DISTALLY BASED ULNAR ARTERY FLAP

The ulnar forearm flap was described as a free flap in 1984[45] and as the radial forearm flap, it provides skin of excellent quality. In contrast to the forearm flap, its donor site is not so exposed and more acceptable, Additionally, the skin paddle is hairless. As is the case with the radial forearm flap, the sacrifice of one of the major arteries of the hand is required.

To overcome this major drawback compared with other flaps, the reverse distally based flap, based on a cutaneous perforator branch, was described in 1998[4]. It does not sacrifice the ulnar artery, but its pedicle is short and its indications are limited. As a free flap, this flap has a high potential, because it can be transferred as an adipofascial or compound bone flap (ulnar fragment).

Indications

As a pedicled flap, since the pedicle is rather short, its range is limited and it is mainly indicated for covering defects on the dorsum of the hand and wrist. It can be rotated 180º like most of the "propeller" flaps.

Vascularization

Its blood supply comes from the ascending and descending branches of the *Dorsal branch of the ulnar artery* (DBUA), which is also known as the *Ulnodorsal artery.* In the distal third of the of the forearm and proximal to the pisiform bone, the Ulnar artery gives off a cutaneous branch, the DBUA, that courses obliquely, from palmar to dorsal, passing deep into the Flexor carpi ulnaris. This artery is closely related to the ulnar nerve (Fig. 6.113) passing superficially to it and emerging between 2-5 cm[49] or 2-7 cm[82] proximal to the pisiform bone (The variance in measurements depends on different authors).The DBUA gives off two branches:

- Ascending branch of the DBUA that runs between the ulna and Flexor carpi radialis, vascularizing the skin of the medial side of the lower forearm, and
- Descending branch of the DBUA, which runs between the ulnar head and the pisiform bone, accompanying the dorsal branch of the ulnar nerve and vascularizing the skin on that area. It anastomoses with the dorsal carpal arch and cutaneous arterioles from the dorsum of the hand. This network of vessels offers the possibility for a variety of flaps.

Markings

The pisiform bone has first to be identified. The pisiform bone is the main landmark, while the long axis of the flap will be the ulnar bone. The dorsal branch of the ulnar nerve will be found at around 2-5 cm (or 7 cm according to different authors) proximal to the pisiform bone, over the ulnar axis of the flap. From this point, the ascending and descending branches can be projected. The cutaneous island paddle, according to different authors can measure from 6-16 cm[82] or up to 9-20 cm[49].

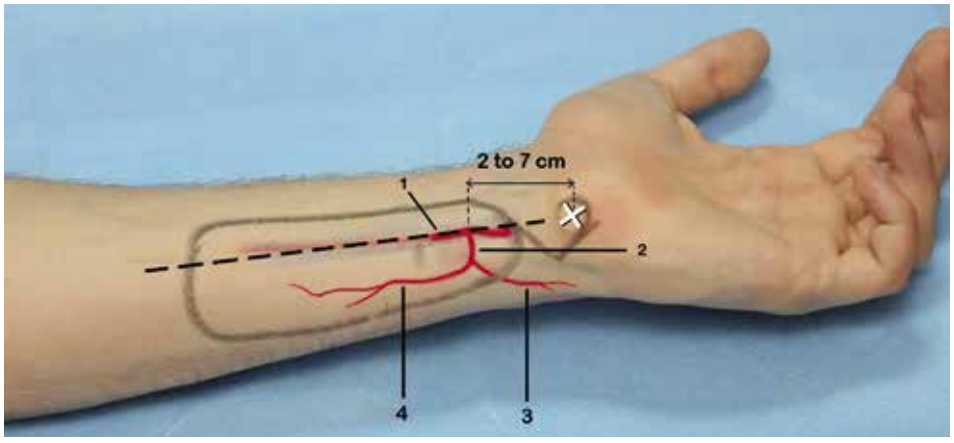

Figure 6.109. The Pisiform is first marked (white cross). The axis of the flap is marked between Flexor carpi ulnaris and Extensor carpi ulnaris (dotted line). On this line, the emerging point of the dorsal branch of the ulnar artery is found between 2 and 7 cm, proximal to the pisiform point. The cutaneous island extends on the distal third of the forearm. It can be about 6-9 cm wide.

Elevation

Raising the flap starts from the radial aspect. The skin is incised deep into the fascia, which has to be left included in the flap, exposing the underlying Flexor carpi ulnaris (FCU). (Refer to legends under the illustrations):

