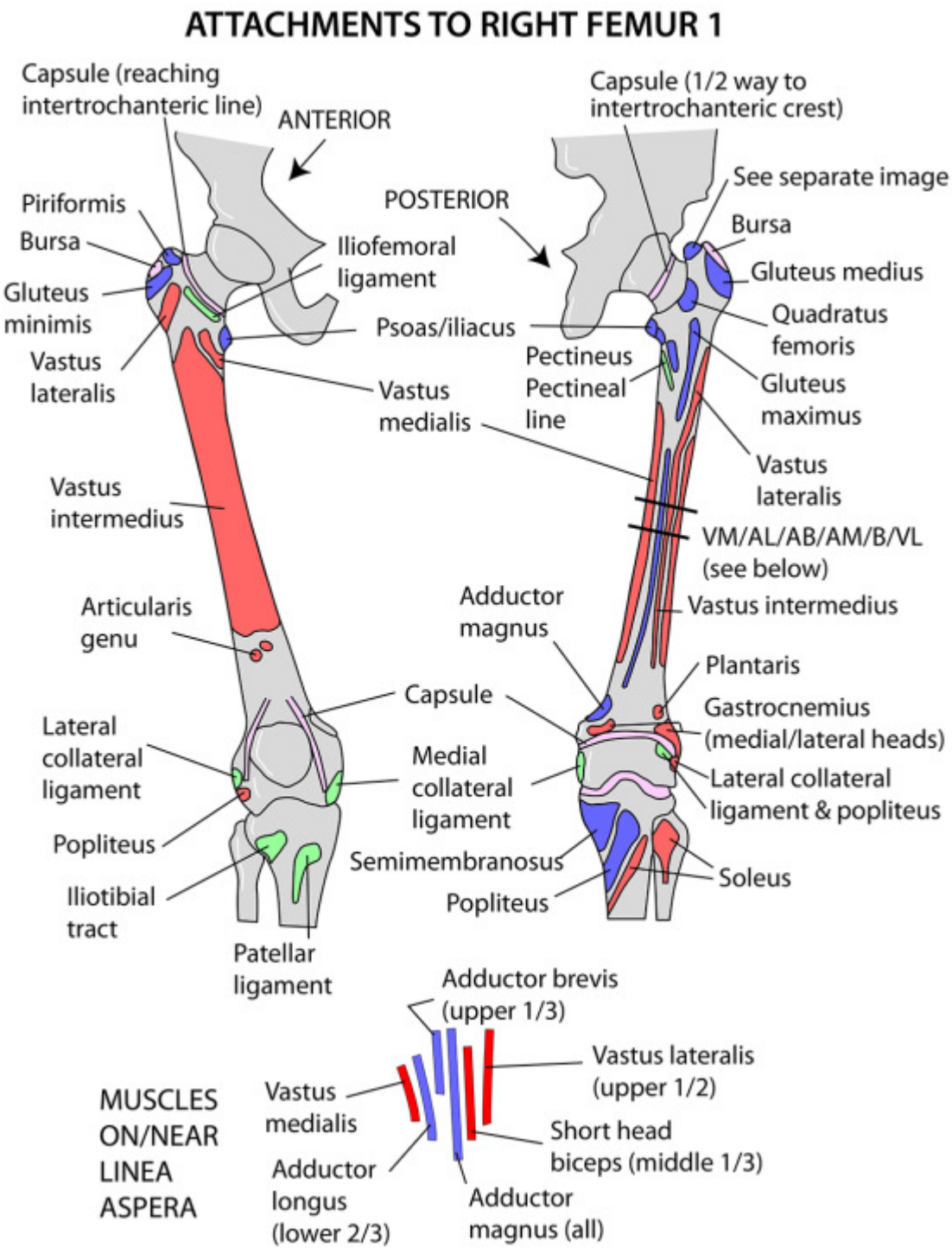
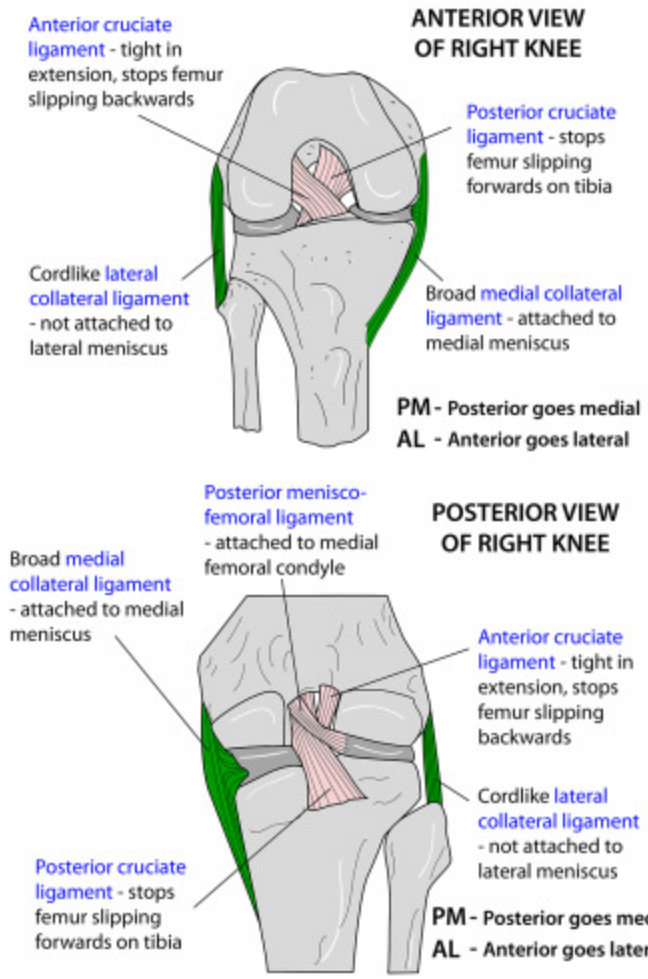
The Knee Joint



