



Figure 6.79. A) Subfascial dissection continues over the Brachioradialis muscle. Any perforator should be properly identified before being divided. B) After the radial side of the flap has been completely elevated, the ulnar side of the flap is incised deep into the fascia of the Flexor Carpi Radialis.



Figure 6.80. A) Subfascial dissection is carried out on the Flexor Carpi Radialis until the intermuscular septum, (where the artery and veins run), is reached. B) Distal portion of the Radial artery, on the radial side of the FCR tendon is localized by careful dissection with blunt scissors.



Figure 6.81. A) If the intention is to dissect the RA and veins as far as the snuffbox, they have to be individualised, in order to follow them distally beyond the wrist. B) RA and veins are now dissected free from their muscular attachments. Small branches to the surrounding muscles are severed and ligated.



Figure 6.82. A) Back on the radial side, any adherence or attachmens are also severed. B) From the ulnar side, the proximal RA and veins are isolated, divided and ligated.



Figure 6.83. From proximal to distal, final attachments are freed from the Brachioradialis muscle.



Figure 6.84. With the pivot point on the wrist, the flap can easily reach the hand.

DISTALLY BASED RADIAL ARTERY PERFORATOR FLAP

The popular and reliable radial forearm flap requires the sacrifice of the *Radial artery*. This is why other flaps that avoid the sacrificing of this valuable artery, such as the posterior interosseous flap, and the distally based ulnar flap, have been described. With the same objective of avoiding the sacrifice of the *Radial artery*⁽⁷⁸⁾, another flap was described; the reverse forearm pedicled adipofascial flap^(12,31,86), which can be used for cases where only adipose tissue is needed.

In addition to the benefit of avoiding the sacrifice of the Radial artery, this flap has the advantages of being highly reliable and versatile, since it can be used as an adipofascial flap⁽⁴²⁾, fasciocutaneous flap, or neurocutaneous flap⁽⁴⁾. It does not require microsurgical techniques

to be harvested and transferred, and its donor site can be primarily repaired depending on the size of the flap.

Indications

This flap is especially useful for coverage of the dorsum, wrist, or first web space, as well as for other types of defects in the volar or dorsal aspects of the hand. However, it is not suitable for more distal defects, since the pedicle is rather short. Also, the perforators are small and precarious and should not be individualized. This flap provides a subcutaneous layer that will allow tendons and their sheaths to move freely under it. This

