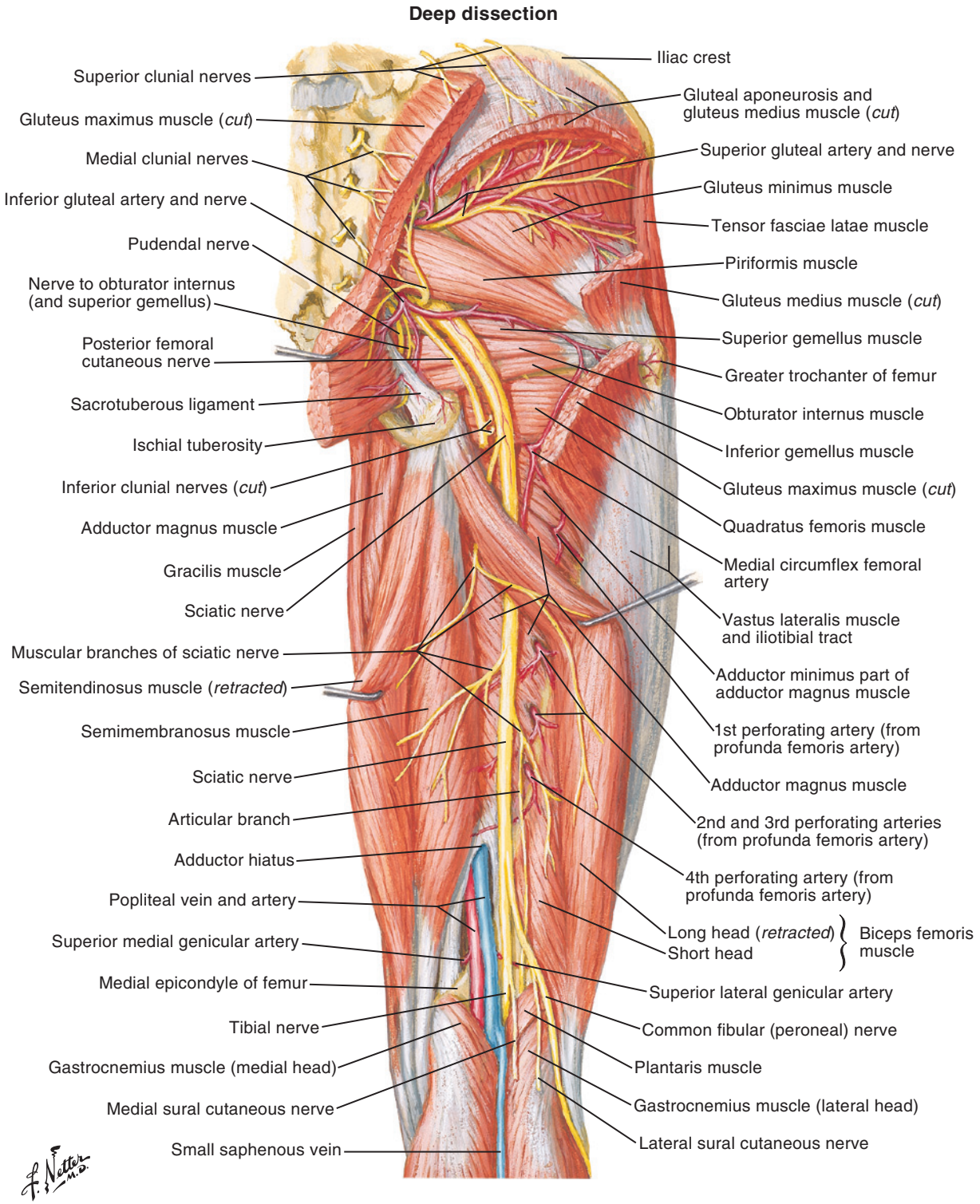

Figure 13.3 Vascular anatomy of the thigh. (Reprinted from Netter Anatomy Illustration Collection. ©Elsevier Inc. All Rights Reserved.)

transverse branches. The ascending branch runs between the adductor longus and magnus and is the primary pedicle for the gracilis muscle flap.

The perforating branches of the deep femoral artery typically include three separate, numbered branches and the terminal segment of the deep femoral which is referred to as the fourth perforating branch. They perforate the adductor magnus to reach the posterior thigh (Fig. 55.1).

EXPOSURE OF BRANCHES OF THE DEEP FEMORAL ARTERY

Branches of the deep femoral artery can be used for recipient vessels in the thigh. The descending branch of the lateral femoral circumflex vessels can be approached as if the surgeon is performing an anterolateral thigh flap (Fig. 59.1). A line is drawn between the anterior superior iliac spine and the lateral border of the patella, the so-called "AP" line. An axial incision 1 cm medial to the AP line can

be carried down to the rectus femoris muscle. Slightly lateral, the interval between the rectus femoris and vastus lateralis can be identified; a fat stripe is usually present at this junction. The descending branch can reliably be located within the largely avascular plane between the two muscles (Fig. 13.2).[2,4] A more superior incision can allow identification of the ascending branch of the lateral femoral circumflex vessels in the interval between rectus femoris and the vastus intermedius, deep to the tensor fascia lata.[5]