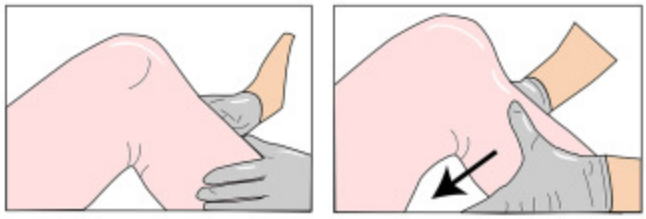
KNEE JOINT 3

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: Posterior slide of tibia on femur.
Used: Down stairs & on hills
Test: Push tibia back on femur



DRAWER TEST

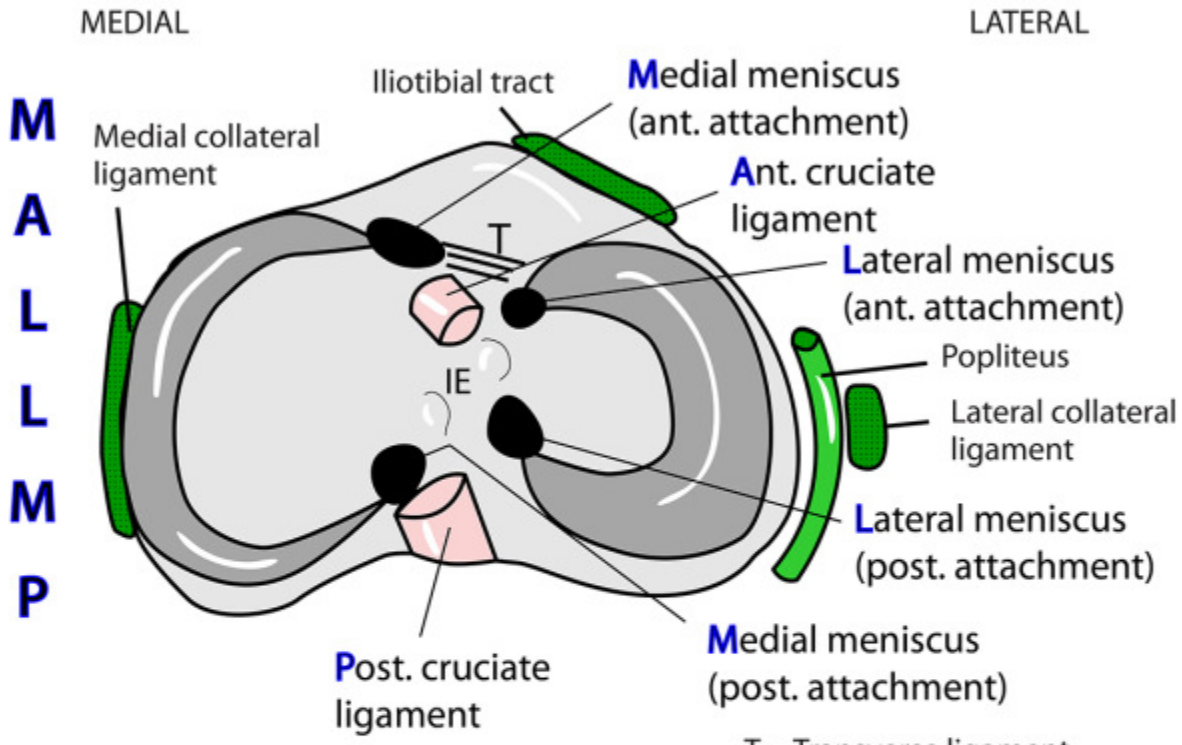


DRAWER TEST
Positive posterior drawer test showing a ruptured posterior cruciate ligament.
BUT beware - if the dip below the patella is not noticed this might appear as a false positive anterior drawer test when the tibia is pulled anteriorly

KNEE JOINT 2

ORDER OF STRUCTURES ON TIBIAL PLATEAU
(anterior to posterior)

UPPER SURFACE OF RIGHT TIBIA



T = Transverse ligament
IE = Intercondylar eminence with medial & lateral intercondylar tubercles

MENISCI

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

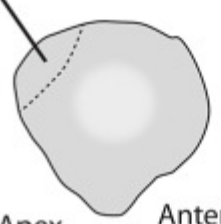
LATERAL MENISCUS

- 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

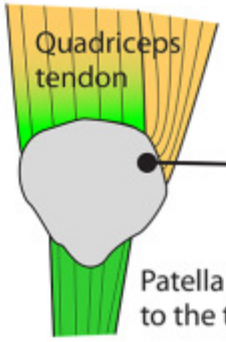
