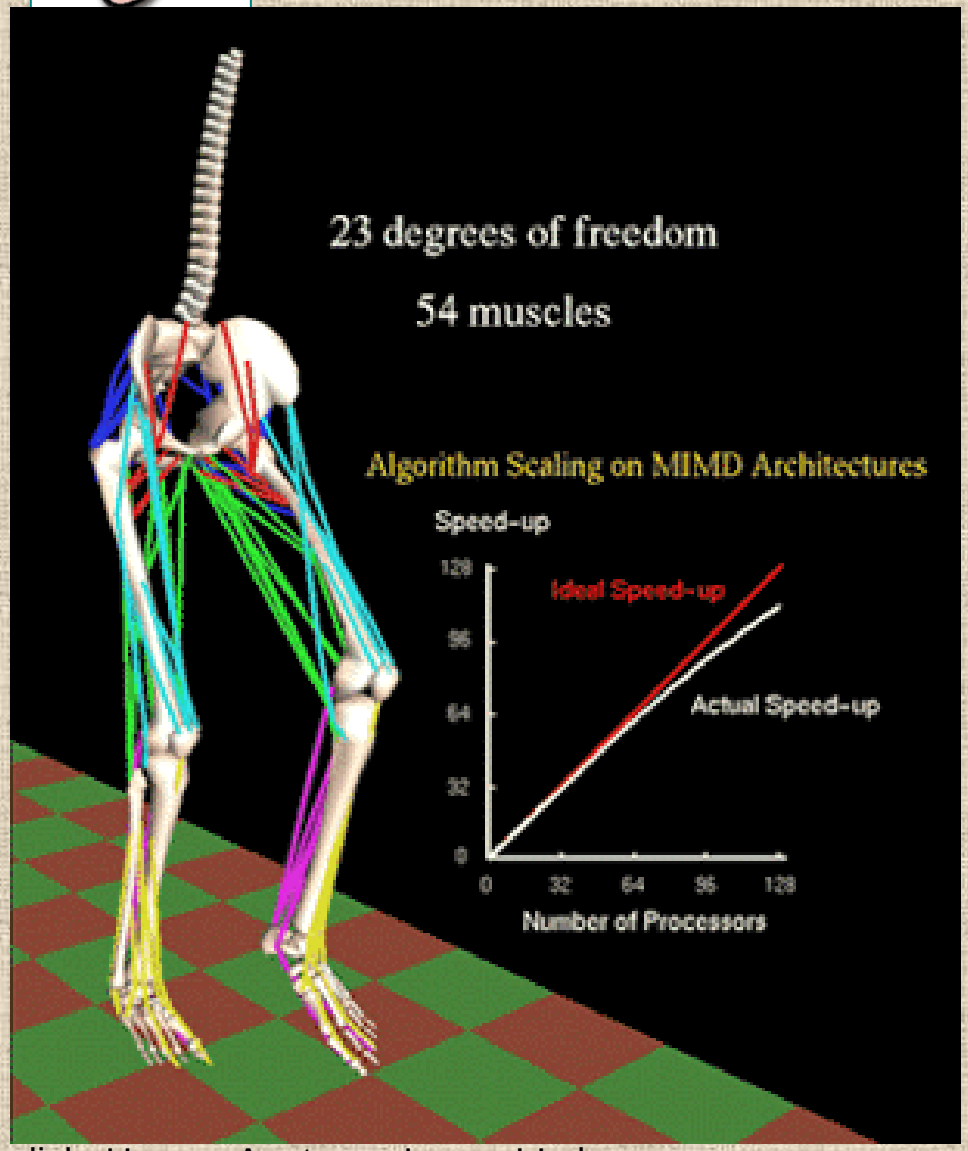
Lower Limb

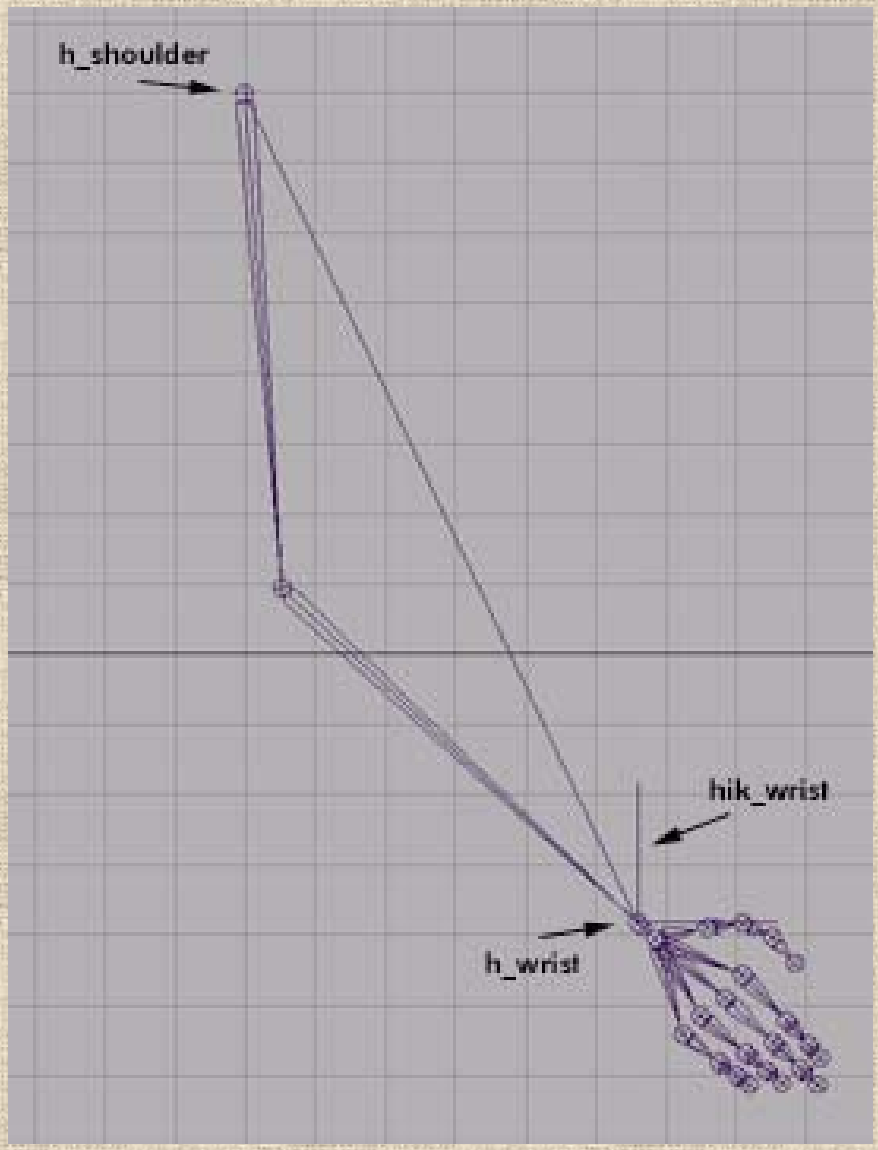
- Skeleton (homologous with upper limb)
- Muscles--anterior, posterior compartments
- Nerves--sciatic, femoral
- Surface anatomy

Frolich, Human Anatomy, Lower LImb

Upper-Lower Limb Comparison

See Table M&M, Table 8.1





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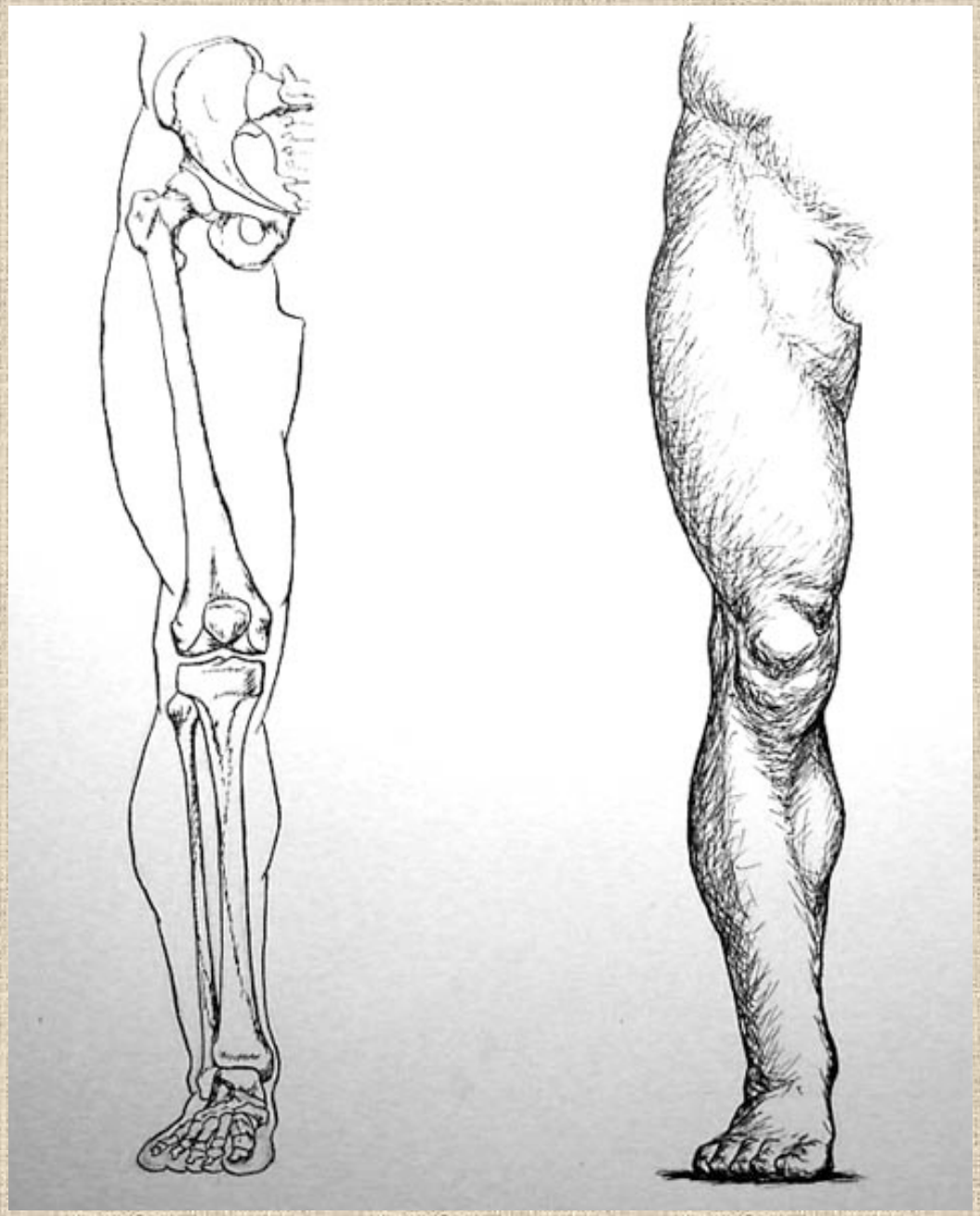