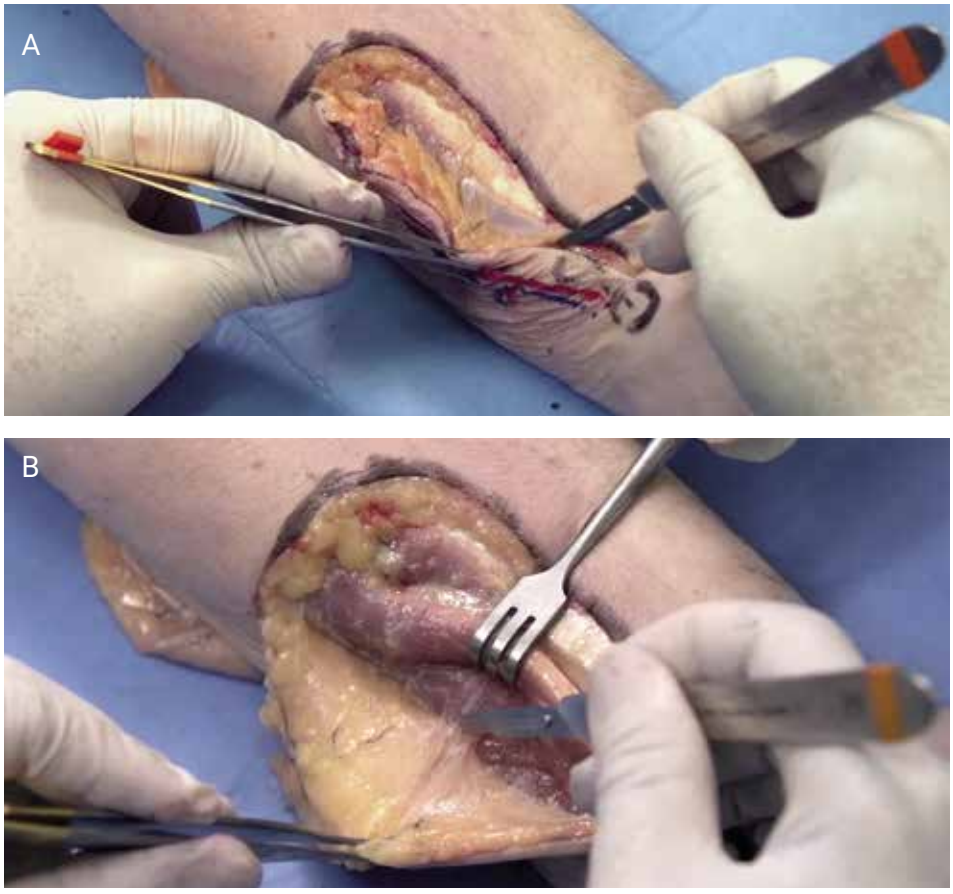

Figure 6.110. A) On its radial aspect, the skin is incised deep into the fascia. B) The fascia has been left attached to the flap, while the flexor carpi ulnaris is shown retracted laterally.

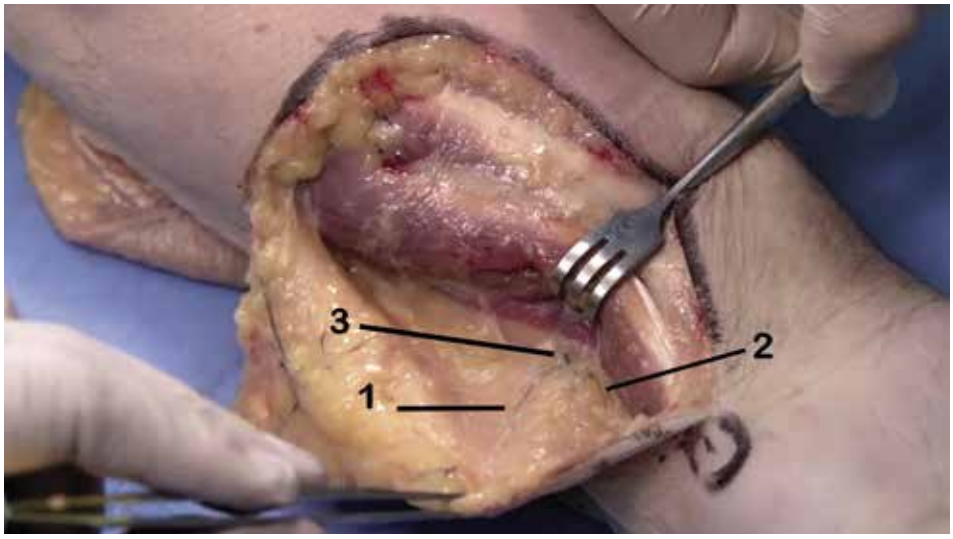

Figure 6.111. As dissection proceeds on the ulnar aspect, through the transparency of the fascia the ascending branch can be seen first of all (1), later, the descending branch and further posteriorly, the main pedicle appears (2), followed by the dorsal branch of the ulnar artery (3).

