MUSCLES OF THE LOWER EXTREMITY

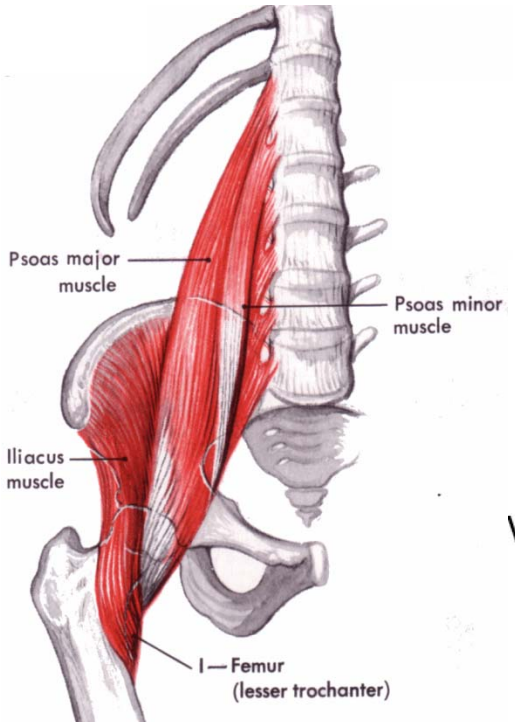
Muscles of the lower extremity are divisible into groups, corresponding with the different regions of the limb.

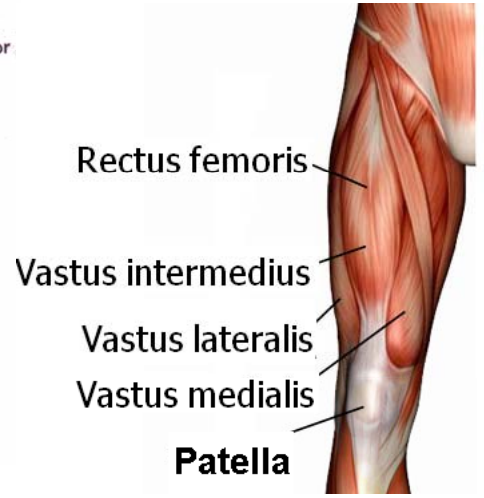
I. Muscles of the Iliac Region
II. Muscles of the Thigh
III. Muscles of the Leg
IV. Muscles of the Foot

I. MUSCLES OF THE ILIAC REGION

Iliopsoas Muscle Group

Psoas major : contributes to flexion and external rotation in the hip joint.
Iliacus: lifting (flexing) the leg forward, flexes the thigh
Psoas minor: Weak trunk flexor; (only present in about 50 % of population)





II. MUSCLES OF THE THIGH

(1) Anterior Femoral Muscles:

Sartorius(tailor's muscle): longest muscle in body,narrow, ribbon-like; rotation of hip, flexion of knee

Quadriceps femoris (Quadriceps extensor): Great extensor muscle of leg, forming a large fleshy mass which covers the front and sides of the femur. Includes 4 remaining muscles on the front of the thigh- Rectus femoris, Vastus lateralis, Vastus medialis, Vastus intermedius

Articularis genu (Subcrureus): Just above the knee ;Prevents friction of the synovial membrane between the patella and the femur.

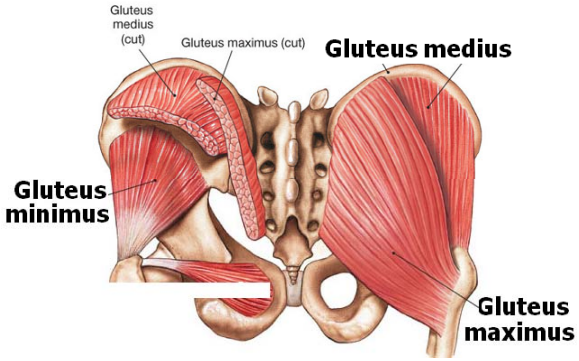
II. MUSCLES OF THE THIGH

(2) Medial Femoral Muscles:

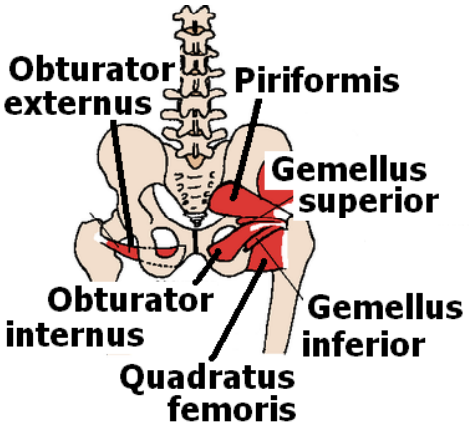
Gracilis: most superficial muscle on the medial side of the thigh.
Pectineus: quadrangular muscle, situated at medial aspect of thigh.
Adductor longus (most superficial),**Adductor magnus,Adductor brevis:** adducts, flexes, and medially rotates the femur; adduct the thigh powerfully; used in horse exercise