Upper lateral part is site of bipartite patella



Apex

Anterior view

Anterior/posterior is obvious

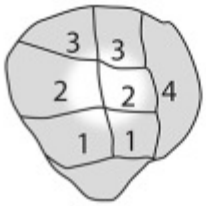


Lateral/posterior surface is: Larger, longer, more steeply sloped

Patella tendon attaches to the tibial tubercle

Posterior view

ARTICULATION WITH FEMUR



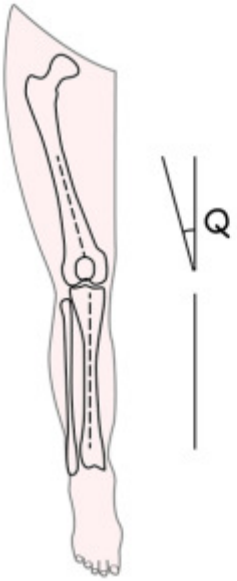
1. In extension
2. In slight flexion
3. In flexion
4. In full flexion

Lateral Medial

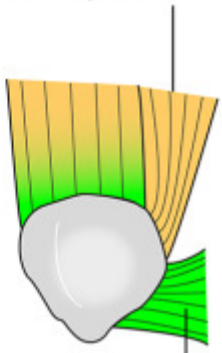
OSSIFICATION

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

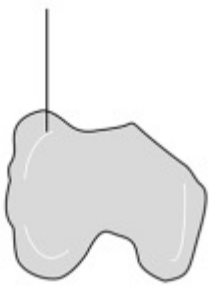


1. Insertion of lower fibres of vastus medialis into medial side of patella



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



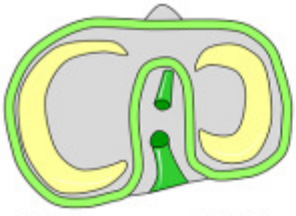
THE Q ANGLE AND PATELLA DISLOCATION

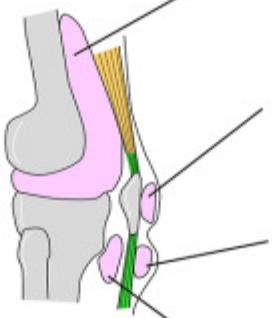
KNEE JOINT 6

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 out side 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