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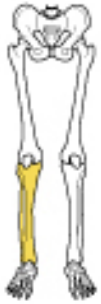
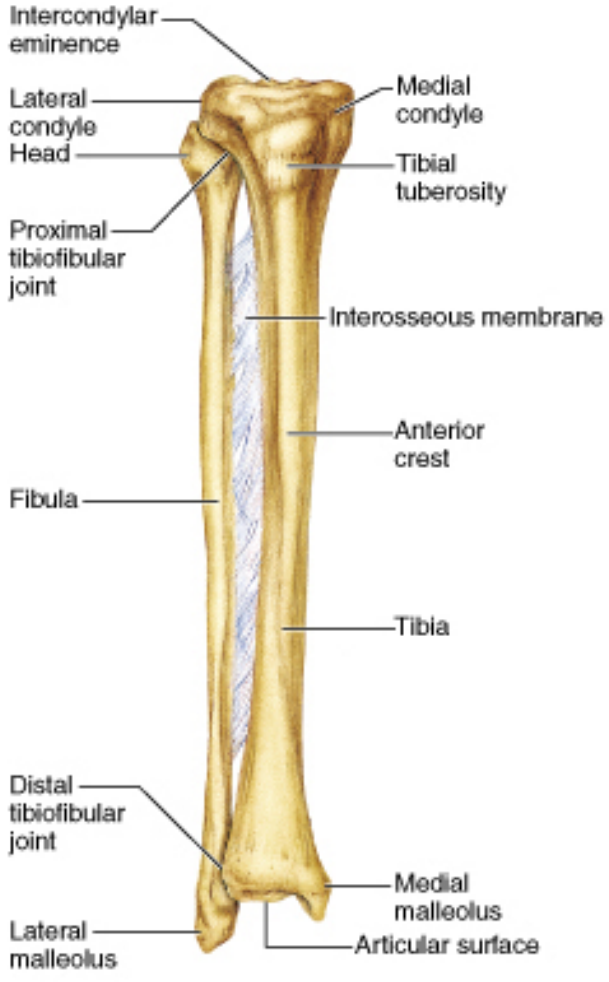
Tibia/fibula





(a) Anterior view

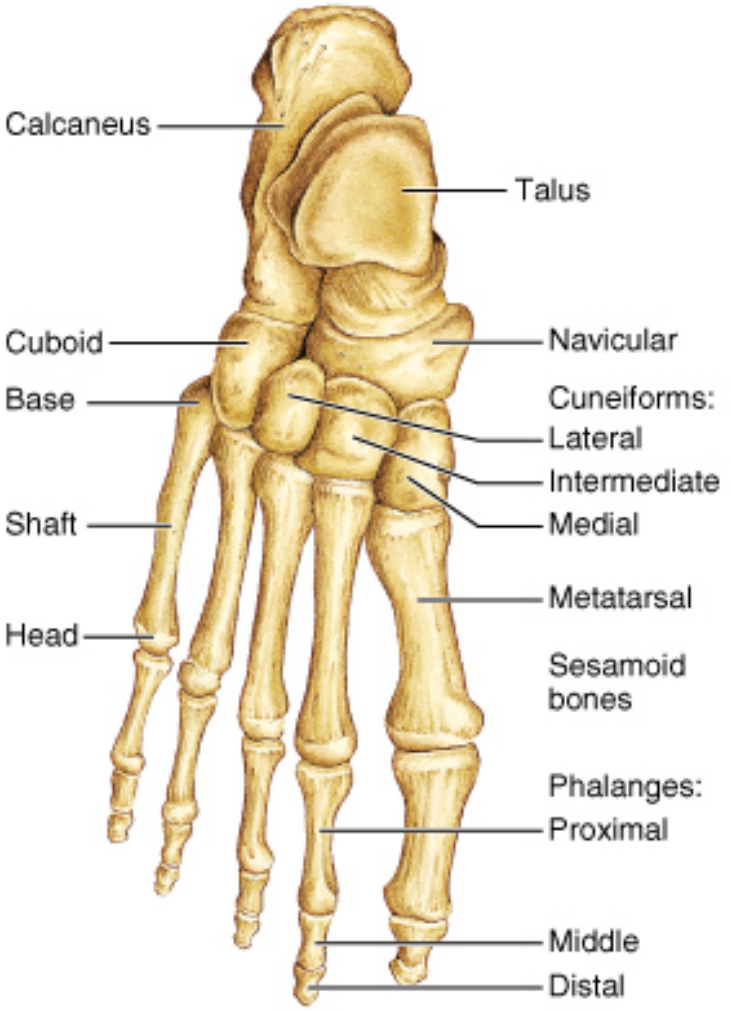
- Tibia--big toe side
- Fibula--little toe side

(no pronation/supination)

Frolich, Human Anatomy, Lower LImb

Ankle

- Tarsus--forms ankle joint
- Calcaneus--forms heel



(a) Superior view

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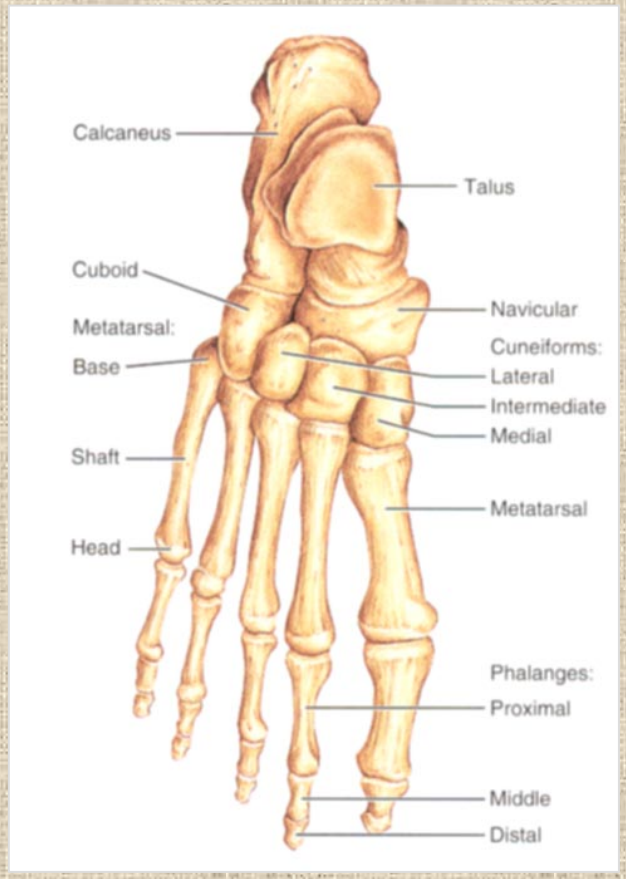
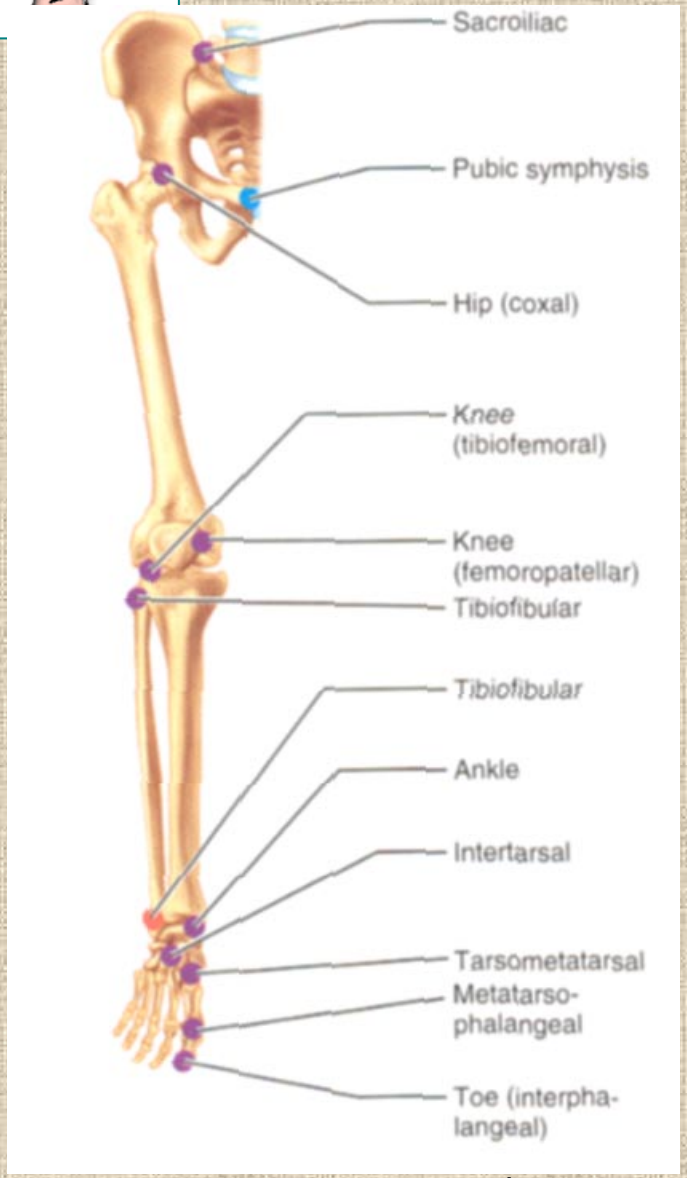
Foot