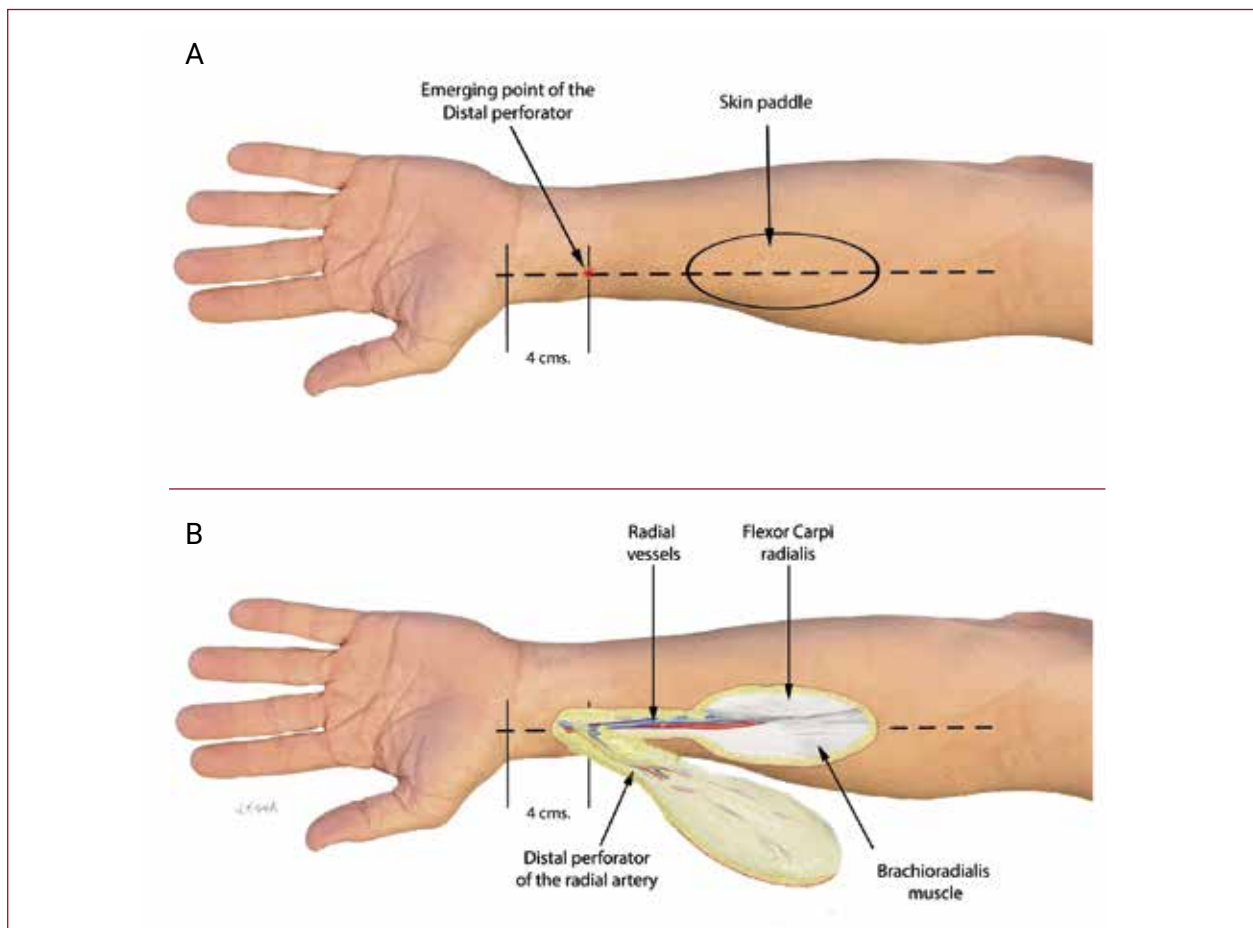


Figure 6.85. A) Distally based radial forearm fasciocutaneous flap design: A line is traced on the anterior aspect of the wrist over the radial styloid process. Over the axis of the radial artery a point is marked at 3-4 cm proximal to the styloid process. Around this point the branching of the distal perforator branch of the radial artery can be localized. The skin island is generally placed over the middle third of the forearm. B) The flap is elevated from proximal to distal including the fascia of the brachioradialis and flexor carpi radialis muscles taking great care when approaching the emerging point area.

flap has also been used as a composite flap that is able to supply bone, tendon, adipose tissue, fascia and nerve; not only for hand defects, but also for nasal reconstruction^(52,42).

Vascularization

The radial artery gives off 12 perforator branches along the fascial septum, between the tendons of the Brachioradialis and Flexor Carpi Radialis muscles⁽⁸³⁾. These vessels vascularize the ventral skin and its radial and ulnar boundaries. The most distal branch is located 1.5 cm above the styloid radial process, where it forms a vascular network with other perforators. Coming from a distal point, it is able to vascularize the area of the descending superficial branch of the radial nerve. It can technically be classified as a reverse neurocutaneous island flap (83). These small skin arteries emerge through the septum and form a longitudinally vascular plexus on the deep fascia, as well as in the subcutaneous tissue of the ventral aspect of the forearm. The subcutaneous pedicle should be 3 cm wide and the pivot point of this flap is 3-4 cm proximal to the styloid process of the radial styloid process⁽³⁸⁾. Venous drainage mostly comes from the cephalic vein and other associated veins.

Markings

Tendons of the Brachioradialis and the Flexor Carpi Radialis muscles are first localized on the wrist (see fig. 6.61a). The point where the main perforator arises from the septum is at 1.5 cm above the styloid process. The pivot point of the flap is localized about 3-4 cm proximal to the styloid process. A line is traced between this point and another, centered on the elbow volar crease. This is the axis of the flap. The cutaneous, or adipofascial paddle is outlined and centered on the marked axis, around the junction of the upper and middle third of the forearm. The upper margin of the cutaneous, or adipofascial, island is located around 10 cm distal to the elbow, however, its distal margin will depend on the length of pedicle needed. The flap's size determines whether the pedicle will be long or short. For larger flaps, the pedicle will be short, whereas for smaller flaps the pedicle will be consequently longer. The more proximal the skin paddle is raised the higher likelihood of necrosis. The flap's width is around 5 cm, though wider flaps have been described. Although not strictly necessary, it is helpful to localize distal perforators by Doppler examination. The boundary between the radial artery perforators and the ulnar vascular territory generally overlies the skin, over the palmaris longus muscle.