(3) Muscles of the Gluteal Region

Gluteus maximus: most superficial muscle in gluteal region; it is with the power he can maintain the trunk in the erect posture.
Gluteus medius: thick, radiating muscle, situated on the outer surface of the pelvis.
Gluteus minimus: smallest of three Glutei, fan-shaped



Tensor fasciae latae / femoris: oblique direction of its fibers enables it to stabilizes knee in extension (helps Gluteus Maximus during knee extension).
Obturator internus: situated partly within lesser pelvis
Gemelli (Gemellus superior and inferior): small muscular fasciculi, accessories to the tendon of Obturator internus
Quadratus femoris: laterally rotates the thigh
Piriformis: laterally rotates and abducts thigh
Obturator externus: flat, triangular muscle, which covers outer surface of the anterior wall of pelvis; rotates the femur outward; extends the femur, supports knee in the extended position



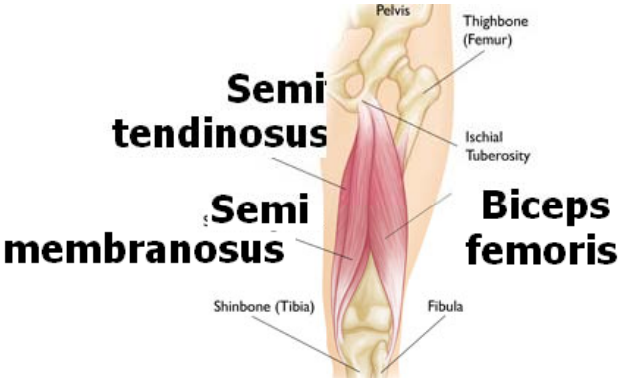
II. MUSCLES OF THE THIGH

(4) Posterior Femoral Muscles (Hamstring Muscles) -Function by pulling the leg backward and propelling body forward while walking or running (hip extension)-- extends the thigh; Hamstrings also bend the knees (knee flexion)--flexes the leg

Biceps femoris (Biceps):situated on the posterior and lateral aspect of the thigh.

Semitendinosus: remarkable for the great length of its tendon of insertion

Semimembranosus: membranous tendon of origin;situated at the back and medial side of thigh



III. MUSCLES OF THE LEG

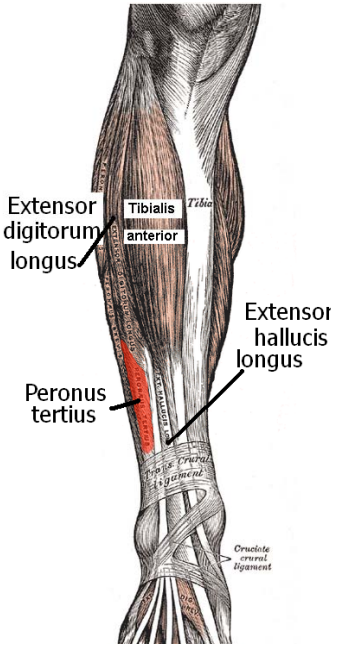
(1) Anterior Crural Muscles

Tibialis anterior (anticus) :lateral side of tibia;

Extensor digitorum longus:extends metatarsophalangeal, proximal interphalangeal and distal interphalangeal joints of the lateral 4 toes

Extensor hallucis longus:extends the metatarsophalangeal interphalangeal joints of the great toe

Peronus tertius (fibularis tertius):everts the foot



2. Posterior Crural Muscles

(I) Superficial Group

Gastrocnemius (most superficial muscle).

Soleus (Tendo calcaneus- common tendon of Soleus and gastrocnemius, thickest and strongest in the body).

Plantaris (between Gastrocnemius and Soleus): Constitute a powerful muscular mass, forming calf of leg. Constantly called into use in standing, walking, dancing, leaping. Muscles of calf are chief extensors of foot at the ankle-joint. In walking, these muscles raise the heel from the ground

•**Plantaris** is accessory to Gastrocnemius, extending or bending ankle.

