

PERONEAL ARTERY PERFORATOR FLAP

Morphology of the lateral aspect of the leg is such that even in heavy individuals thin or relatively thin flaps can be harvested from this region. This is why extensive anatomic studies were performed to get a clear view of the skin vascularization of this area^(5,14,135,149,162). However, some minor discrepancies, that will be discussed later, were found.

The peroneal artery perforator flap was first described by Yoshimura et al. in 1990⁽¹⁶²⁾, based on an extensive anatomic dissection of 80 cadavers. It is a thin flap that can be pedicled proximally or distally depending on the selected perforator and can be used as a regional pedicled or free flap. Donor areas of flaps harvested on the proximal half of the lower leg can usually be repaired by primary suture. While flaps elevated on the distal third of the leg usually require skin grafting.

Perforator vessels are usually short and if it is intended to use the flap as a pedicled flap, perforators should be traced in the septum or through the muscle, to the peroneal vessels. At this stage loupe magnification is highly advisable.

Indications

This flap has the great advantage of being thin and pliable with a long pedicle (if it is traced deep). As a pedi-

cled flap it can be used to repair defects around the ankle and heel⁽¹⁹⁾. As a free flap it has been extensively used for intraoral reconstruction⁽¹⁵²⁾ and even for treatment of cervical post-burn contractures⁽¹⁴⁷⁾.

Vascularization and anatomy

The flap is mainly supplied by perforator cutaneous vessels branching off the peroneal artery in a mean number of four⁽¹³⁵⁾ or five⁽¹⁵²⁾. The proximal and distal perforators are constant and can generally be localized at 5cm to 15 cm below the fibula head (proximal perforator) or in the supramalleolar area (distal perforator)⁽¹⁵²⁾. Occasionally, these perforator branches come from the posterior tibial artery. A different matter is the way by which these branches emerge to the skin. According to Wolf⁽¹⁵³⁾, it seems that these cutaneous perforators tend to be musculocutaneous in the proximal third of the lower leg (through the hallucis longus muscle) and septocutaneous in the distal third of the lower leg (posterior intermuscular septum). So, it will depend on where the flap is harvested from, as to whether the nourishing vessels will be found as musculocutaneous or septocutaneous perforators. However, each perforator is accompanied by two venae comitantes.