SUPERFICIAL FEMORAL ARTERY

The common femoral artery becomes the superficial femoral artery after the take-off of the profunda femoris (Fig. 13.2). The superficial femoral artery continues through the distal femoral triangle, courses through the subsartorial canal, and ends at the hiatus of the adductor magnus, where it continues as the popliteal artery (Fig. 13.2). At the entrance to the adductor hiatus (also known as Hunter's canal), the descending genicular branch arises from the anterior portion of the superficial femoral artery (Figs 13.4, 13.5, 55.1). This vessel runs deep to the vastus medialis muscle on the surface of the medial femoral condyle to supply the medial femoral condyle flap. The saphenous artery, a medial branch of the descending genicular artery, supplies a reliable skin island that can be included with the medial femoral condyle flap (Fig. 13.5).

EXPOSURE OF THE SUPERFICIAL FEMORAL ARTERY AND ITS BRANCHES

After giving rise to the deep femoral artery, the superficial femoral artery passes inferiorly, deep to the sartorius, and passes into the adductor canal. Distal to the femoral triangle, the superficial femoral artery can be exposed through a longitudinal thigh incision along the lateral edge of the sartorius (Fig. 13.5). The incision is deepened through the muscle fascia and the lateral edge of sartorius is reflected medially; this preserves the segmental inferior-medial perforators entering the muscle. In the middle one-third of the thigh, the superficial femoral artery runs on the surface of the adductor longus. In the distal one-third, it passes through the adductor hiatus. Access requires division of the fascial connection between the adductor magnus and vastus medialis which forms the canal's roof. End-to-side anastomosis to the superficial femoral artery requires temporary interruption to the blood supply below the knee. When present, prominent perforators including the descending genicular vessels at the adductor hiatus may be preferable to allow end-to-end anastomosis.

ANATOMY OF THE LEG

The framework of the lower leg is composed of two long bones, the fibula and the tibia, which are arranged in parallel and connected along their length by a fibrous membrane termed the interosseous membrane These three structures together divide the leg into two anatomic sections: the anterior and posterior compartments. The anterior compartment is further divided into anterior and lateral sections separated by a thick anterior intermuscular septum. The lateral leg compartment is separated from the posterior compartment by the posterior intermuscular septum (see Fig. 13.6).

The anterior compartment has four muscles: the extensor digitorum longus, extensor hallucis longus, peroneus tertius, and tibialis anterior (see Fig. 13.7). These muscles are supplied by the anterior tibial vessels and are innervated by the deep peroneal nerve, all traveling deep to the muscles along the interosseous membrane (see Fig. 13.8).

The posterior compartment is divided into superficial and deep compartments by a thin fascia termed the "transverse intermuscular septum (see Fig. 13.6)." Three muscles are located in the superficial compartment: the gastrocnemius, soleus, and plantaris (see Fig. 13.9). The gastrocnemius and plantaris originate from the femur, while the soleus originates from the posterior surface of the fibula and tibia. The gastrocnemius and soleus join together at midcalf to form the Achilles tendon, which inserts into the calcaneal bone. The plantaris is a thin, small muscle. The plantaris tendon follows the larger Achilles tendon to insert into the medial portion of the calcaneus. All these muscles flex the foot in a plantar direction (the gastrocnemius also flexes the knee) with slight inversion. The muscles are vascularized by branches from the popliteal and posterior tibial arteries and innervated by branches of the tibialis nerve from the popliteal fossa.

The deep posterior leg compartment contains four muscles: the popliteus, flexor digitorum longus, flexor hallucis longus, and tibialis posterior (see Figs 13.6 and 13.10). The popliteus performs knee flexion and medial rotation of the leg. The flexor hallucis longus muscle originates from the distal two-thirds of the fibula posteriorly, transverse intermuscular septum, and the interosseous membrane. The tibialis posterior muscle is the most deeply situated muscle in the deep posterior compartment, lying between the flexor hallucis longus and flexor digitorum longus muscles. It arises from the upper two-thirds of the fibula posteromedially, the interosseous membrane, posterolateral tibia, and transverse intermuscular septum that separates it from the soleus.

The lateral compartment contains two muscles: the peroneus longus and brevis (see Figs 13.6 and 13.7). The peroneus longus muscle arises from the upper two-thirds of the compartment, whereas the peroneus brevis muscle arises from the lower two-thirds. Their action consists of extension and eversion of the foot. They are vascularized by vessels from the peroneal artery and innervated by the superficial peroneal nerve, which runs deeply in the upper two-thirds of the leg and then becomes superficial distally, supplying sensory innervation to the lower third of the anterior leg skin as the medial and intermediate dorsal cutaneous nerves.

NERVES

The common peroneal nerve runs subcutaneously at the level of the head of the fibula, where it passes around its neck and divides into a superficial and deep peroneal branch. Motor innervation to muscles of the lateral compartment is supplied by the superficial peroneal nerve, which initially runs deep to the peroneus longus muscle in the proximal leg and then becomes superficial more distally as the medial and intermediate dorsal cutaneous nerves.