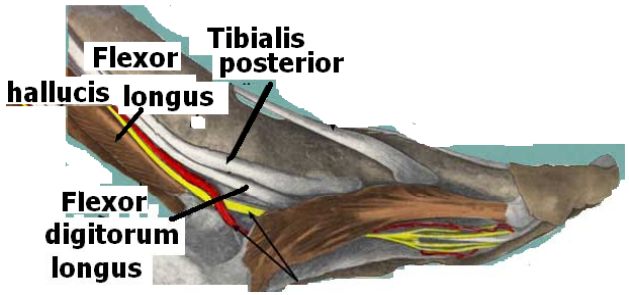
III. MUSCLES OF THE LEG

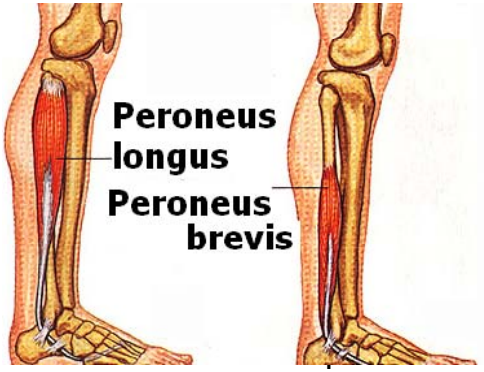
(II) Deep Group

Popliteus: assists in flexing the leg upon the thigh;
Flexor digitorum longus (on tibial side of leg) **and**
Flexor hallucis longus (on fibular side of the leg): direct flexors of phalanges; extend the foot;assist Gastrocnemius and Soleus in extending foot, as in walking, standing on tiptoe.
Tibialis posterior: most deeply seated of muscles on back of leg; direct extensor of the foot at the ankle-joint

3. Lateral Crural Muscles

Peroneus longus: more superficial
Peroneus brevis: a shorter and smaller muscle
•Peronei serve to steady the leg upon the foot; extend the foot upon the leg, in conjunction with Tibialis posterior, antagonizing the Tibialis anterior and Peroneus tertius, which are flexors of the foot. Peroneus longus also everts the sole of the foot.



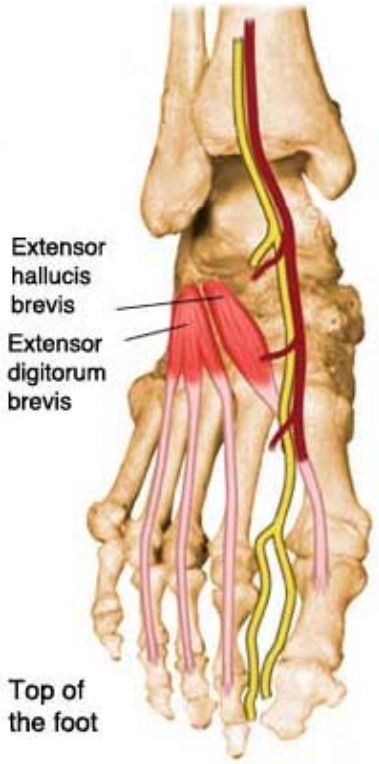


IV. MUSCLES OF THE FOOT

(1) Dorsal Muscle of the Foot

Extensor digitorum brevis: extends phalanges of the four toes into which it is inserted, but in the great toe acts only on the first phalanx.

Extensor hallucis brevis: part of extensor digitorum brevis that goes to the great toe



2. Plantar Muscles of Foot

First Layer: Abductor hallucis, Flexor digitorum brevis, Abductor digiti quinti

Second Layer: Quadratus plantae (Flexor accessorius), Lumbricales

Third Layer: Flexor hallucis brevis, Adductor hallucis, Flexor digiti quinti brevis