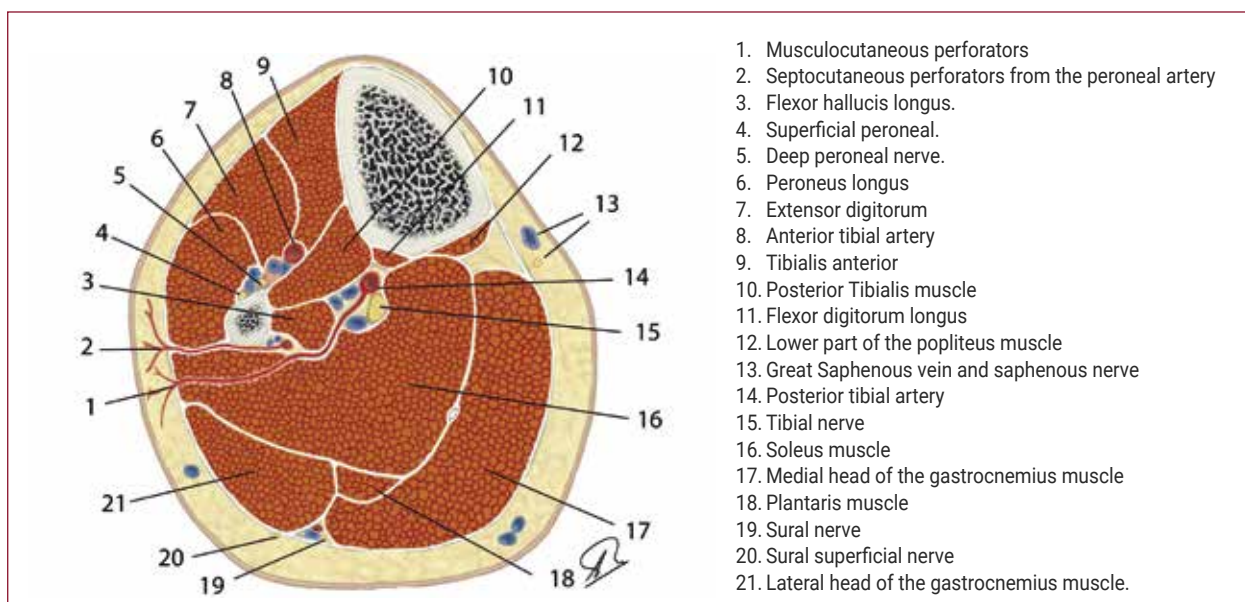


Figure 7.78. PAP: Local anatomy of the lower leg and vessels supplying the peroneal artery flap. Note that perforator from the Peroneal artery is shown as septocutaneous vessel while the perforator coming (occasionally) from the posterior tibial artery is shown as a musculocutaneous perforator.

Markings

Two references are marked first, the lateral malleolus and the fibular head and the peroneal shaft in between. A line is marked between the distal third and the two proximal thirds. Proximally to this line a constant perforator is usually found. However, Doppler examination provides more accurate information about its emerging point. The flap can be outlined centered on the emerging point, or slightly displaced, depending on how should it rotate or

where the final defect is located. One single perforator vascularizes an average skin area of 7 cm by 12 cm⁽¹⁵²⁾.

Elevation

For flaps harvested on the middle area, the most proximal incision should be made approximately 5 cm to 8 cm distal to the fibular head, to avoid accidental injury to the common peroneal nerve.



Figure 7.79. Outlining a peroneal artery perforator flap. Fibular head and shaft with the supramalleolar eminence are marked, as well as the limit between the middle and distal third of the fibula. Over this line a constant perforator can be found. Acoustic Doppler examination helps to determine the exact point where the perforator emerges to the skin.

