LOWER EXTREMITY 3
ANTERIOR LEG. KNEE JOINT

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Leg: superficial structures

Great and lesser saphenous Vv, saphenous N, sural N
Popliteal fossa

Common fibular N entering lateral and anterior compartments of leg: branches into deep and superficial fibular Nn
Major arteries of the leg
Skeleton of leg: tibia and fibula with connecting interosseous membrane with vascular foramen

Crural (leg = crus) compartments
Anterior crural (prim. dorsal)

Lateral crural (prim. dorsal)

Deep posterior crural (prim. ventral)

Superficial posterior crural (prim. ventral)

Deep posterior crural compartment (3-4)

Tibial N (L4-S3)

Fibular A

Tibialis posterior M (sometimes in separate compartment 3)

Flexor digitorum longus M

Flexor hallucis longus M
Superficial posterior crural compartment (5)

- Tibial N (L4-S3)
- Posterior tibial A
- Gastrocnemius M
- Plantaris M
- Popliteus M
- Soleus M

Anterior crural compartment (1)

- Deep fibular N L4-S2
- Anterior tibial A
- Tibialis anterior M
- Extensor hallucis longus M
- Extensor digitorum M
  (Fibularis tertius M)
Lateral crural compartment (2)

Superficial fibular N
Perforating branches of anterior tibial A and fibular A
Fibularis longus M
Fibularis brevis M

Retinacula and tendon sheaths

Superior (transverse) retinaculum
Inferior retinaculum
Tendon sheath
Retinacula redirect lines of action of the muscles.
None of the muscles in the anterior and lateral compartments cross the knee joint. They act on distal joints (ankle joints and joints of the foot)
**Synovial fluid-filled structures**

- **Diarthrodial joint spaces**: reduce friction in joint movement
- **Bursae**: allow movement of muscles over rigid surfaces
- **Tendon sheaths**: allow smooth gliding of long tendons

**Muscles of the anterior and lateral crural compartments**
Dorsal foot
4 dorsal and 3 plantar interossei

Dorsal foot: arteries and nerves

Superficial fibular N medial (I)
/lateral br.II-V Sural N lat.toe V
**Knee joint: skeletal components**

Distal femur: femoral condyles
Proximal tibial plateau and Patella

Patella: allows for smooth gliding of quadriceps tendon; centralizes forces of different quadriceps heads; and improves efficiency through entire range of motion.
Ligaments associated with joints

Ligaments may
• Cross the joint space inside the capsule
• Reinforce the capsule
• Run outside the capsule
Ligaments crossing joint space

- PCL: prevents forward displacement of femur in flexion
- ACL: prevents backward displacement of femur in extension

External ligaments

- Patellar ligament with lateral and medial patellar retinacula (expansion of vastus muscle tendons)
- Lateral and medial collateral ligaments (prevent lateral and medial displacement, and resist lateral rotation)
- Oblique popliteal ligament (resists medial rotation)
- Arcuate popliteal ligament
In extension, most ligaments are stretched.

ACL  PCL

Extreme extension

ACL  PCL  MCL  LCL

Extreme flexion
If opposing joint surfaces are incongruous discs (menisci) are present.

Medial meniscus position is relatively fixed – attachment to MCL
Lateral meniscus can move more freely – no attachment to LCL

Extension
Flexion; diff. degrees of rotation
Axes of rotation of knee joint.
2 principal motions: flexion/extension, medial/lateral rotation

3rd AP axis: varus (knockkneed) and valgus (bowlegged)

Flexion of knee joint – muscles posterior to transverse axis

Hamstrings
Sartorius M
Gracilis M
Gastrocnemius M
Plantaris M
Popliteus M
Extension of knee joint

- Quadriceps femoris M
- Tensor fasciae latae M.

Lateral and medial rotation of knee joint – in semiflexed position

- Biceps femoris M (lateral rotation)
- Semitendinosus M
- Semimembranosus M
- Gracilis M
- Sartorius M
- Popliteus M (unlocking extended knee)
Extension of knee joint involves 3 motions.
Initially simultaneous roll and slide. ACL and iliotibial tract become stretched and prevent further motion – final 10 degree of extension: spin with 5 degree lateral terminal rotation of tibia to locked position. To unlock popliteus M. must contract.