- Function:
  - Support weight
  - Act as lever when walking
- Tarsals
  - Talus = ankle
    - Between tibia + fibula
    - Articulates w/both
  - Calcaneus = heel
    - Attachment for Calcaneal tendon
    - Carries talus
- Metatarsals
  - Homologous to metacarpals
- Phalanges
  - Smaller, less nimble

Frolich, Human Anatomy, Lower LImb

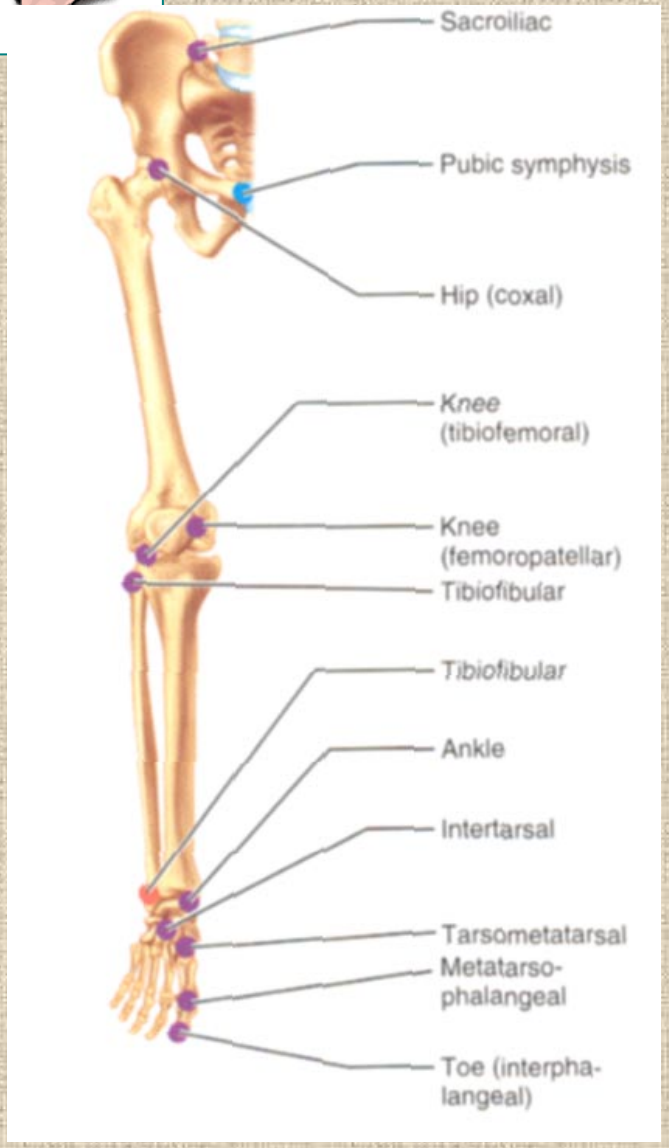
Joints of Lower Limb



Frolich, Human Anatomy, Lower LImb

- Hip (femur + acetabulum)
  - Ball + socket
  - Multiaxial
  - Synovial
- Knee (femur + patella)
  - Plane
  - Gliding of patella
  - Synovial
- Knee (femur + tibia)
  - Hinge
  - Biaxial
  - Synovial

Joints of Lower Limb



- Proximal Tibia + Fibula
  - Plane
  - Gliding
  - Synovial
- Distal Tibia + Fibula
  - Slight “give”
  - Fibrous
- Ankle (Tibia/Fibula + Talus)
  - Hinge
  - Uniaxial
  - Synovial

pg. 218
Frolich, Human Anatomy, Lower LImb

Lower Limb Movements

- Bending on posterior side is flexion (except hip)
- Bending on anterior sided is extension (except hip)

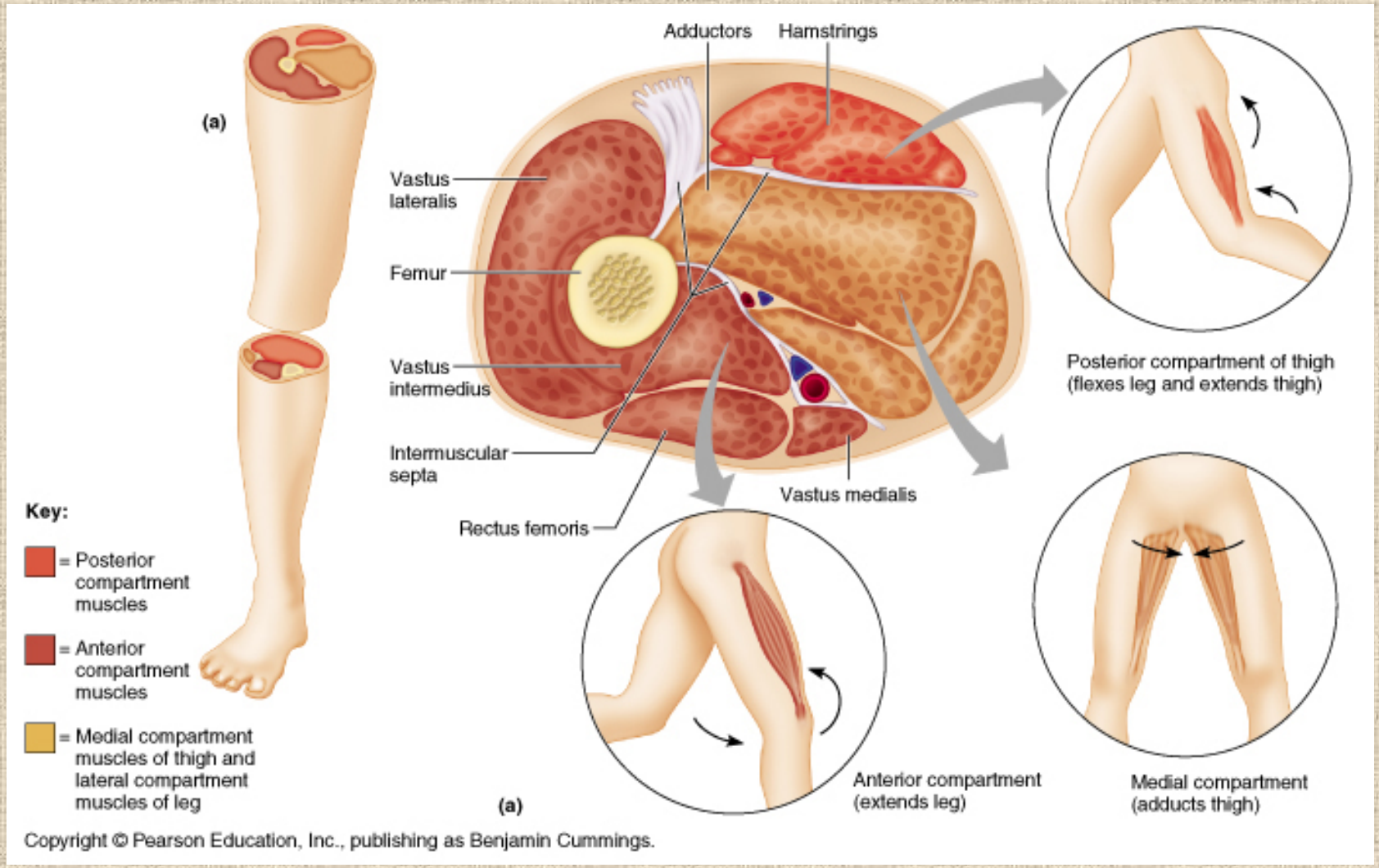
- Hip
  - Flexion/extension
  - Abduction/adduction
  - Lateral/medial rotation
- Knee
  - Flexion/extension
- Ankle
  - Dorsiflexion/plantarflexion
  - Inversion/eversion
- Toes
  - Flexion/extension