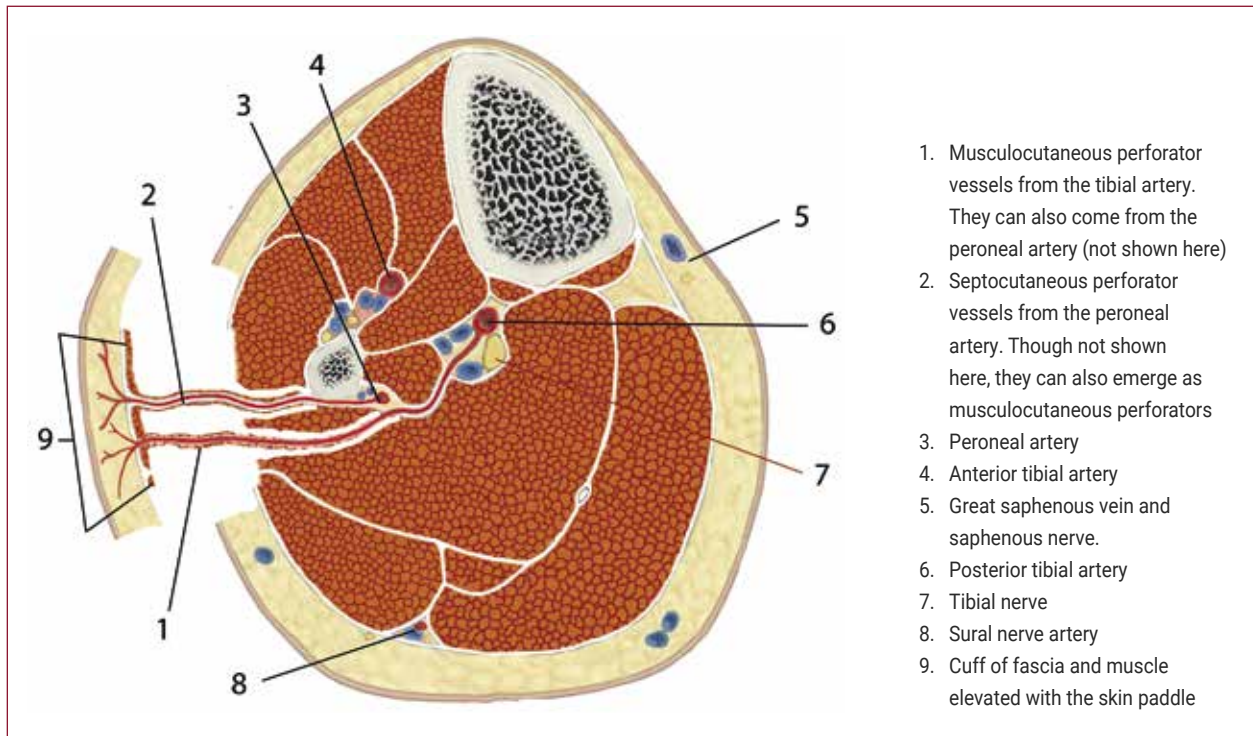


Figure 7.80. Peroneal artery perforator flap



Figure 7.81. Anterior skin incision is made over the peroneal muscles and elevation is performed subcutaneously respecting the fascia of the peroneus longus muscle.



Figure 7.82. Suprafascial elevation should stop 2-3 cm away from the posterior compartment. At this level, the fascia is incised and dissection continues subfascially, leaving a security cuff of fascia before reaching the posterior septum.



Figure 7.83. The fascia of the Peroneus longus muscle is elevated and left attached to the cutaneous paddle until the posterior septum is reached. Very carefully, particularly if perforators had not been precisely localized by Doppler examination, the septum is opened and blunt examination continues to search for arising perforators.

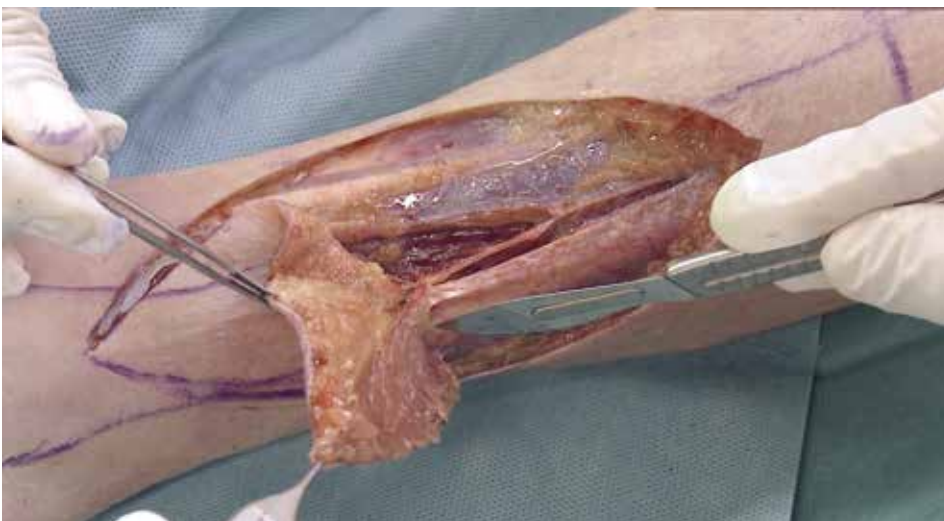


Figure 7.84. In this case, where the flap has been based on a distal pedicle, proximal septal attachments are divided as well as proximal perforators. But all distal perforator vessels should be explored and preserved before continuing to liberate the flap. Remember that proximally, perforators arising from the deep down use to be musculocutaneous perforators and distally use to be septocutaneous perforators.



Figure 7.85. Distal perforators are identified emerging through the septum. Though usually the largest perforator should be the preferred option, in the case of regional pedicled flaps the best-positioned perforator determines its selection as pedicle. In other words, the one that will allow better and easier rotation of the flap should be selected.



Figure 7.86. Once the main perforator vessel has been selected, the others are divided, to free the cutaneous paddle of the flap.



Figure 7.87. With the main perforator localized and preserved, the pedicle is freed from the posterior aspect.



Figure 7.88. Perforators are usually short and should be traced retrograde to the peroneal vessels to gain length for the pedicle. At this stage, loupe magnification is highly advisable, as vessels are small and delicate.



Figure 7.89. Rotation of the pedicle is checked, and as soon as it enables the flap to cover the full defect, individualization of vessels stops. The flap can easily reach all the area around the ankle.