



MUSCLES OF THE LOWER EXTREMITIES

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ABSTRACT

This article explores the intricate anatomy, functions, and significance of the muscles in the lower extremities, encompassing the thighs, legs, and feet. It delves into the roles of major muscle groups such as the quadriceps, hamstrings, and calf muscles, highlighting their contributions to locomotion, postural stability, and daily activities. The significance of lower extremity muscles in occupational movements, challenges such as musculoskeletal disorders, and their role in athletic performance is thoroughly examined. The article aims to provide a comprehensive understanding of the lower extremity musculature and its vital role in human movement.

Rehabilitation: The process of restoring and strengthening muscles through targeted exercises.

Athletic Performance: The role of lower extremity muscles in enhancing sports and exercise performance.

Occupational Movements: Activities related to work that require the engagement of lower extremity muscles.

Daily Activities: Routine tasks such as walking, climbing stairs, and bending that involve lower extremity muscles.

Flexibility Training: Exercises focused on improving the range of motion in lower extremity joints.

Running and Sprinting: Dynamic activities heavily reliant on lower extremity muscle power.

Sports-Specific Training: Tailored exercise programs designed to enhance performance in specific sports.

Introduction. The lower extremities, consisting of the thighs, legs, and feet, house a sophisticated network of muscles that play a fundamental role in human locomotion, stability, and overall functionality. From the powerhouse quadriceps to the intricate muscles of the foot, these structures contribute to our ability to stand, walk, run, and engage in a myriad of

activities. In this article, we delve into the anatomy, functions, and significance of the muscles of the lower extremities.

We might take the lower extremities for granted, but they are two well-oiled machines comprised of several complex anatomical parts working together in perfect harmony. Without them, you wouldn't be able to walk to your favourite (or not so favourite) [anatomy](#) class, jump, run, stand, crouch, and so on. Therefore, try to keep them in top physical condition by giving them plenty of exercise.

The lower extremity can be divided into several parts or regions, as follows:

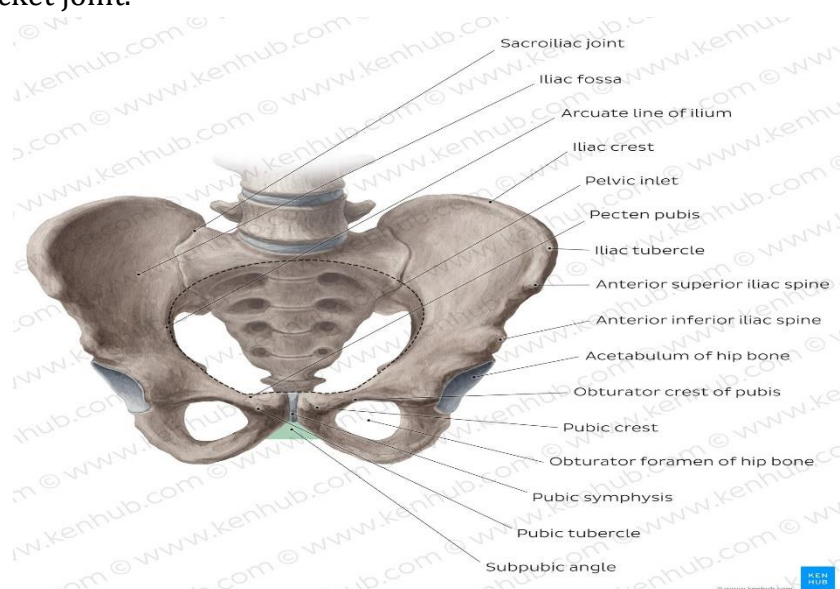
- [Hip](#)
- [Thigh](#)
- [Knee](#)
- [Leg](#)
- [Ankle](#)
- [Foot](#)

In this topic page, we will take a brief look at all of them and cover the basics of the entire lower limb.

- Hip and pelvis
- Bones

The pelvis, and that is made up of the coccyx and pelvic girdle, provides the structural framework to earn the hip region. The pubic symphysis and sacroiliac joints connect the two hip bones and the sacrum that make up the pelvic girdle.

The ilium, ischium, and pubis, the three components of each hip bone, receive the femur head to form the hip joint. The broad range of motion in the lower extremities is attributed to this ball-and-socket joint.

