

living anatome: The Lower Extremity

I. Introduction

II. Warm-up

III. Anatomy of the Lower Extremity

Thigh (and the muscles of its 3 compartments)

Exercise (yoga): Tree Pose

- Featured muscle: Sartorius
- Function: Lateral rotation of thigh, flexion of thigh, flexion of knee, abduction of thigh
- Innervation: Femoral n. (L2-4)
- Notes: The “tailor’s muscle,” which happens to be the longest muscle in the body. Sartorius is one of the thigh muscles that crosses two joints, as does: rectus femoris, gracilis, semi-tendinosus, semi-membranosus, and the long head of the biceps femoris.

Exercise (yoga): Chair pose

- Featured muscle: Iliopsoas (technically belongs to posterior abdominal wall) and quadriceps femoris (rectus femoris, vastus medialis, vastus intermedius, vastus lateralis)
- Function: Thigh flexion (iliopsoas and rectus femoris) and knee extension (vasti)
- Innervation: Quadriceps: femoral n. (L2-4); Iliopsoas: ventral rami (L2-3) to psoas major
- Notes: Hip flexors (iliopsoas and rectus femoris) work with gravity while in chair pose. Note that of the quads, only rectus crosses both joints and works at the hip as well as the knee. All quadriceps (knee extensors) work against gravity to prevent collapse at knee in this pose.

Exercise (yoga): Warrior II

- Featured muscle: Hamstring muscles: semitendinosus, semimembranosus, biceps femoris
- Function: Hip extension (all except short head of biceps femoris) and knee flexion
- Innervation: Tibial n. (L4-S3) (part of sciatic nerve) except for short head of biceps, which is the only muscle to be innervated by the common peroneal n. (L4-S2).
- Notes: Refer to other hip extensor (gluteus maximus) (which will be featured later in the gluteal region of the class).

Exercise (Pilates): Side-lying leg series: Staggered legs

- Featured muscle: *Medial compartment*: gracilis, pectineus, adductor longus, adductor brevis, adductor magnus
- Function: Adduction of femur
- Innervation: All innervated by obturator n. (L2-4), EXCEPT for adductor magnus, which is innervated by obturator n. and a branch of tibial n., and pectineus, which is innervated by femoral n.

Gluteal region

Exercise (Pilates): Side-lying leg series: Abduction

- Featured muscle: Tensor fasciae latae, gluteus medius, gluteus minimus
- Function: Abduction of femur
- Innervation: Superior gluteal n. (L4-S1)
- Clinical correlate: Trendelenburg Gait

Exercise (Pilates): Clam-shell

- Featured muscle: Lateral rotators (Deep rotators: piriformis, gemelli superior, obturator internus, gemelli inferior, quadratus femoris, obturator externus) and all attach to greater trochanter
- Function: Lateral rotation
- Innervation: Piriformis: branches of sacral plexus (S1-2), Gemelli superior and obturator internus: n. to O.I. (L5-S2), Gemelli inferior and quadratus femoris: n. to Q.F (L4-S1), Obturator externus: obturator n. (L2-4)

Exercise (yoga): Ankle-to-knee pose (yoga) as counter-stretch

- *Clinical correlate*: Pes anserine bursitis. Pes anserinus: Tendons of sartorius, gracilis, and semitendinosus; important because infection here could spread to three different compartments.

Leg & Foot

Exercise (yoga): Sitting forward fold (1: dorsiflexion, 2: plantar flexion, 3: inversion/eversion)

- Featured muscles: *Anterior compartment*: tibialis anterior, extensor hallucis longus, extensor digitorum longus, peronius tertius; *Lateral compartment*: Peroneus longus, brevis; *Posterior compartment*: Soleus, gastrocnemius, plantaris, popliteus, tibialis posterior, flexor digitorum longus, flexor hallucis longus

- Function: *Anterior*: dorsiflexion of foot; *Lateral*: eversion of foot; *Posterior*: plantar flexion
- Innervation: *Anterior*: Deep peroneal n. (L4-S2); *Lateral*: Superficial peroneal n. (L4-S2); *Posterior*: Tibial n. (L4-S3)
- Notes: Notice how the muscles of the leg cross the ankle joint to affect the foot, some working the ankle (e.g. tibialis anterior), others the bones of the foot, itself (e.g. flexor hallucis longus). Of course, the foot has many muscles of its own, all very important in the aforementioned movements, which help us sense and navigate our substrate (e.g. ground) as we walk.
- *Clinical correlate*: It is easier to lose eversion of the foot rather than inversion, since eversion is due to action of muscles innervated by one nerve (superficial peroneal).
- *Clinical correlate*: When the common peroneal nerve is injured, it results in a foot drop, due to lack of dorsiflexion from loss of function of deep or common peroneal nerves. A patient loses the ability to pick up his/her foot when walking. A worsened version of foot-drop is steppage gait, as individuals compensate for an inability to flex the foot by flexing hip and knee more to lift foot off ground.

III. Savasana

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