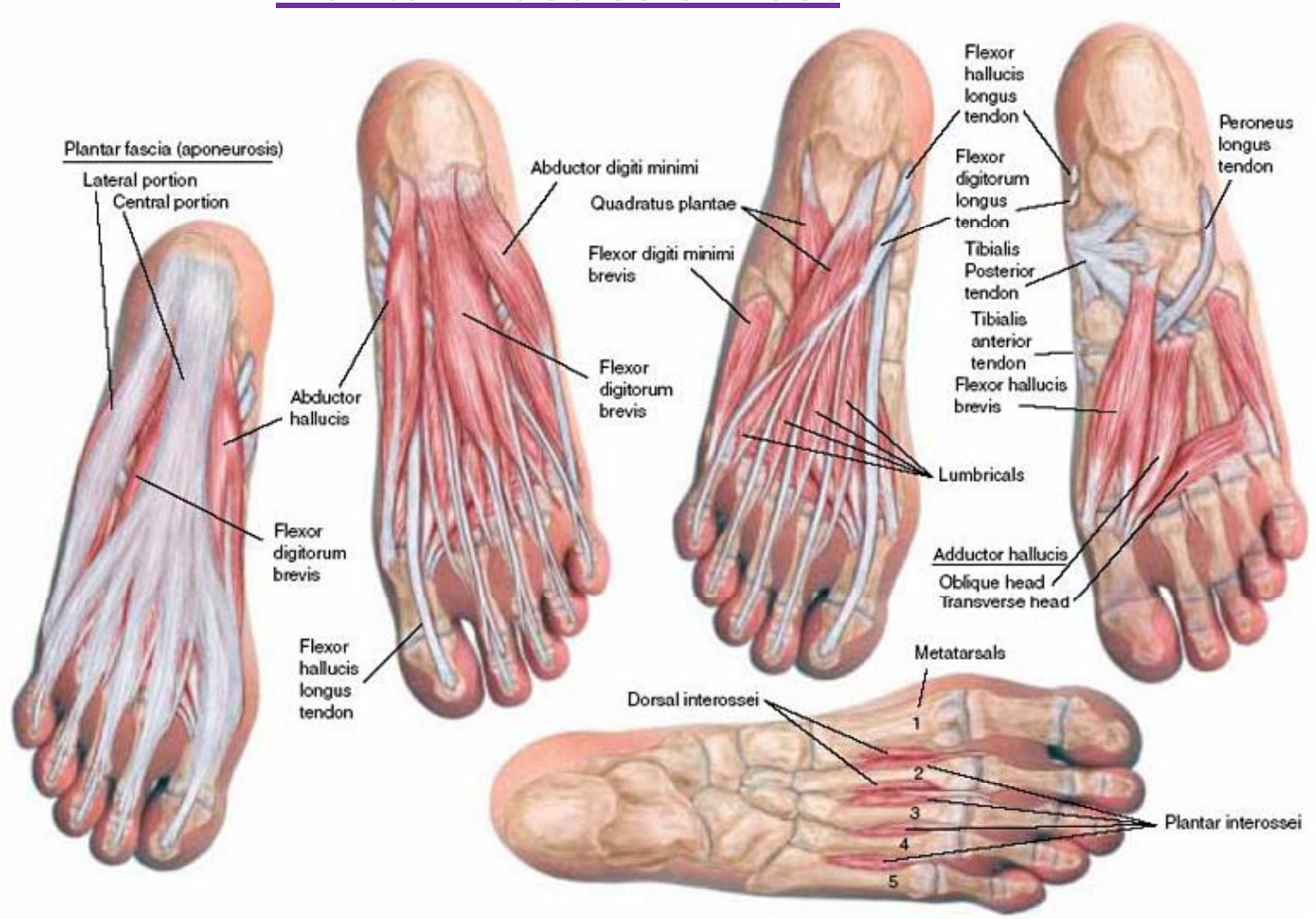
Fourth Layer : **Interossei** dorsales

Abductors→Interossei dorsales, Abductor hallucis, and Abductor digiti quinti.

Adductors→Interossei plantares, Adductor hallucis.

Flexors→Flexor digitorum brevis, Quadratus plantæ, Flexor hallucis brevis, Flexor digiti quinti brevis, and Lumbricales.

Plantar Muscles of Foot



Muscular Dystrophy: Progressive degeneration and atrophy of skeletal muscles.

- Duchenne muscular dystrophy – lack dystrophin, most common & serious form, inherited as a sex-linked recessive disease
- Myotonic dystrophy: slow-progressing disease, can be present anytime between birth and age 60

Spasm: Sudden, involuntary contraction of muscle lasting a short time.
▪Prolonged spasm is called cramp, when muscle becomes taut & painful; common in calf, thigh & hip muscle, usually occurs at night or after exercise.
▪Cramps have been attributed to a lack of salt or other minerals (like calcium, potassium), muscle fatigue, or dehydration.

Pes planus ('flatfoot' or 'fallen arches')
•foot does not have a normal arch when standing

Fibromyalgia :(algia = pain)
▪ a mysterious chronic-pain syndrome; affects mostly women; affecting tendons, ligaments, fibrous tissues.
▪symptoms: fatigue, sleep abnormalities, severe musculoskeletal pain, and headache.

Rhabdomyolysis: (Rhabdomyo- skeletal muscle)
•destruction of muscle tissue, resulting in the release of muscle fiber content into the bloodstream. The fibers release myoglobin, which blocks the kidney structures and can lead to kidney failure.
• A common cause is a crushing muscle injury. Also a side effect of statin cholesterol medications.

- Myasthenia- muscular weakness
- Myodynia- pain of the muscle
- Myomalacia- abnormal muscle softening
- Myositis- inflammation of muscle

Rigor Mortis

- Stiffening of the body beginning 3 to 4 hours after death; deteriorating sarcoplasmic reticulum releases calcium. Calcium activates myosin-actin cross-bridging and muscle contracts, but can not relax.Muscle relaxation requires ATP and ATP production is no longer produced after death.Fibers remain contracted until myofilaments decay.
- Facial muscles are affected first. Joints are stiff for 1-3 days, but after this time general tissue decay and leaking of lysosomal intracellular digestive enzymes will cause the muscles to relax.