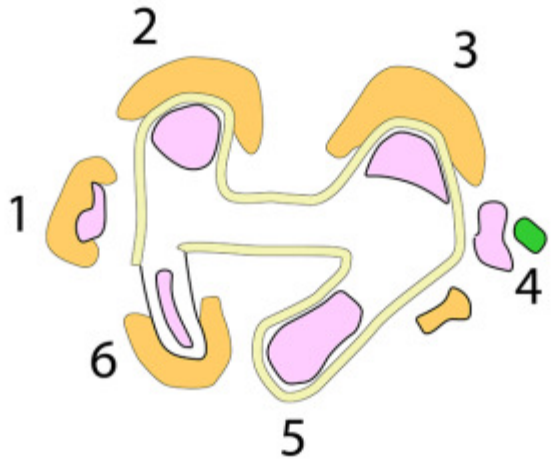
Prepatellar bursa (Housemaid's)

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

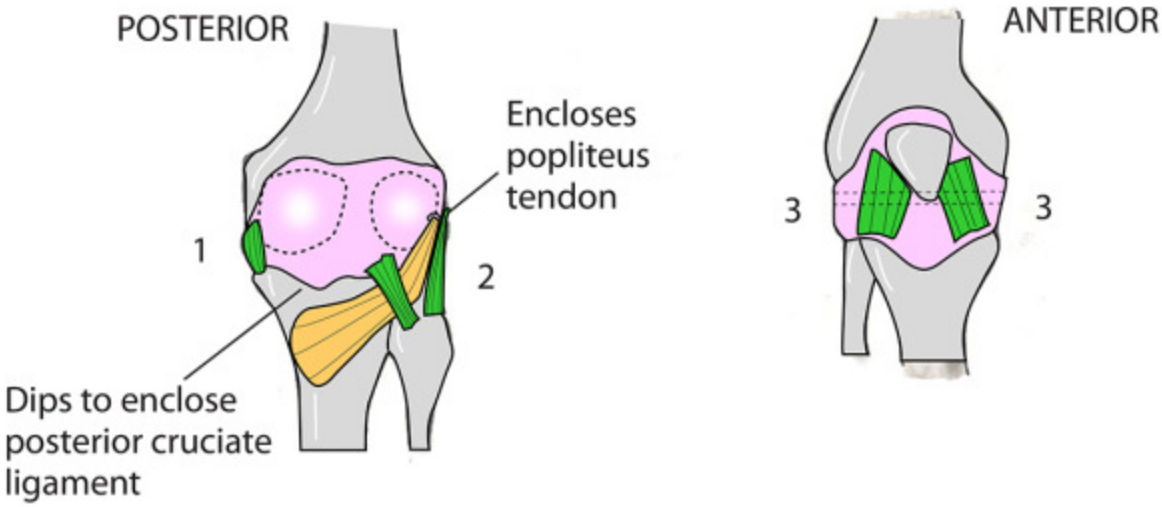


KNEE JOINT 4

RIGHT CAPSULE

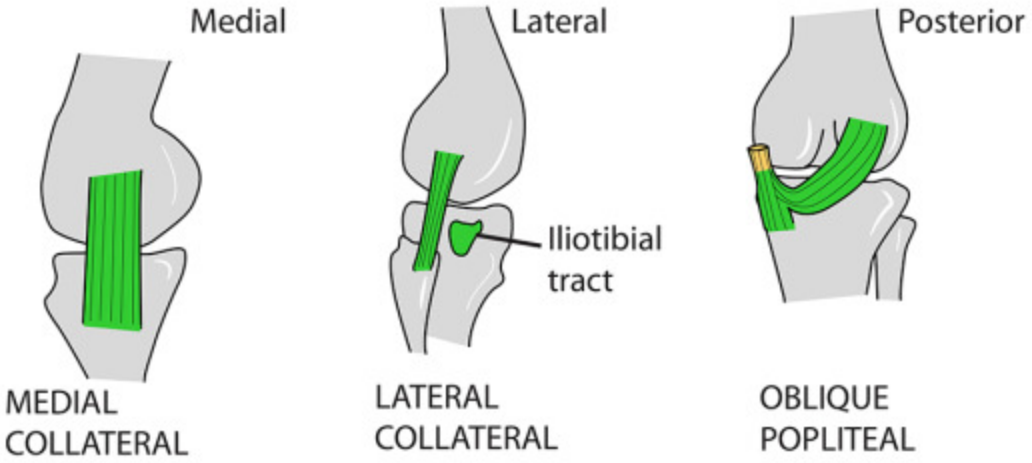
Capsule is attached to the bony margins of the tibia and femur
It has several thickenings shown below called internal ligaments

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



KNEE JOINT 5

LIGAMENTS OF RIGHT KNEE



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