Anterior/Posterior compartments

	ANTERIOR COMPARTMENT	POSTERIOR COMPARTMENT
MOVEMENT	Extension	Flexion
MUSCLES	Quads Shin	Hamstrings Gastrocs
NERVES	Femoral n. (lumbar plexus)	Sciatic n. (sacral plexus)

Frolich, Human Anatomy, Lower LImb

Thigh movements by compartment



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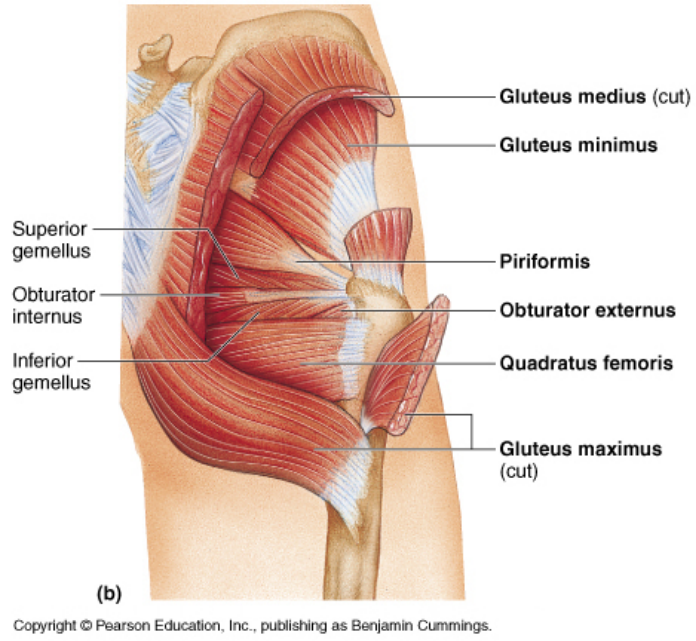
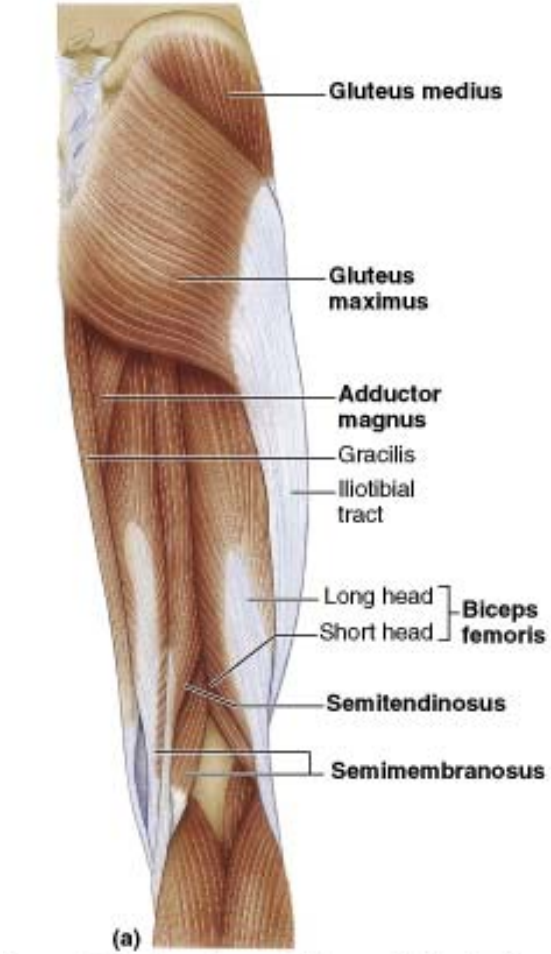
Posterior Thigh





- Gluts (gluteal nn.)
  - Maximus—extensor of thigh
  - Medius--pelvic tilt
- Lateral rotators (spinal nn.)
  - Piriformis syndrome
- Hamstrings (sciatic n.)
  - Biceps femoris
  - Semimembranous
  - Semitendinous

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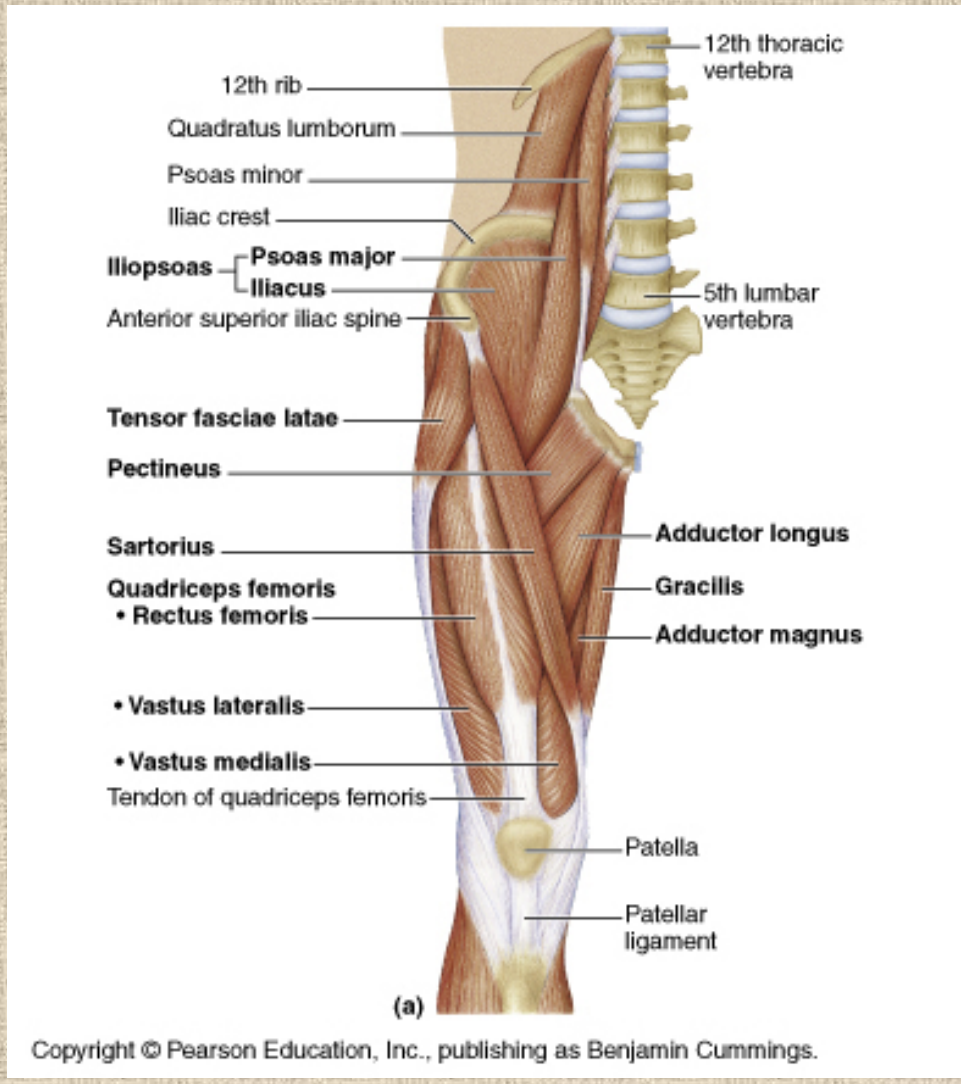
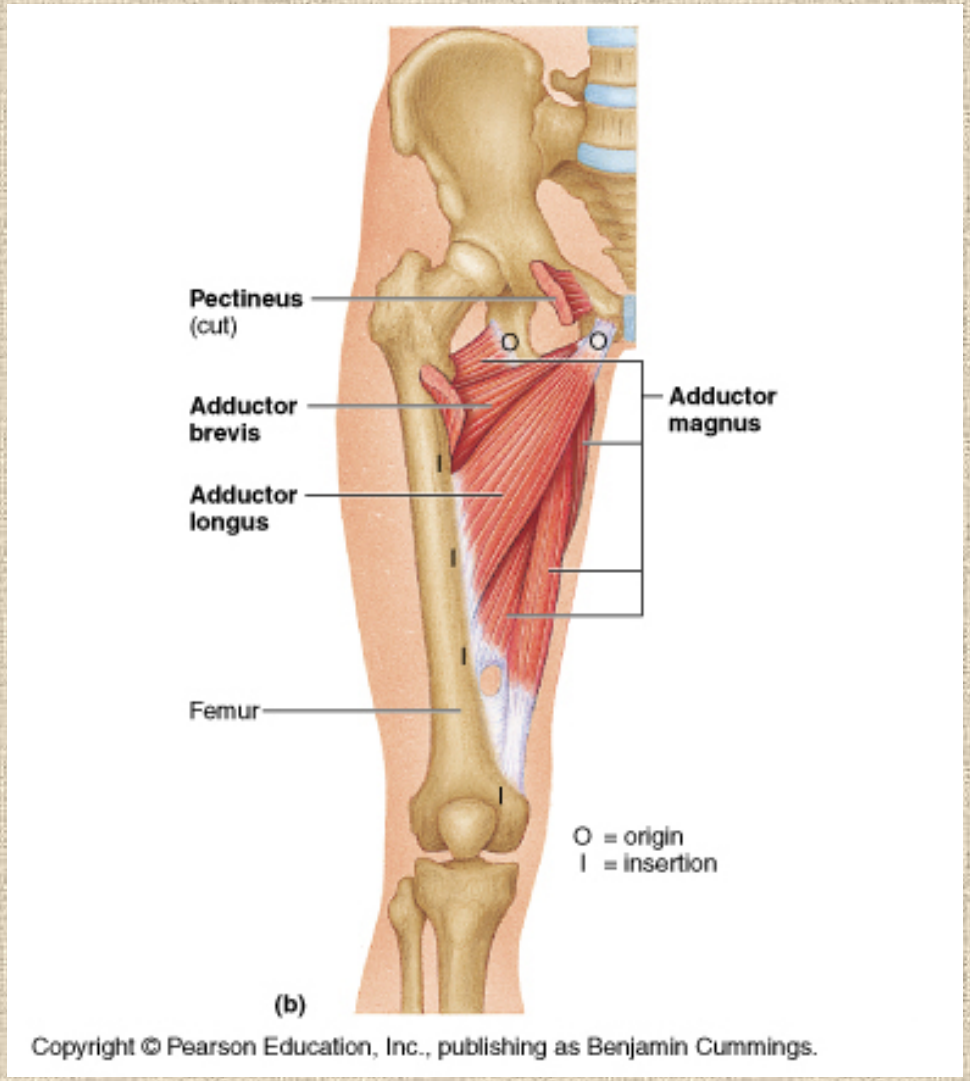
Anterior thigh (femoral n.)

