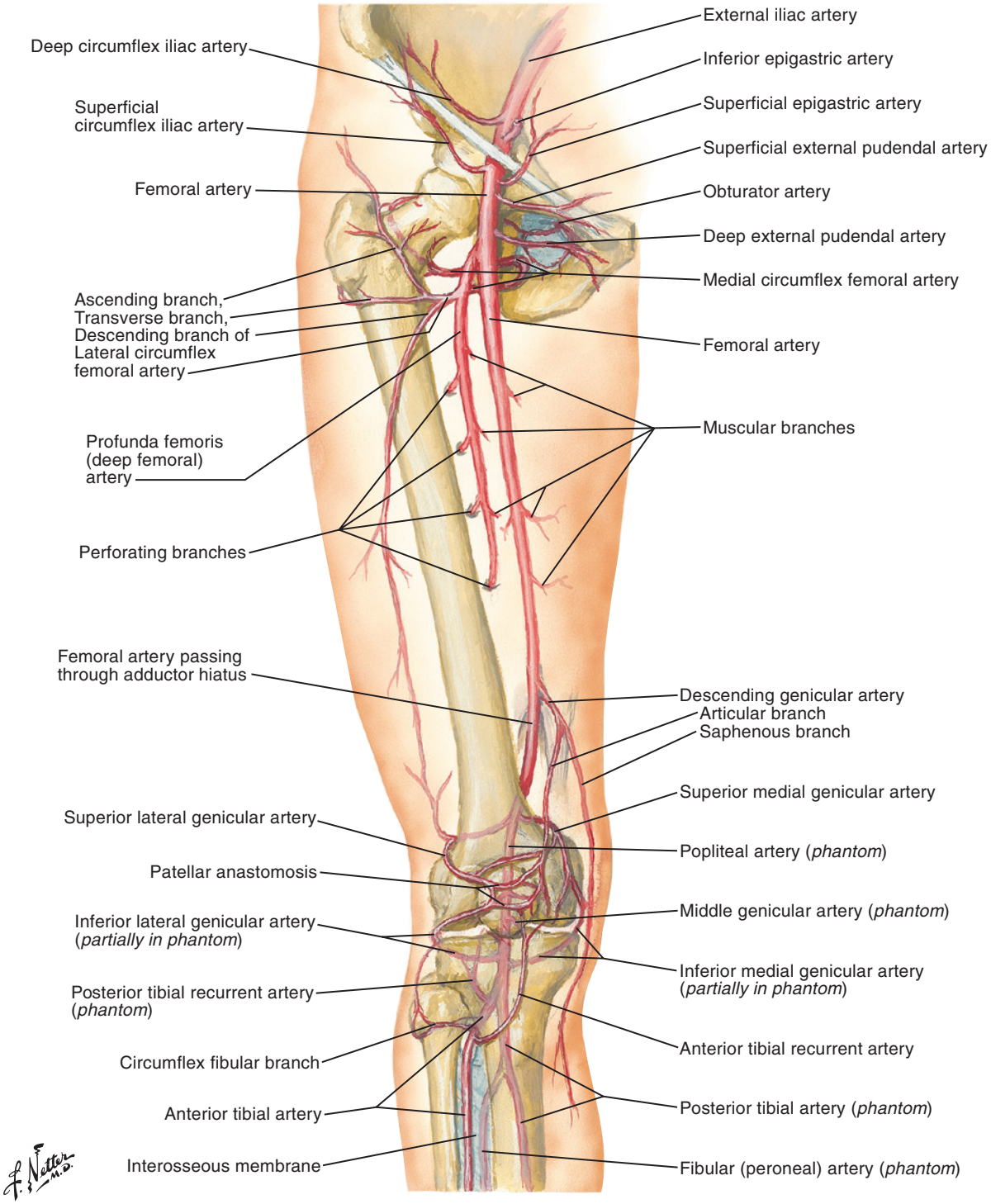

Figure 13.4 Collateral pathways between the superficial femoral artery and deep femoral artery around the knee. (Reprinted from Netter Anatomy Illustration Collection. ©Elsevier Inc. All Rights Reserved.)

The deep peroneal nerve runs in the anterior compartment, innervating its musculature and providing sensation to the first web space of the foot. The tibial nerve provides innervation to the posterior compartment and runs deeply in the proximal half of the leg and then shifts medially to provide motor and sensory innervation to the foot (see Figs 13.6, 13.7, 13.8, 13.9 and 13.11).

ARTERIAL ANATOMY OF THE LEG

POPLITEAL ARTERY

The popliteal artery runs from medial to lateral in the popliteal fossa (see Figs 13.9 and 13.10). The diamond-shaped fossa is bounded superiorly by the hamstrings (medially: semitendinosus and semimembranosus; and laterally:

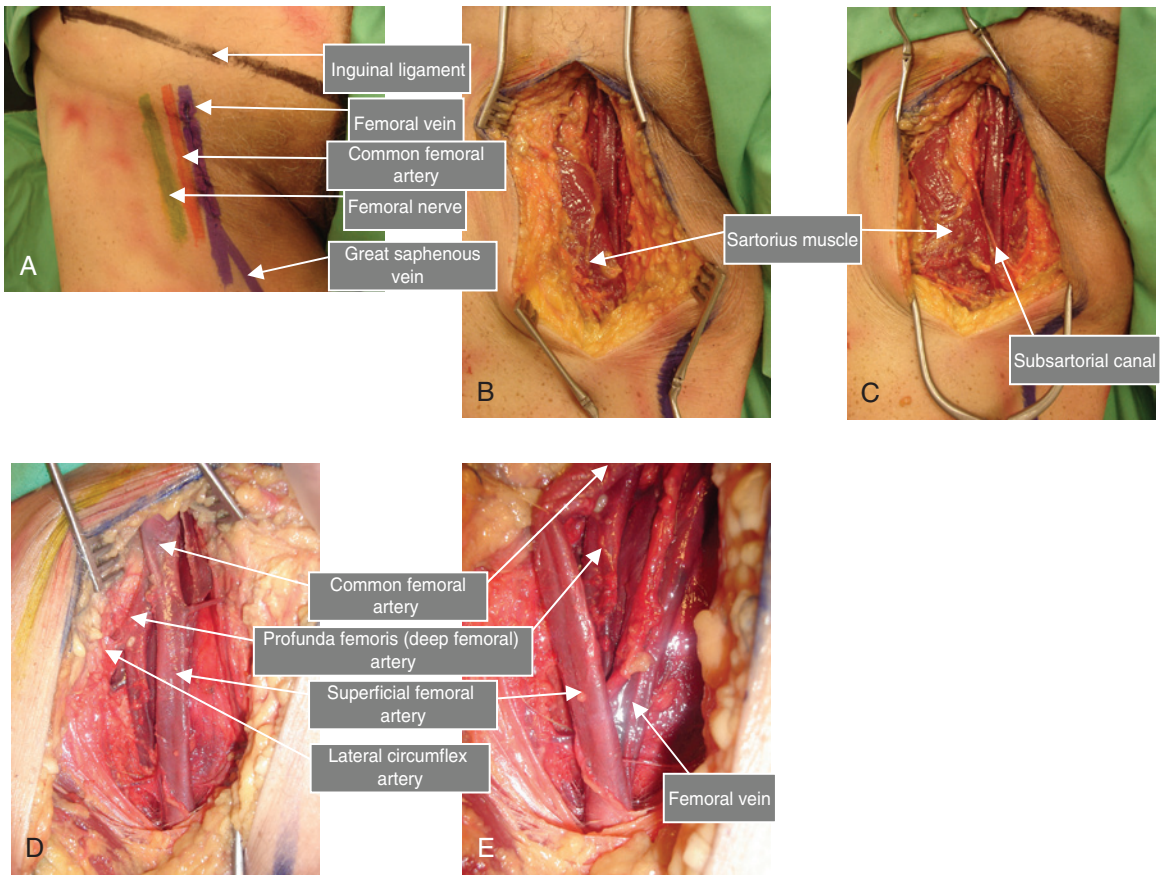

Figure 13.5 (A–E) Surgical exposure of the femoral vessels in the groin and proximal thigh.

biceps femoris). Inferiorly, the fossa is bounded by the two heads of the gastrocnemius and the plantaris muscle. In addition to smaller branches, the popliteal artery gives rise to the medial and lateral sural arteries (the primary pedicles to the medial and lateral gastrocnemius flaps) and the superior and inferior genicular arteries. The latter are an important source of collateral flow around the knee. At the inferior border of the popliteus, the popliteal artery divides into the anterior and posterior tibial artery. As the peroneal (fibular) artery arises from the posterior tibial artery, some refer to the proximal segment of the posterior tibial artery as the "tibial-peroneal trunk" (Fig. 13.6). All three vessels can serve as recipient arteries in the lower leg.

EXPOSURE OF THE POPLITEAL ARTERY

The popliteal artery (Fig. 13.12) can be felt pulsating in the popliteal fossa with the knee bent. It corresponds to a line joining a point at the middle and lower thirds of the thigh, 2.5 cm medial to its posterior midline with the midpoint between the femoral condyles. It continues inferior and laterally to the level of the tibial tuberosity, medial to the fibular neck. For exposure in the fossa, the muscular outlines as mentioned above are marked. Using the posterior approach, the patient is placed prone. For the more difficult medial approach, the patient lies supine, the contralateral hip is supported with a cushion, and legs are in a "frog position" (hip and knee flexed and externally rotated). The incision in the flexion crease should be transverse and extended stepwise. However, often a longitudinal incision between the gastrocnemius heads is sufficient, thus avoiding the flexion crease. Below the fascia, the tibial nerve, and popliteal vein and artery (from superficial to deep) lie vertically in the fossa. The popliteal vein lies superficial to the artery in the same sheath, at first posteromedial of the artery and lateral to the nerve; more superiorly, it lies posterior to the artery, between this vessel and the overlying tibial nerve. The tibial nerve crosses the vessels from lateral to medial. The common peroneal nerve has already bifurcated from the sciatic nerve at the entry into the popliteal fossa. It runs laterally following the tendons of the long and short heads of the biceps femoris, then passes over the fibula head before dividing into the superficial peroneal nerve to the lateral compartment and the deep peroneal nerve to the anterior compartment (Fig. 13.8). Often the popliteal artery does not need to be completely exposed as the geniculate or sural arteries can be used as recipient vessels.

POSTERIOR TIBIAL ARTERY

The posterior tibial artery is the larger of the two terminal branches of the popliteal artery (see Figs 13.6 and 13.10). It originates just distal to the ring in the soleus muscle and inclines medially as it descends in the deep posterior compartment of the leg. It runs in the deep posterior compartment between the flexor digitorum longus muscle (in the deep posterior compartment) and the soleus muscle (in the superficial posterior compartment). Distally it lies more superficial and medial to the Achilles tendon. The posterior