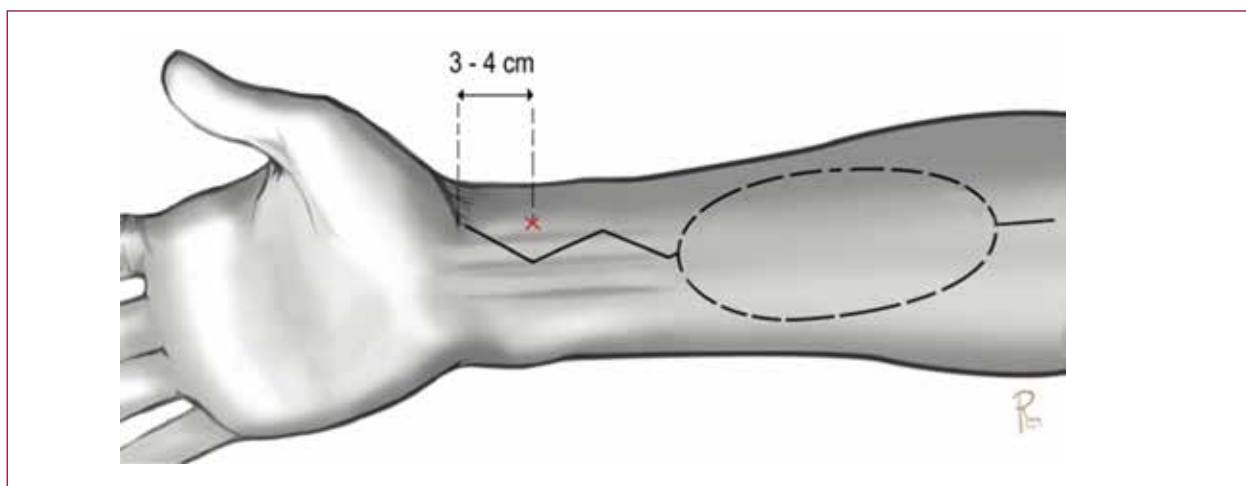


Figure 6.86. Design of the adipofascial island flap on the subcutaneous aspect and the W-shaped incision over the axis of the pedicle. The Pivot point is marked 3-4 cm proximal to the styloid process.

Elevation

The procedure starts under controlled ischemia by placing a pneumatic tourniquet, or elastic band on the upper arm. An S or W-shaped line is outlined and incised

from the wrist, over the pedicle to the distal margin of the outlined cutaneous island, if it is raised as a cutaneous flap, or up to the most proximal point of the flap's adipofascial paddle, if it is raised as an adipofascial flap.

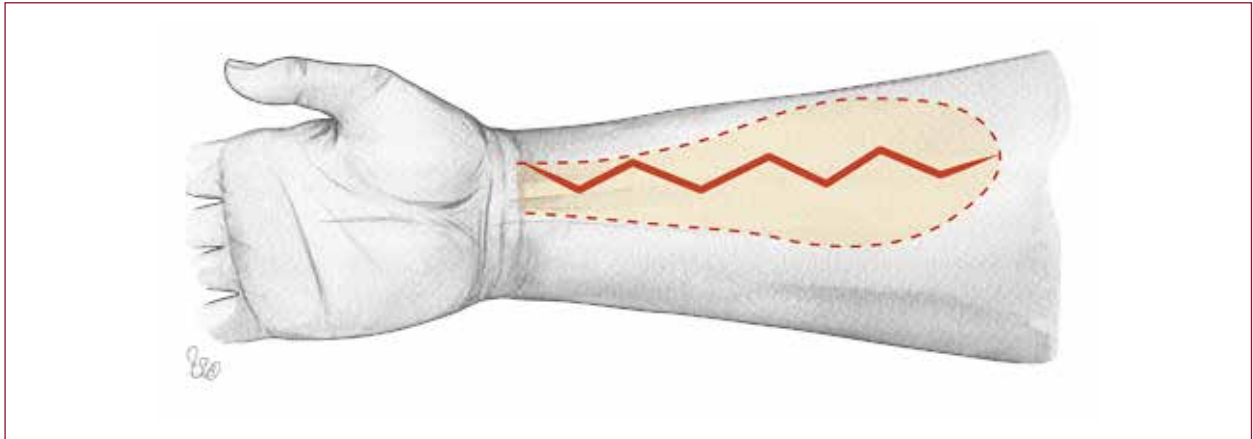


Figure 6.87. Skin incision is made in a zig-zag manner to avoid retraction. The adipofascial flap should not be outlined on the proximal third of the forearm.