- Sartorius (Tailor's muscle)
- Quads (four)
  - Rectus femoris (crosses hip)
  - 3 vastus mm. (vast--big)



Medial compartment (obturator n.)



- Adductor muscles
  - Gracilis
  - Adductor
    - Magnus
    - Longus
    - brevis

Frolich, Human Anatomy, Lower LImb

Leg movements by compartment (in leg all nn are branches of sciatic)

(a)

Triceps surae

Fibula

Fibularis muscles

Posterior compartment of leg (plantar flexes foot, flexes toes)

Lateral compartment of leg (plantar flexes and everts foot)

Tibialis anterior

Tibia

Key:

= Posterior compartment muscles

= Anterior compartment muscles

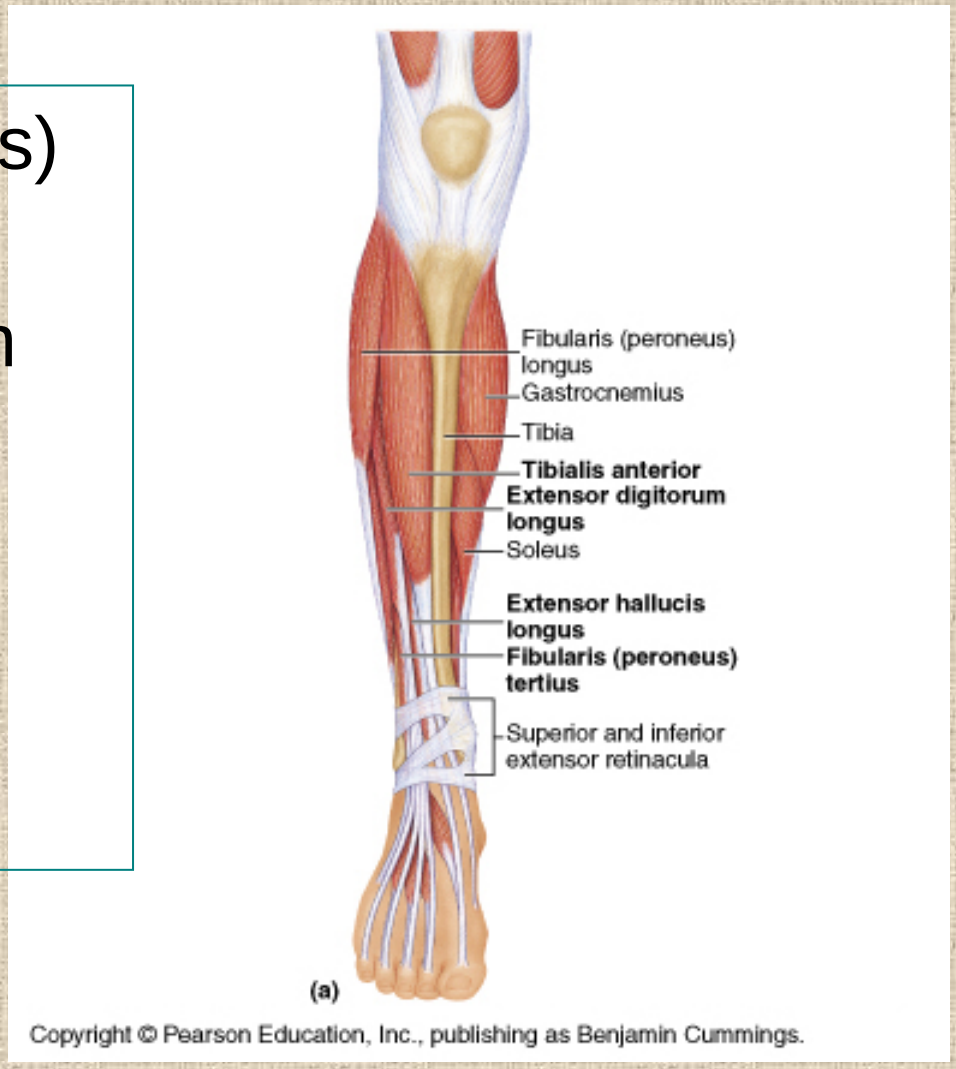
= Medial compartment muscles of thigh and lateral compartment muscles of leg

(b)

Anterior compartment of leg (dorsiflexes foot, extends toes)

Anterior Leg (deep fibular n.)

- Fibularis (peroneus) longus
- Extensor digitorum longus
- Extensor hallicus longus
- Tibialis anteriorus



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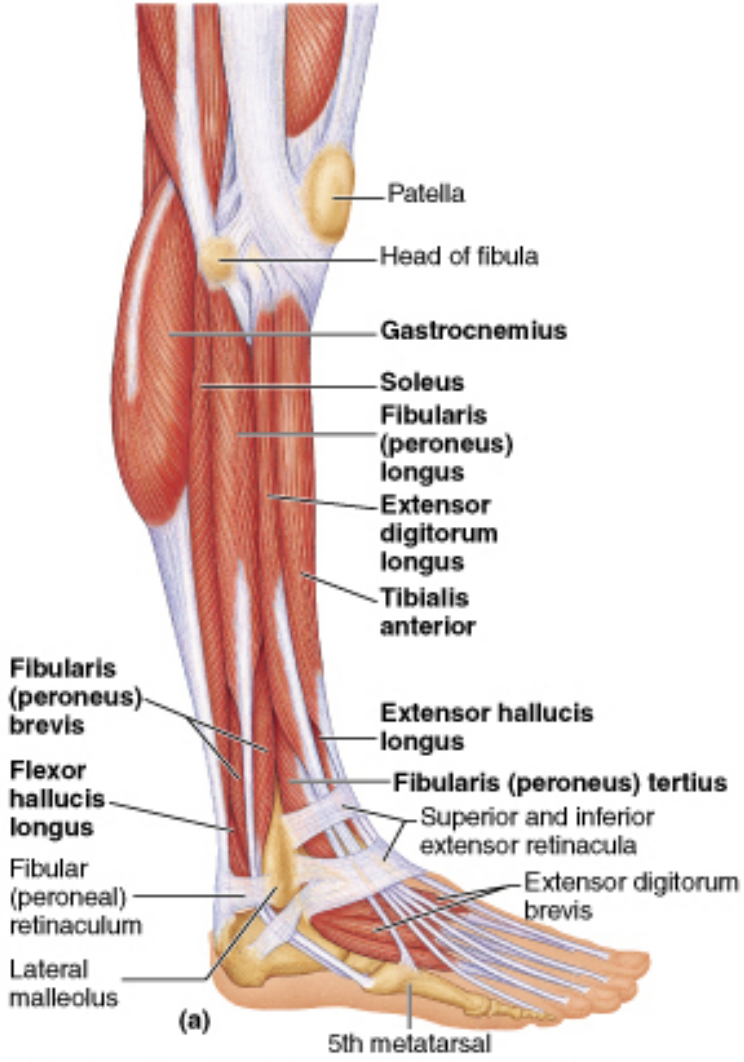
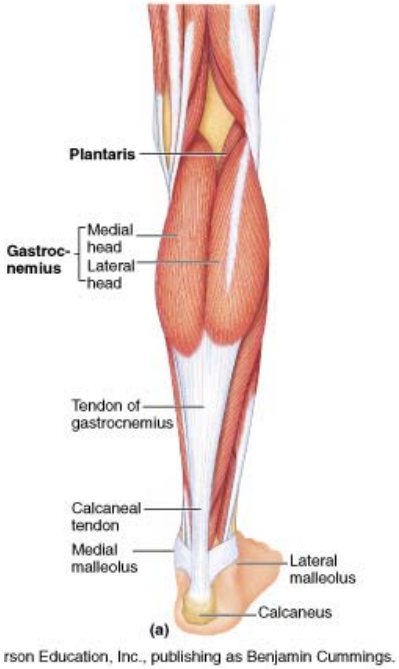
Lateral Leg (superficial fibular n.)



- Fibularis brevis/longus

Posterior Leg (tibial n.)



