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Clinical Anatomy and Recipient Vessel Selection and Exposure in the Lower Extremity

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INTRODUCTION

The reconstructive microsurgeon is often consulted for management of lower extremity bone and soft tissue defects. Defects can arise from multiple causes, including trauma, oncologic resection, infection, or pre-existing vascular disease. By far, trauma is the most common etiology for lower extremity defects that require microsurgical reconstruction. This chapter delineates clinically relevant anatomy in the lower extremity and provides anatomic and technical descriptions of exposing recipient vessels in this region.

ANATOMY OF THE THIGH

Thigh muscles are divided into anterior, medial, and posterior compartments (see [Fig. 13.1](#)). Within the anterior compartment are the sartorius and quadriceps muscles, which include the rectus femoris (see [Figs 13.1 and 13.2](#)), vastus lateralis, vastus medialis, and vastus intermedius. The femoral nerve provides innervation to these muscles. The psoas major and iliacus muscles are also found in the upper part of this compartment. The rectus femoris crosses the hip joint and knee joint, whereas the vastus muscles originate on the femur and cross the knee joint only. The posterior compartment contains the hamstring muscles including the semitendinosus, semimembranosus and biceps femoris, which are all innervated by the sciatic nerve. (see [Fig. 13.3](#))

The medial compartment contains the gracilis, pectineus, adductor longus, adductor brevis, adductor magnus, and obturator externus. The obturator nerve supplies innervation to all these muscles except the pectineus (femoral nerve) and part of the adductor magnus (sciatic nerve).

NERVES

Three main nerves traverse the thigh, the femoral nerve (L2–L4) (see [Fig. 13.1](#)), the sciatic nerve (L4–S3), and the obturator nerve (L2–L4) (see [Fig. 13.3](#)). The femoral nerve passes through the anterior compartment; the obturator through the medial compartment; and the sciatic through

the posterior compartment. The femoral nerve above the inguinal ligament gives off branches that supply the iliacus and psoas muscles, then below, the inguinal ligament gives off branches that supply the anterior compartment muscles. Below the ligament, the femoral nerve also gives off an anterior cutaneous branch supplying the anterior thigh and knee skin, and the saphenous nerve which supplies the medial side of the leg and foot. The obturator nerve passes through the obturator canal into the medial compartment and divides into a posterior and anterior branch. The anterior branch supplies innervation to the adductor longus, gracilis, adductor brevis and the skin on the medial aspect of the thigh. The sciatic nerve supplies all the muscles of the posterior compartment and continues on to the knee, dividing into the tibial and common peroneal nerve.

The lateral femoral cutaneous nerve (L2–L3) is a direct branch of the lumbar plexus and enters the thigh deep to the lateral end of the inguinal ligament. It travels under the tensor fascia lata for ~10 cm before rising through it and dividing into anterior and posterior branches that supply the skin of the anterolateral thigh. It is found in the deep subcutaneous tissue just above the fascia. The motor branch to vastus lateralis muscle originates from the femoral nerve and accompanies the descending branch of the lateral femoral circumflex artery (LCFA) along the intermuscular septum.

ARTERIAL ANATOMY OF THE THIGH

COMMON FEMORAL ARTERY

The external iliac artery becomes the common femoral artery ([Fig. 13.3](#)) as it passes underneath the inguinal ligament. In the proximal thigh, the common femoral artery passes through the femoral triangle, bounded by the sartorius laterally, the adductor longus medially, and the inguinal ligament superiorly. Just distal to the inguinal ligament, the superficial circumflex iliac artery (SCIA) and superficial inferior epigastric artery (SIEA) originate from the lateral and medial surface of the common femoral artery, respectively. Alternately, they can arise as a common trunk from the anterior surface in 48% of patients.¹ The SCIA runs