Chapter 9

Soleus Perforator Flap
Development and Indications

The soleus perforator flap basically is a true perforator flap with a short pedicle, consisting of septo- or septomyocutaneous perforators on which anastomoses are performed. Thus, none of the main vessels of the lower leg has to be sacrificed. The perforators mostly arise from the peroneal vessels and are exposed at the proximal half of the lateral lower leg to allow for primary closure. Because of the similar anatomy of the skin paddle, the raising of this flap can easily be learned by surgeons familiar with the osteocutaneous fibular flap.

Before short pedicle perforator flaps such as the soleus perforator flap were established, free flaps from the lower leg were raised at the tibial posterior [449], tibial anterior [267, 415], and peroneal vessels [446], which served as the vascular pedicle. The tibial posterior flap was first described by Zhang et al. [449] as a distally based fasciocutaneous flap for defect cover at the foot and lower leg. In an anatomical study on 20 cadavers, the author found a high number of septocutaneous perforators coming from the tibial posterior artery. According to this study, three septocutaneous perforators from the posterior tibial artery can be found in the proximal, seven in the middle, and three in the distal lower leg. A precise description on the number and location of the septocutaneous branches of the tibial posterior artery was also given by Carriquiry and co-workers, who found four to five such perforators, each located 9–12, 17–19, and 22–24 cm above the medial ankle [54]. Amarante et al. used this flap as a distally pedicled transplant for defect cover at the foot, and they reported two regular branches that they found 4 and 6.5 cm above the medial ankle [9]. Similar findings were published by Koshima et al., who also preferred to raise flaps at the distal half of the lower leg due to the high number of septocutaneous perforators in this region [201]. To avoid sacrifice of this main vessel of the lower leg, they anastomosed their flaps directly to the perforator, leaving the tibial posterior artery intact [201]. Hung and co-workers later transferred this flap by means of microvascular anastomoses at the tibial posterior vessels for covering extended defects of the extremities [165]. A special indication of the free tibial posterior perforator flap was described by Chen et al., who performed reconstructions of the esophagus in three cases [60].

Focusing on the tibial anterior artery, based on their own cadaveric dissections Morrison and Shen described the proximal third of the lower leg to be the most reliable donor area for raising flaps based on septocutaneous perforators from this artery, each having a vascular territory covering 15×10 cm [267]. According to the first clinical applications, three types of tibial anterior flaps were described [267, 334, 415], all of them mainly used for local defect cover at the lower leg. The main advantages of flaps based on septocutaneous perforators from the tibial anterior artery are their wide arch of rotation, their thinness, and the ease of flap raising, making them an ideal transplant for defect cover at the foot [267].