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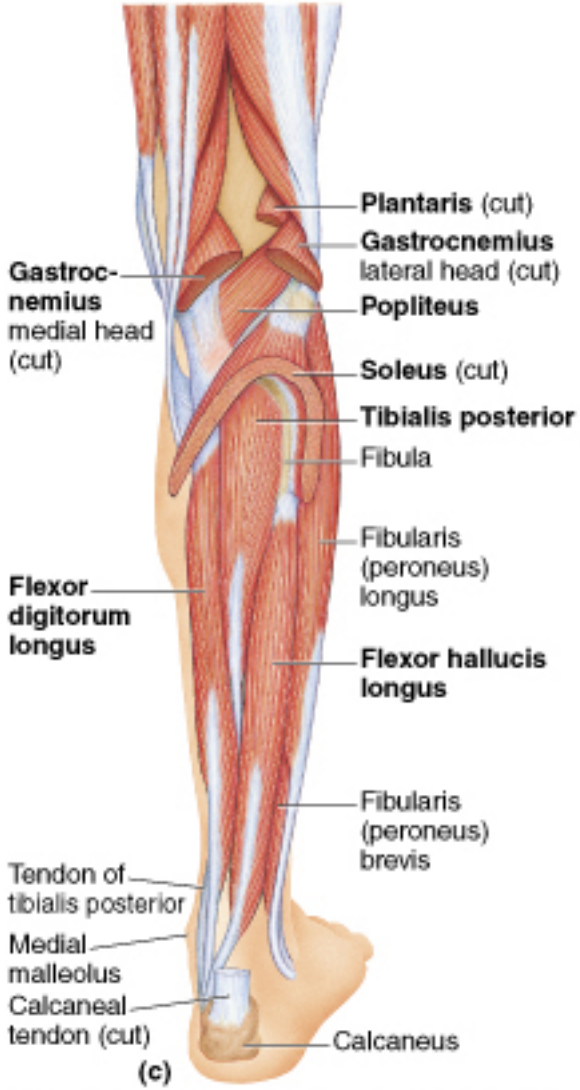

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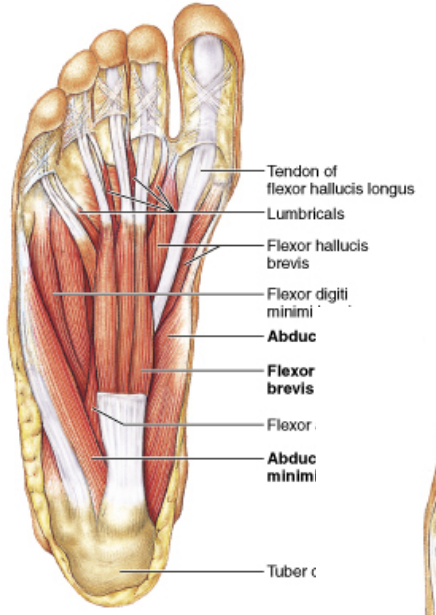
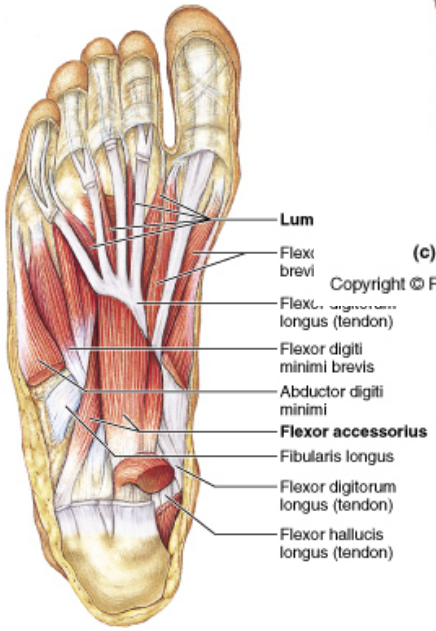
- Gastrocs and soleus
- Flexor digitorum longus
- Flexor hallucus longus

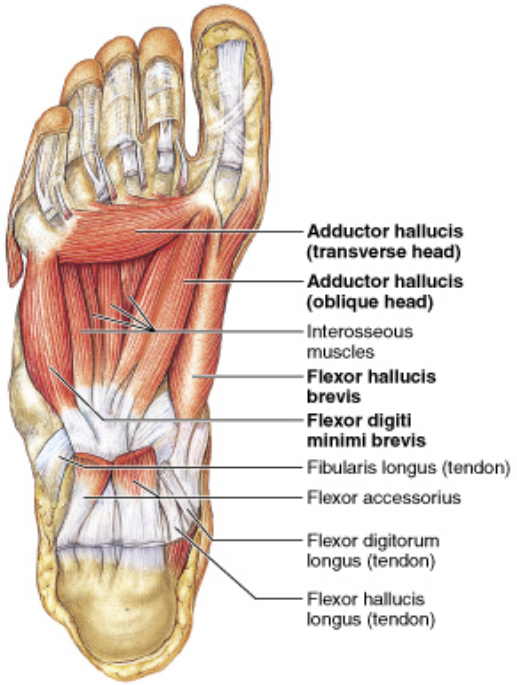
Frolich, Human



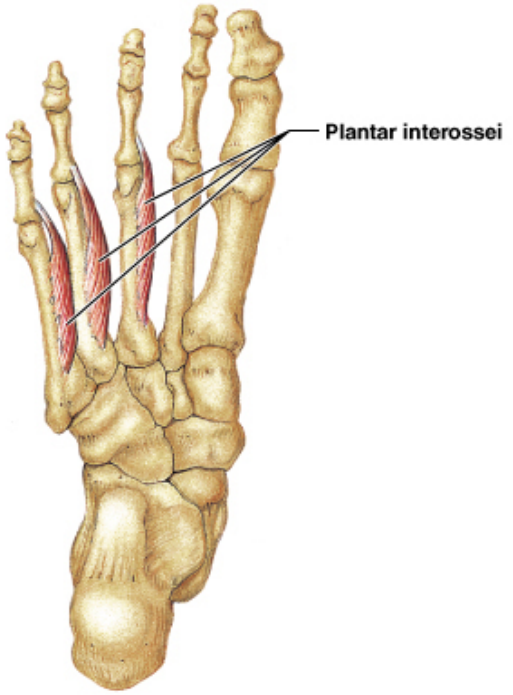
(a) First layer



(b) Second layer



(c) Third layer

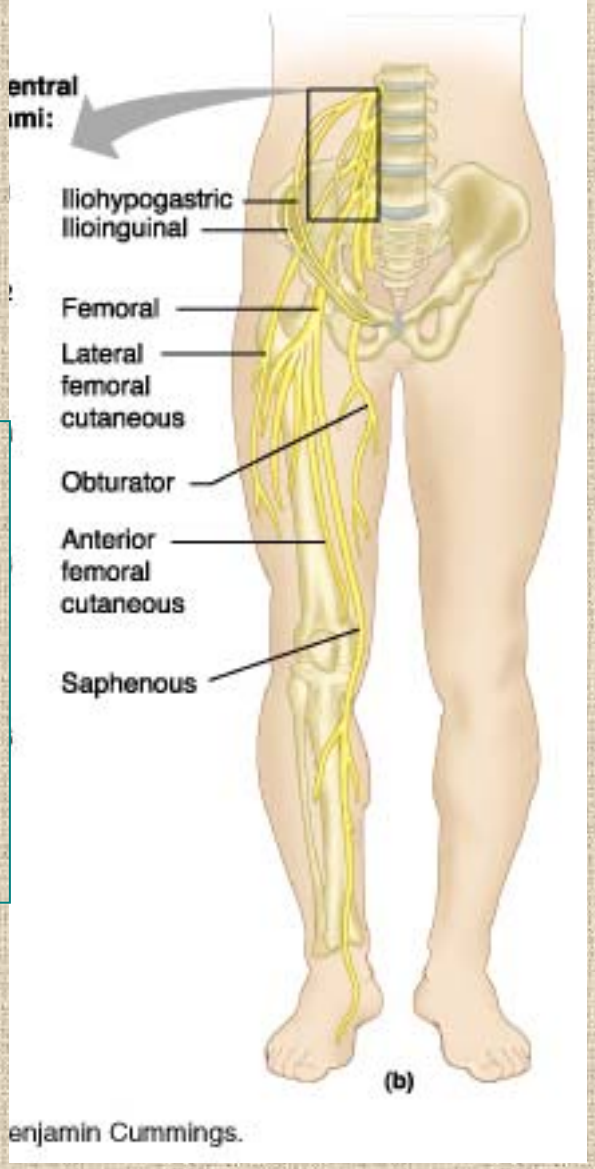


(d) Fourth layer: plantar interossei

Intrinsics of foot

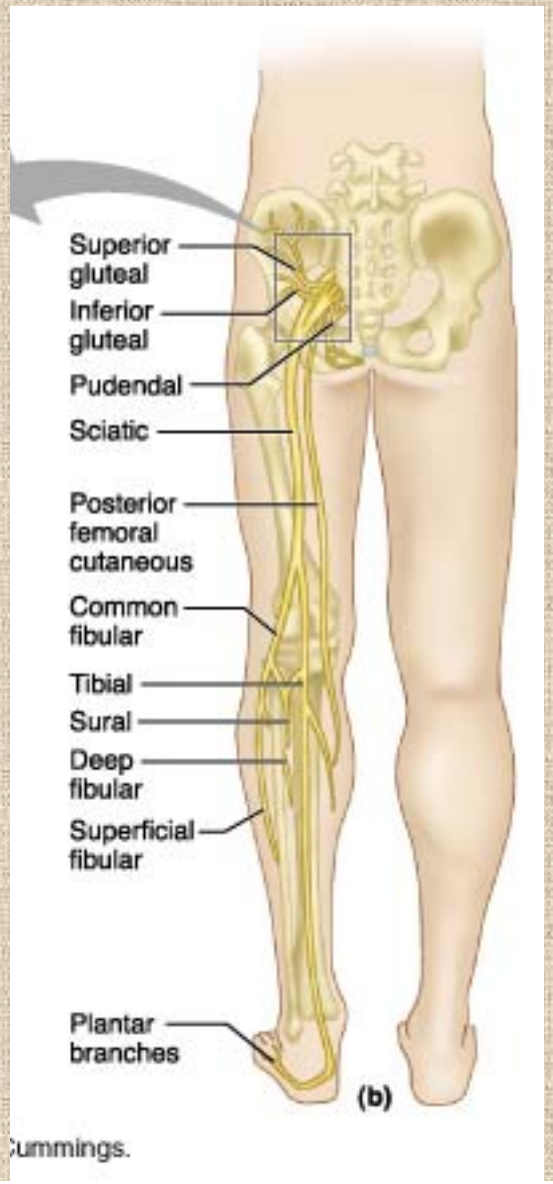
Frolich, Human Anatomy, Lower LImb

With leg out to side like quadruped, lumbar-anterior, sacral-posterior makes sense