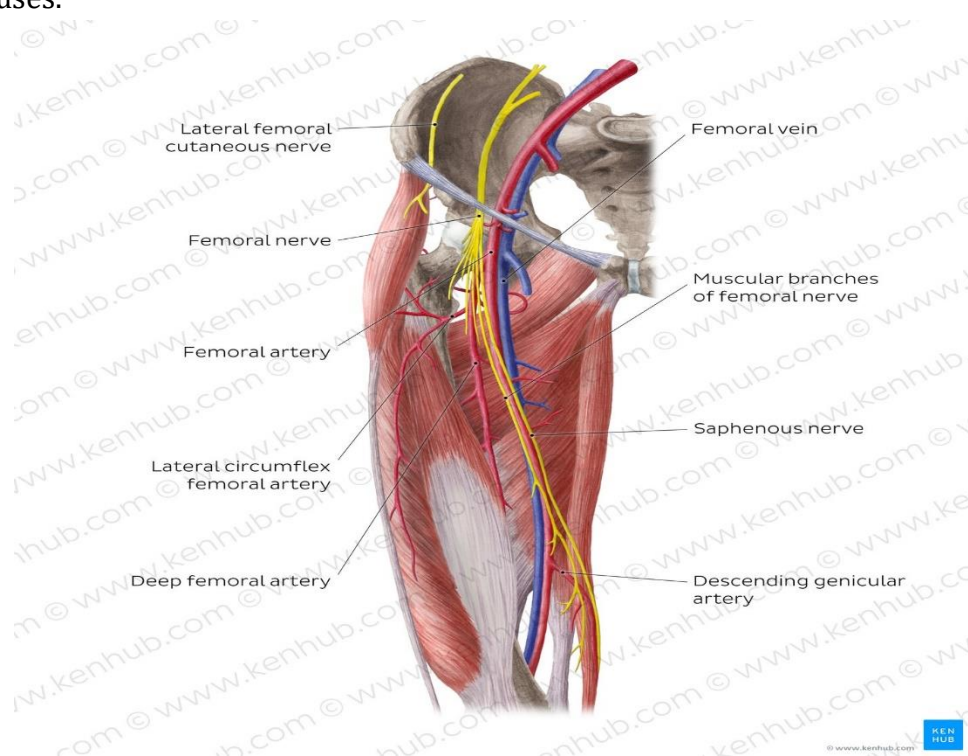


Muscles. The lower extremities move as the consequence of the action of multiple hip muscles on the hip joint, which also moves the thigh. They are separated into muscle groups that are anterior and posterior. Subgroups of the latter are further separated into deep and superficial groups. The iliacus, psoas major, and psoas minor are muscles in the anterior muscle group. The tensor fascia latae and the three gluteal muscles—the gluteus maximus,

gluteus medius, and gluteus minimus—make up the posterior superficial muscles. The quadratus femoris, superior gemellus, inferior gemellus, piriformis, and obturator internus and externus are the muscles that together make up the posterior deep muscles.



Nerves and vessels. Now let's examine the neurovasculature and see how the hip structures are nourished (this article has more information on the neurovasculature of the lower limb). The iliac arteries give rise to the gluteal and femoral arteries, which are the principal arteries in this area. Both superficial and deep venous systems are responsible for the venous drainage of the entire lower extremity. The external and internal iliac veins, which connect to form the common iliac veins, are the principal, deep veins that drain the hip and pelvis. Although they have numerous tributaries, the femoral veins and the deep veins of the pelvis and thigh are the most significant. The cluneal nerves are the primary nerves supplying the hip area, femoral cutaneous nerves, femoral nerve, obturator nerve, sciatic nerve, and gluteal nerves. All of them, except the cluneal nerves, originate from the lumbar and sacral plexuses.





I. Anatomy of the Lower Extremities

A. Muscles of the Thigh:

Quadriceps Femoris: Comprising the rectus femoris, vastus lateralis, vastus medialis, and vastus intermedius, the quadriceps extend the knee and provide essential strength during activities such as standing and walking.

Hamstring Group: Including the biceps femoris, semitendinosus, and semimembranosus, the hamstrings flex the knee and assist in hip extension.

Muscles of the Leg: Gastrocnemius and Soleus: Forming the calf muscles, these muscles play a crucial role in ankle plantarflexion.

Tibialis Anterior and Posterior: Responsible for dorsiflexion and inversion of the foot, contributing to gait control.

Muscles of the Foot: Intrinsic Muscles: Including the abductor hallucis, flexor digitorum brevis, and quadratus plantae, these muscles control fine movements and provide support to the arches of the foot.

Extrinsic Muscles: The peroneus longus and brevis, as well as the tibialis posterior, contribute to foot and ankle stability.

II. Functions of the Lower Extremities

Locomotion: Walking and Running: The coordinated action of muscles in the thighs, legs, and feet allows for efficient and dynamic movements.

Jumping and Hopping: Engagement of lower extremity muscles is essential for explosive movements.

Postural Stability: Standing Upright: The interaction between muscles of the thighs, legs, and feet maintains balance and stability.

Weight Distribution: Muscles work harmoniously to distribute body weight during static and dynamic activities.

Conclusion. The muscles of the lower extremities form an intricate and indispensable system that underpins human movement and functionality. From the dynamic actions of the thighs during running to the stability provided by the muscles of the foot, each component contributes to our ability to navigate the world. Understanding the anatomy and functions of these muscles not only deepens our appreciation for the complexity of human biomechanics but also informs rehabilitation strategies and exercise regimens. As we continue to explore the wonders of the lower extremities, we unveil the dynamic interplay of muscles that enables us to stride forward in our daily lives.

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