KNEE JOINT 3

ANTERIOR CRUCIATE LIGAMENT
From: Anteroiateral tibia
To: Posterior on medial side of lateral femoral condyle
Limits: Extension & anterior draw & is taut on locking
Test: Pull tibia forwards on femur

POSTERIOR CRUCIATE LIGAMENT
From: Posteromedical tibia
To: Anterior on lateral side of medial femoral condyle
Limits: Posterior slide of tibia on femur.
Used: Down stairs & on hills
Test: Push tibia back on femur

ANTERIOR VIEW OF RIGHT KNEE

POSTERIOR VIEW OF RIGHT KNEE

DRAWER TEST
Positive posterior drawer test showing a ruptured posterior cruciate ligament.
BUT beware - if the dip below the patella is not noticed this might appear as a false positive anterior drawer test when the tibia is pulled anteriorly
KNEE JOINT 2
ORDER OF STRUCTURES ON TIBIAL PLATEAU
(anterior to posterior)
UPPER SURFACE OF RIGHT TIBIA

MEDIAL

Lateral meniscus (post. attachment)

Lateral meniscus (ant. attachment)

Medial meniscus (post. attachment)

MENISCUS

Liable to tears when flexed knee is twisted
Function: transfers forces, keep bones together, helps locking

MEDIAL MENISCUS

● Wider C
● Medial lip slopes up
● Attaches as shown but also to medial collateral ligament
● More liable to damage than lateral meniscus

LATERAL MENISCUS

● Smaller, tighter C
● Lateral lip slopes down
● Not attached to lateral collateral ligament
● Attached as shown
● Lightly attached to popliteus & is retracted by it on flexion
RIGHT PATELLA
Largest sesamoid bone in body
Mobile from side to side

Upper lateral part is site of bipartite patella
Apex Anterior view
Anterior/posterior is obvious

Lateral/posterior surface is: Larger, longer, more steeply sloped
Patella tendon attaches to the tibial tubercle
Posterior view

ARTICULATION WITH FEMUR
1. In extension
2. In slight flexion
3. In flexion
4. In full flexion

Lateral Medial

OSSIFICATION
Several centres between 3 & 6 years that fuse at puberty (they appear as child starts running). Sometimes a separate centre superior/lateral at 6 years - fuses at puberty

Deviation from the vertical (the tibia) to a line along the femur (pull of quadriceps). Wider the pelvis, the greater Q angle (F > M)
Offset tends to pull patella laterally. 3 factors avoid dislocation

1. Insertion of lower fibres of vastus medialis into medial side of patella
2. Stronger medial retinacular fibres of knee capsule
3. More anteriorly protuberant lateral condyle of lower femur. Note that lateral condyle is smaller than medial one but it protrudes further anteriorly

THE Q ANGLE AND PATELLA DISLOCATION
KNEE JOINT 6

BURSAE AND SYNOVIUM

Synovium lines the inside of the capsule and is attached to the bony edges. It extends into the suprapatellar bursa. The cruciate ligaments and popliteus tendon lie outside it (see figure below).

Tibial plateau showing attachment of synovium to its edges. The cruciate ligaments lie outside it but the menisci within it

Suprapatellar bursa, extension of synovium of knee joint

Prepatellar bursa (Housemaid’s)

Superficial infrapatellar bursa (Clergyman’s)

Deep infrapatellar bursa

Bursae associated with tendons and muscles
1. Under sartorius, gracilis, semitendinosus
2. Under medial head of gastrocnemius (often into joint)
3. Under lateral head of gastrocnemius (sometimes into joint)
4. Under lateral collateral ligament
5. Under popliteus (into joint)
6. Under semimembranosus
KNEE JOINT 4

RIGHT CAPSULE

Capsule is attached to the bony margins of the tibia and femur. It has several thickenings shown below called internal ligaments.

1. Thickened medially to make the Short Internal (medial) Ligament which attaches to medial collateral ligament outside & to the medial meniscus inside as the coronary ligaments.

2. Arcuate Popliteal Ligament. This is Y shaped and the lateral part of it is often known as the Short External (lateral) ligament. Popliteus tendon passes medially to it.

3. Medial and lateral Patellar Retinacular Fibres. These reinforce the capsule anteriorly. The medial ones are important as they help to prevent the patella dislocating laterally.

![Diagram of Knee Joint]

Encloses popliteus tendon

Dips to enclose posterior cruciate ligament
KNEE JOINT 5

LIGAMENTS OF RIGHT KNEE

MEDIAL COLLATERAL
- Broad, long, thick, strong
- Attached to capsule & medial meniscus
- Limits full extension & thus aids locking

LATERAL COLLATERAL
- Thick, cordlike.
- Not attached to joint structures.
- Limits full extension & thus aids locking

OBLIQUE POPLITEAL
- Upward extension of semimembranosus tendon.
- Limits extension & thus aids knee locking

NOTE
- Knee is largest joint in body
- It is a modified hinge joint
- The line of the body weight is anterior to the knee
KNEE JOINT 3

ANTERIOR CRUCIATE LIGAMENT
From: Anterolateral tibia
To: Posterior on medial side of lateral femoral condyle
Limits: Extension & anterior draw & is taut on locking
Test: Pull tibia forwards on femur

POSTERIOR CRUCIATE LIGAMENT
From: Posteromedial tibia
To: Anterior on lateral side of medial femoral condyle
Limits: Posterolateral slide of tibia on femur.
Used: Down stairs & on hills
Test: Push tibia back on femur

ANTERIOR VIEW OF RIGHT KNEE

POSTERIOR VIEW OF RIGHT KNEE

DRAWER TEST

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KNEE JOINT 7

BLOOD & NERVE SUPPLY, MOVEMENTS

BLOOD SUPPLY
Genicular arteries
  • Popliteal gives: Superior (medial and lateral)
    Middle
    Inferior (medial and lateral)
  • Femoral gives: Descending branch from profunda

NERVES
• Posterior division of obturator
• Femoral
• Sciatic (both parts)

MOVEMENTS
Flexion: Semimembranosus, semitendinosus, biceps, gracilis, sartorius (gastrocnemius, plantaris, popliteus)

Extension: Quadriceps femoris, iliotibial tract (gluteus maximus, tensor fasciae latae)

Internal rotation  Semimembranosus, semitendinosus, (with knee flexed):  gracilis, sartorius

External rotation  Biceps
(with knee flexed):
KNEE JOINT 8

PHYSIOLOGICAL LOCKING OF KNEE

**LOCKING**

Full extension → Taut anterior cruciate → No further symmetrical extension → Medial femoral condyle moves back - lateral condyle moves forwards

Tensor fasciae latae & gluteus maximus tighten iliotibial tract

Knee “hyperextends” and locks

Medial/lateral collateral & oblique popliteal ligaments tighten

Femur internally rotates on tibia on axis of anterior cruciate ligament

**UNLOCKING**

Popliteus externally rotates femur on tibia → Locked ligaments loosen → Hamstrings can then flex knee