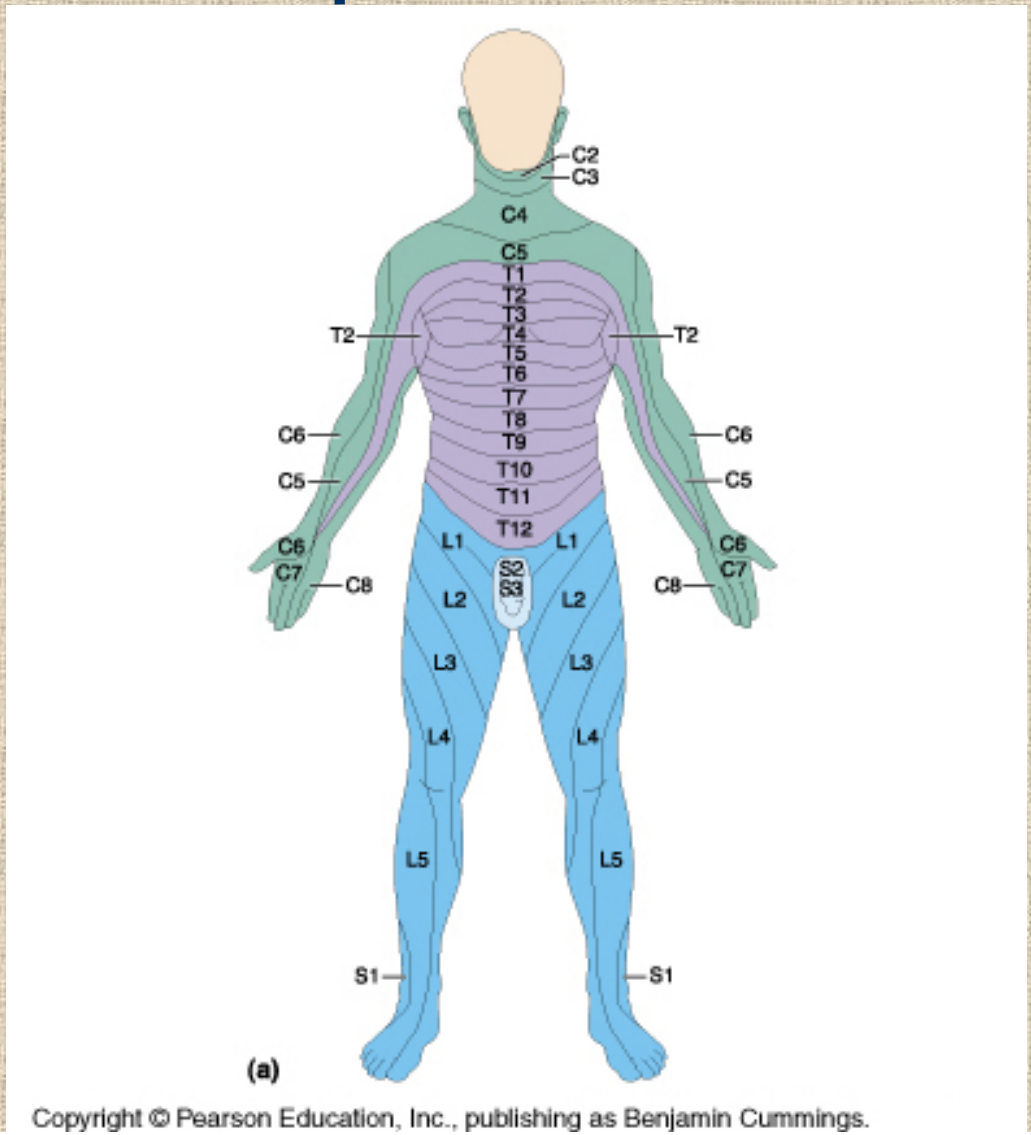
- Lumbar plexus (femoral nerve)

- Sacral plexus (sciatic nerve)