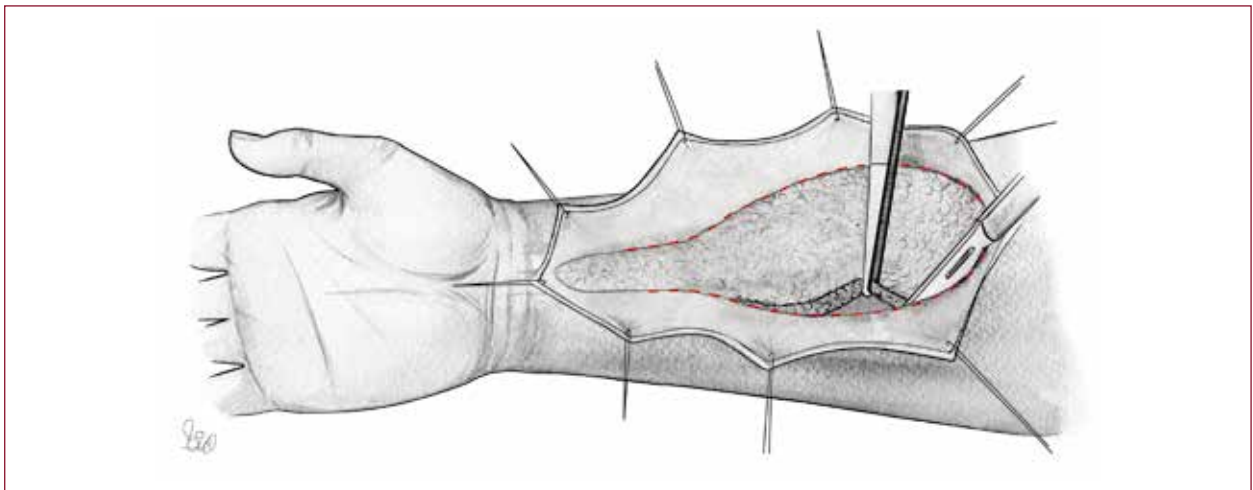


Figure 6.88. For adipofascial flaps, subdermal dissection is performed over the flap's area, as well as over the pedicle, maintaining a thin layer of fat attached to the skin flaps to avoid necrosis or dehiscence of the skin. On the adipose boundaries of the flap the incision is made deep into the fascia, which is elevated attached to the flap.

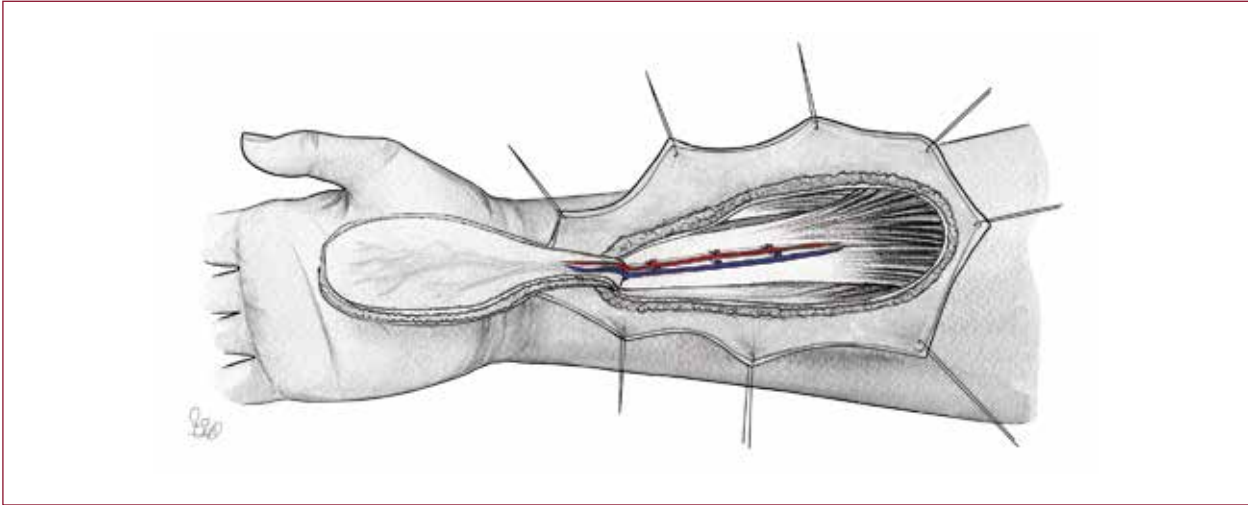


Figure 6.89. The flap is raised including the fascia of the Brachioradialis and Flexor Carpi Radialis, but instead of going deep dissecting the intermuscular septum, subfascial dissection proceeds from proximal to distal dividing and ligating the perforators emerging from the radial artery. Close to the pivot point (3-4 cm proximal to the styloid process), great care has to be taken to localize and preserve the perforator that vascularize the flap.