• Posterior division of obturator
• Femoral through nerves to vasti
• Tibial through superior & inferior medial genicular and middle genicular
• Common peroneal through superior & inferior lateral genicular and recurrent genicular
Movements:

- Flexion-
biceps femoris/ semimembranosus/
semitendinosus/ gracilis/ sartorius/
popliteus/ gastrocnemius/ plantaris

- Extension-
quadriceps
tensor fasciae latae
movements (contd.)

• Lateral rotation (with foot on the ground)-
popliteus (unlocking)/
semimembranosus
semitendinosus/ gracilis/ sartorius
• Medial rotation (with foot on the ground)-
biceps
tensor fasciae latae
Locking and unlocking

- **Locking:**
  In full extension: A slight medial rotation of femur on tibia (screw home position)

- **Unlocking:** A slight lateral rotation of femur on tibia (Popliteus acts as key; contraction has helped the rotation of lateral femoral condyle, pulls lateral lemniscus backwards.)
Applied anatomy

- Ligament sprains
(B) Anterior drawer sign (ACL)

Half of bone is removed to show ligaments.

Anterior cruciate ligament (torn)

The anterior cruciate ligament prevents the femur from sliding posteriorly on the tibia and hyperextension of the knee and limits medial rotation of the femur when the foot is on the ground, and the leg is flexed.
The posterior cruciate ligament prevents the femur from sliding anteriorly on the tibia, particularly when the knee is flexed.
• Meniscal tears:
• Bursitis
  Housemaid’s knee (prepatellar)
  Clergyman’s knee (subcutaneous infrapatellar)
  Deep infrapatellar
  Suprapatellar
  Popliteal cysts
• Deformities
  Genu varum (adduction deformity)
  Genu valgum (abduction deformity)
• Aspiration
• Arthroscopy
• Replacements