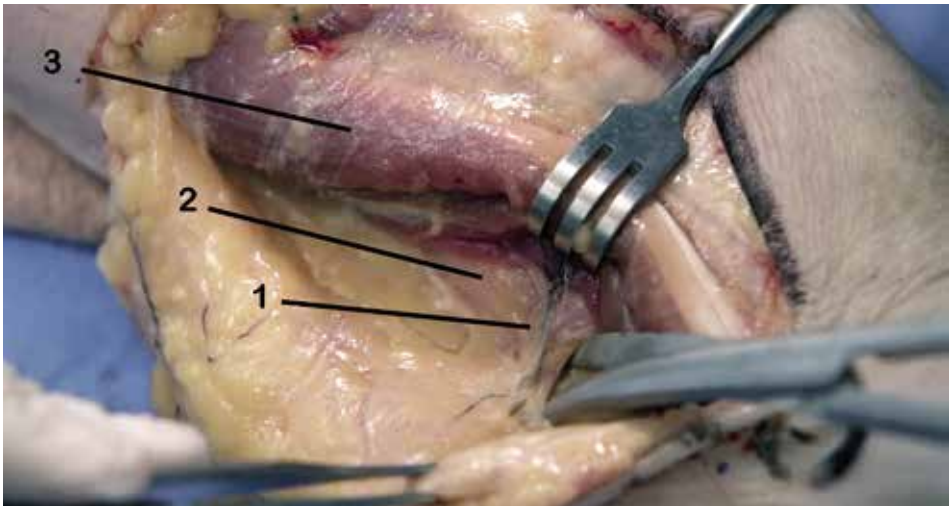

Figure 6.112. Once the dorsal branch (1) of the ulnar artery (DBUA) has been localized,emerging between the flexor carpi (3) and extensor carpi (2) ulnaris, it has to be individualized, in order to localize and preserve the ulnar nerve that courses immediately below the DBUA.

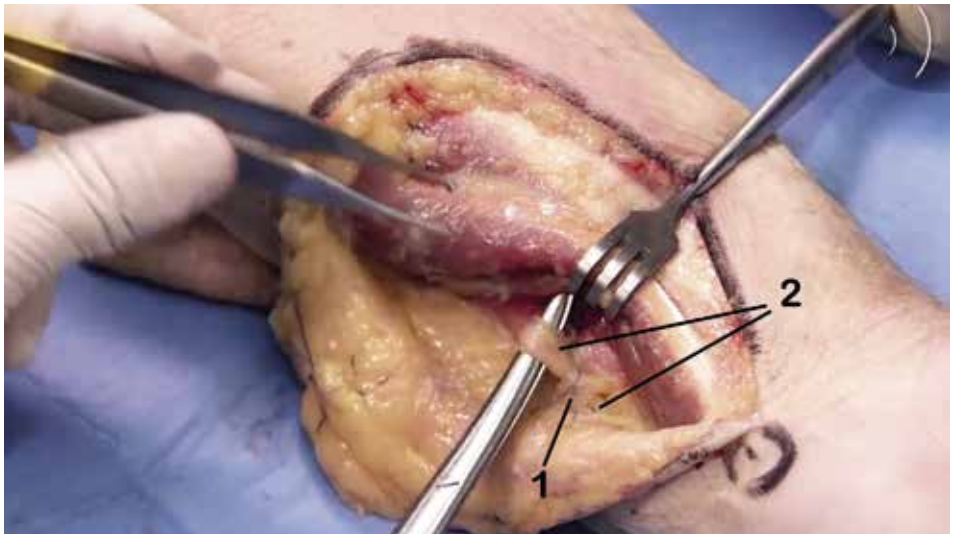

Figure 6.113. The DBUA (1) is seen entering the subcutaneous tissue of the skin paddle, while the ulnar nerve (2) is seen coursing downward, below the pedicle.

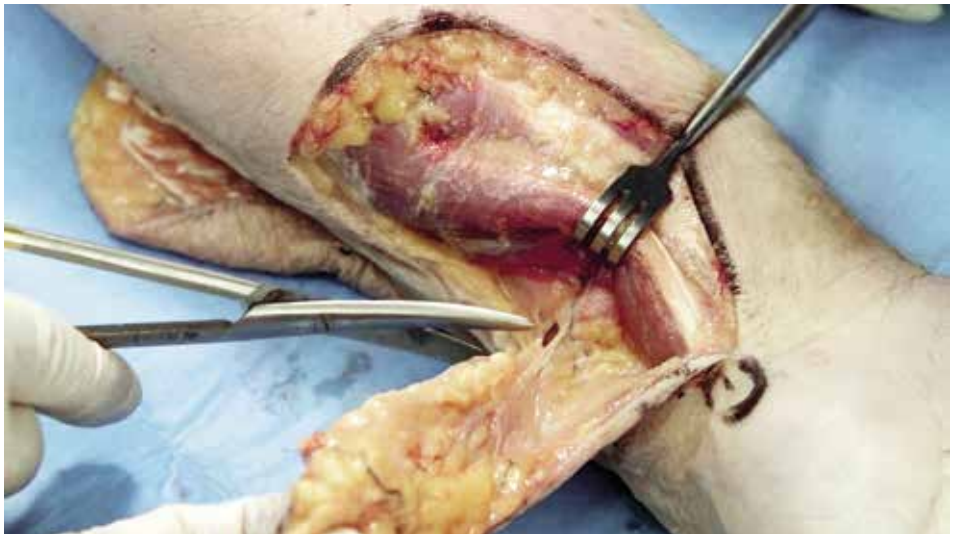

Figure 6.114. Once the DBUA and ulnar nerve have been identified and isolated, the ulnar aspect of the flap is incised around the pedicle and the island perimeter completely freed.

Figure 6.115. As a pedicled flap, it can be mobilized like a propeller flap. Its rotation is enough to provide coverage for wrist or proximal hand defects.