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

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

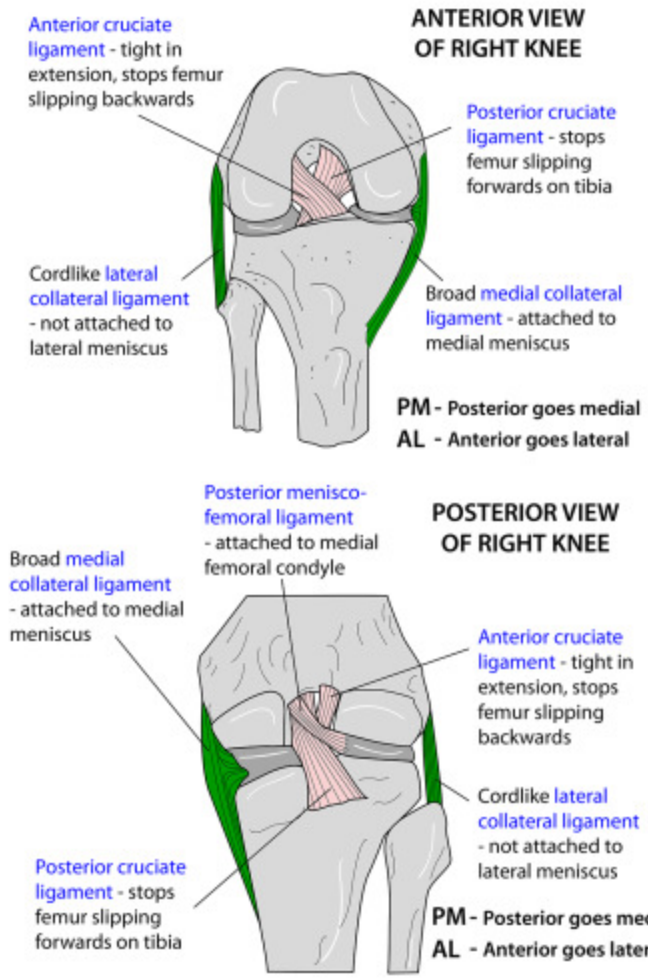
NOTE

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

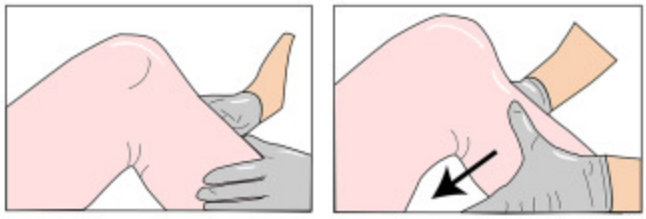
KNEE JOINT 3

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: Posterior slide of tibia on femur.
Used: Down stairs & on hills
Test: Push tibia back on femur



DRAWER TEST



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

External rotation (with knee flexed): Biceps

KNEE JOINT 8

PHYSIOLOGICAL LOCKING OF KNEE