Frolich, Human Anatomy, Lower LImb

Dermatomes show twisting of leg in development

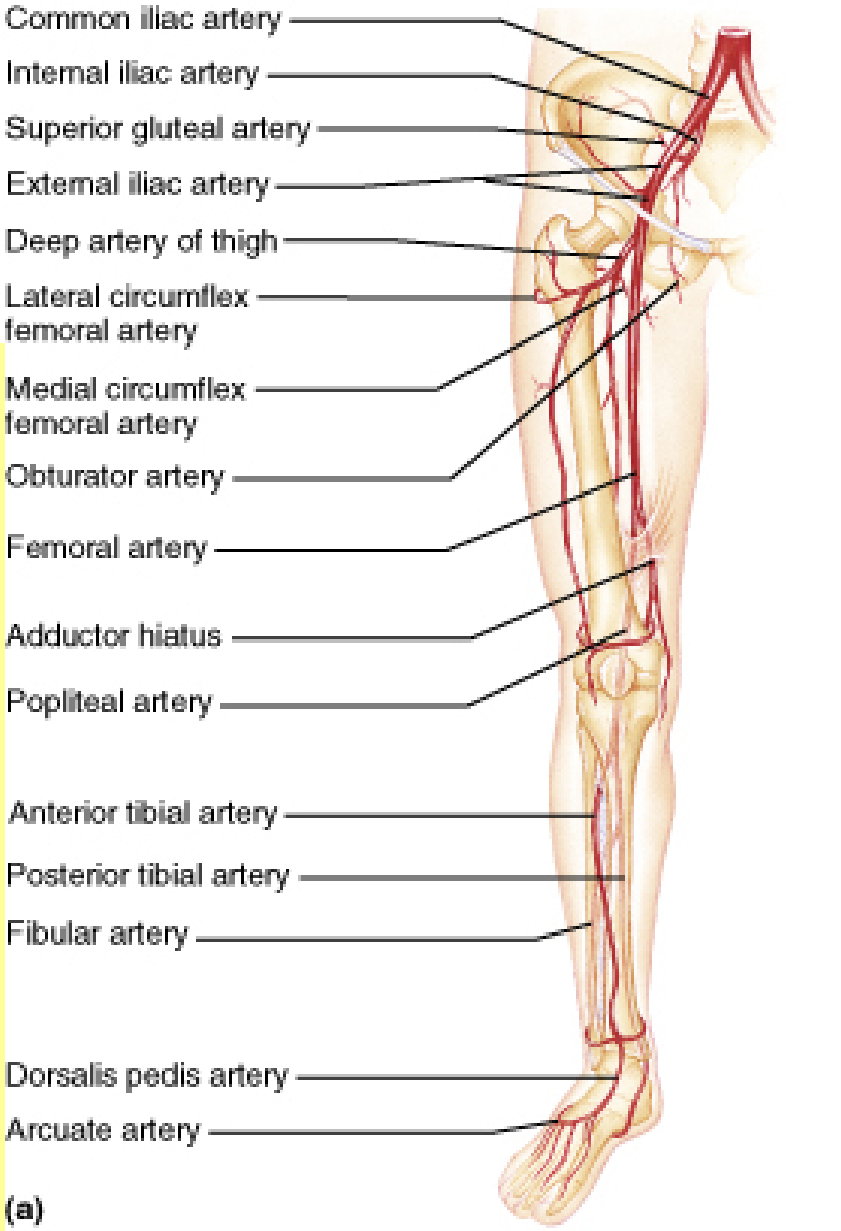


Frolich, Human Anatomy, Lower LImb

Blood supply to lower limb

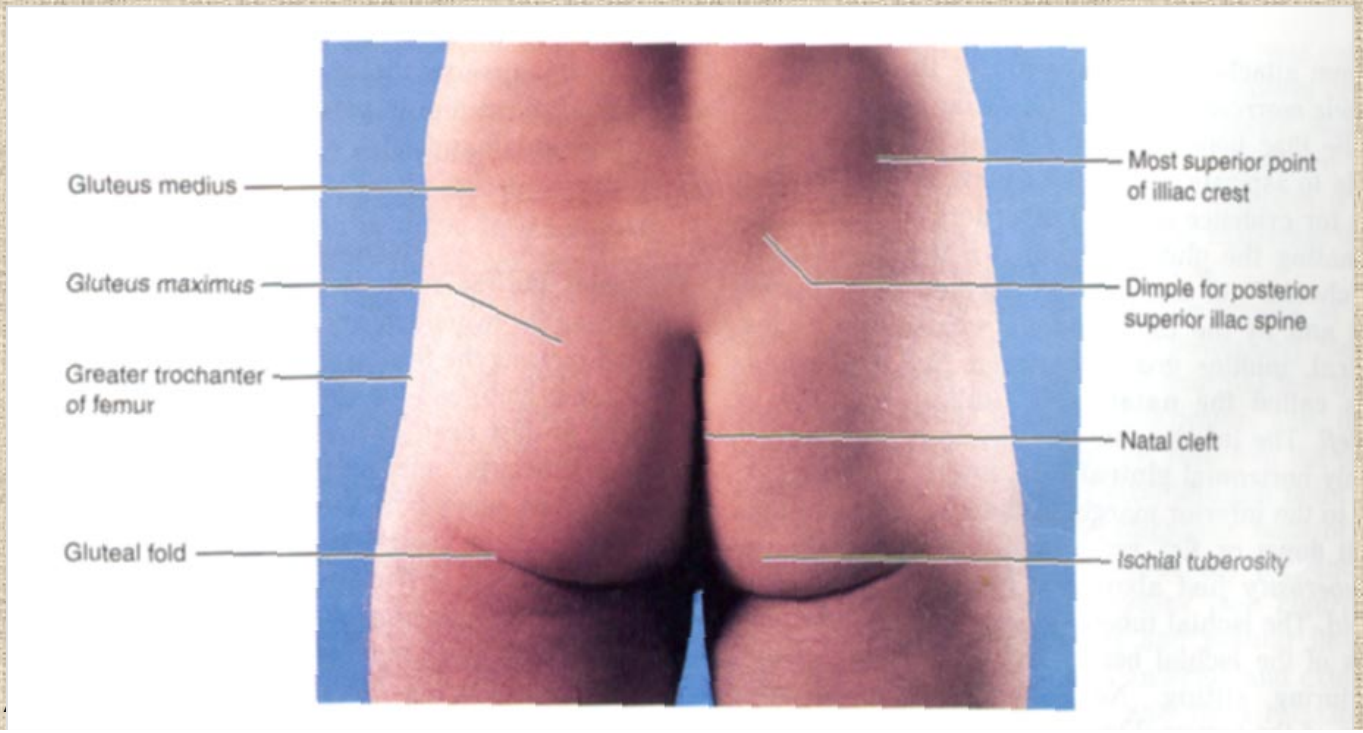
- Internal Iliac
  - Cranial + Caudal Gluteals= gluteals
  - Internal Pudendal = perineum, external genitalia
  - Obturator = adductor muscles

- External Iliac
  - Femoral = lower limb
    - Deep femoral = adductors, hamstrings, quadriceps
  - Popliteal (continuation of femoral)
    - Geniculars = knee
    - Anterior Tibial = ant. leg muscles, further branches to feet
    - Posterior Tibial = flexor muscles, plantar arch, branches to toes



Surface Anatomy: Posterior Pelvis

- Iliac crest
- Gluteus maximus = cheeks
- Natal/gluteal cleft = crack
- Gluteal folds = bottom of cheek

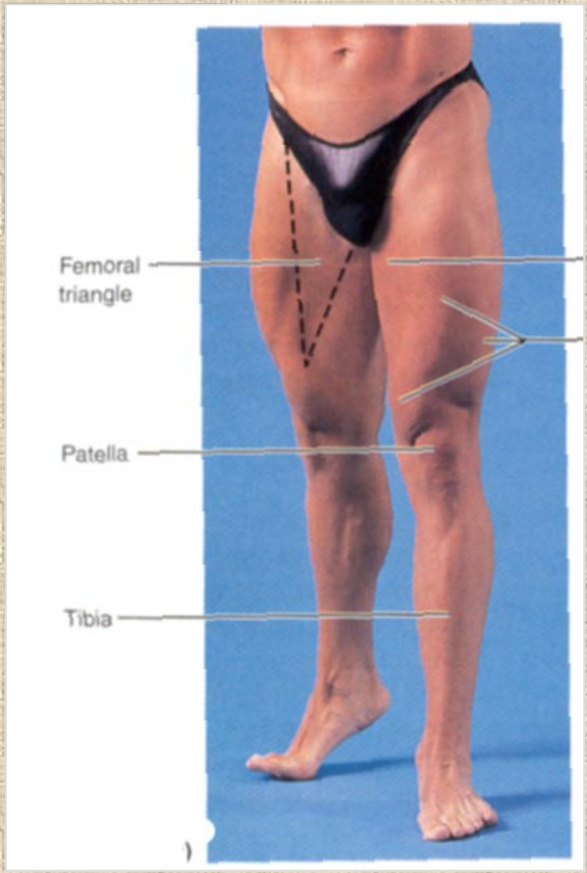


pg 789

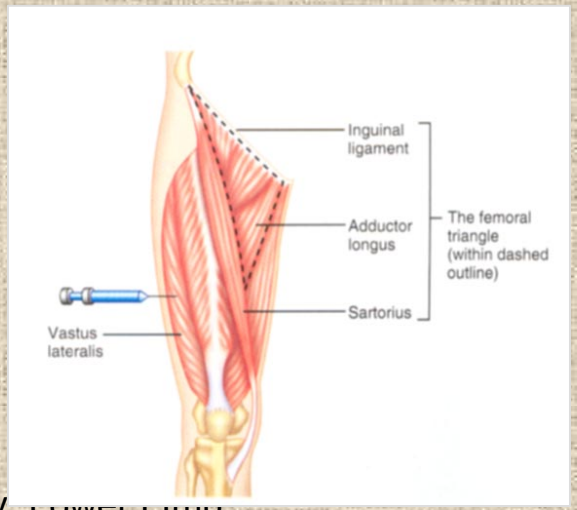
Frolich, Human

pg 792

Surface Anatomy: Anterior Thigh + Leg



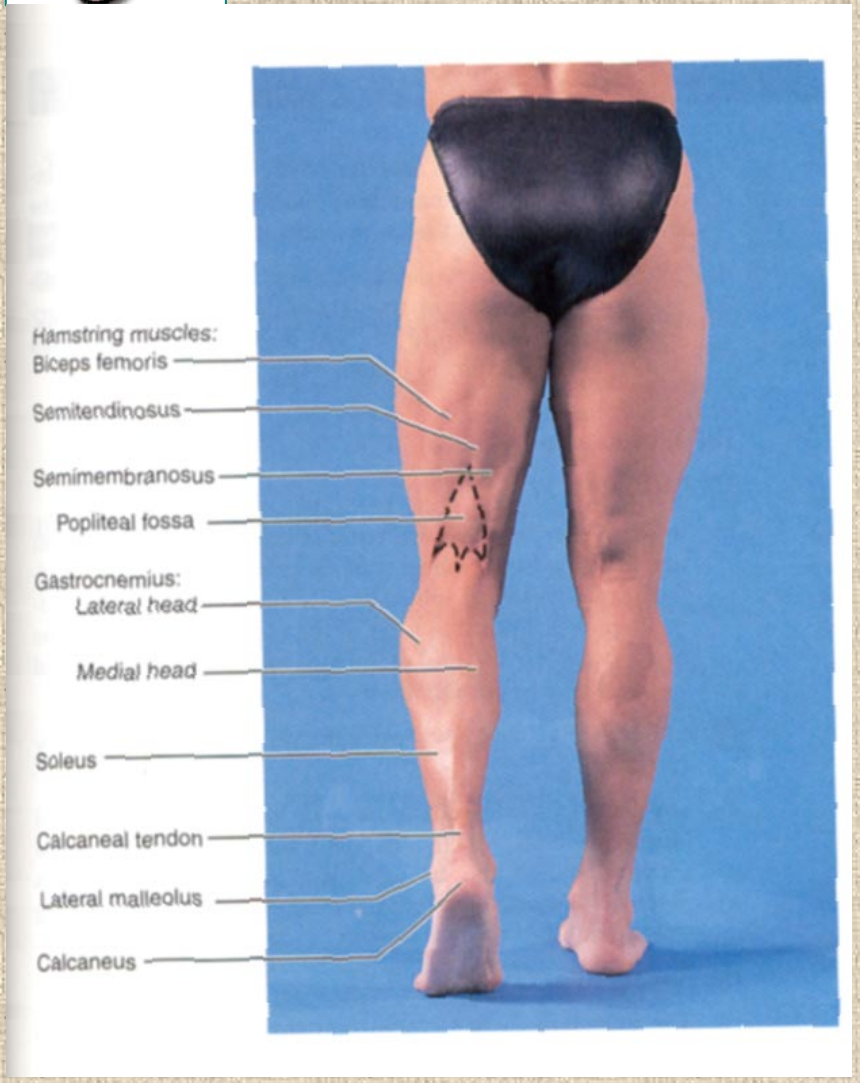
- Palpate
  - Patella
  - Condyles of femur
- Femoral Triangle
  - Sartorius (lateral)
  - Adductor longus (medial)
  - Inguinal ligament (superior)
  - Femoral a + v, lymph nodes



pg 785

Frolich, Human Anatomy, Lower Limb

Surface Anatomy: Posterior Leg



- Popliteal fossa
  - Diamond-shape fossa behind knee
- Boundaries
  - Biceps femoris (sup-lat)
  - Semitendinosis + semimembranosis (sup-med)
  - Gastrocnemius heads (inf)
- Contents
  - Popliteal a + v
- Calcaneal (Achilles) tendon

pg 793