

## BRACHIAL MEDIAL ARM FLAP

Medial aspect of the arm is an excellent donor area for flaps because its skin is highly elastic and has an excellent texture, colour and thickness, especially when they are intended to resurface skin defects over joints such as the elbow (reverse pedicled flaps) or axilla (proximally based pedicled flaps).

The skin of the inner arm is vascularized by terminal septocutaneous branches from the *Brachial artery*, the *Superior ulnar collateral artery* and the *Middle ulnar collateral artery* (when present) that arise through the septum between the Biceps and Triceps.

Based on these perforators a variety of flaps have been described:

- The Medial arm flap (proximally or distally based) that is vascularized by terminal septocutaneous branches emerging from the *Superior ulnar collateral artery*.
- The Distal medial arm flap, a reverse fasciocutaneous perforator flap based on the main perforator from the *Distal brachial artery*.
- The Reverse ulnar recurrent perforator artery flap based on branches from the anastomosis, between the *Superior ulnar collateral artery* and the *Ulnar recurrent artery*.

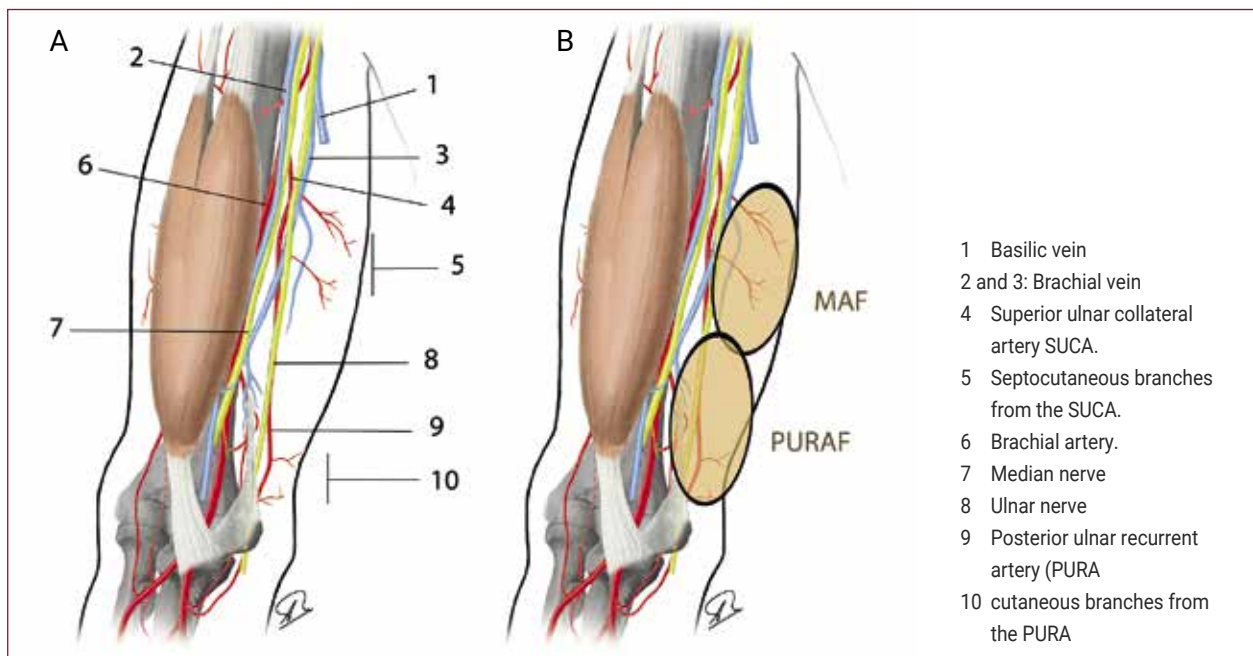
The most reliable vessel in this area is the *Superior ulnar collateral artery*, which is the source vessel for the Medial arm flap. This artery anastomoses distally with the posterior Ulnar recurrent artery and that is why this flap, when it is distally based and distally outlined, is known as the Ulnar recurrent fasciocutaneous flap.

### Indications

As pedicle flaps, Medial arm perforator flaps are especially useful to resurface distal defects around the elbow (distally based flap)<sup>(48)</sup> or defects on the shoulder or axilla<sup>(10)</sup>. As free flaps they have been widely used for many reconstructive challenges.

### Vascularization and anatomy

The Medial arm flap is vascularized by the *Superior ulnar collateral artery* that branches off from the *Brachial artery* at about midpoint of the upper arm and, according to Cormack and Lamberty<sup>(17)</sup>, has a diameter of about 2-3 mm (see fig. 6.1) and gives one or two septocutaneous perforators that reach the skin, emerging



**Figure 6.18.** A) Anatomical relationships of the vascular structures involved in medial arm flaps. B) Skin paddles of the Medial arm flap (MAF) and Posterior ulnar recurrent artery flap PURAF.

through the septum, between the Biceps and Triceps muscles. This artery is closely related to the ulnar and median nerves all along its course down to the elbow, where it anastomoses with the posterior (and indirectly the anterior) *Recurrent ulnar artery*. Sensory innervation to the skin of the medial aspect of the arm is supplied by the intercostobrachial nerve (proximal third of the inner arm) and by the medial cutaneous nerve of the arm (middle and distal third) (see fig. 6.18).

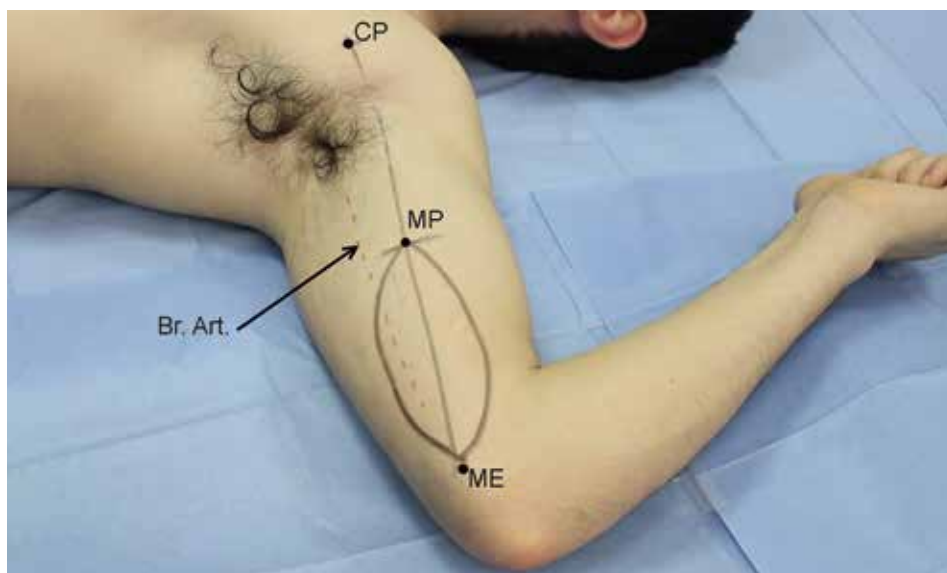
### Markings

The reference points to mark the axis over which the island flap will be outlined, are the Coracoid point and the

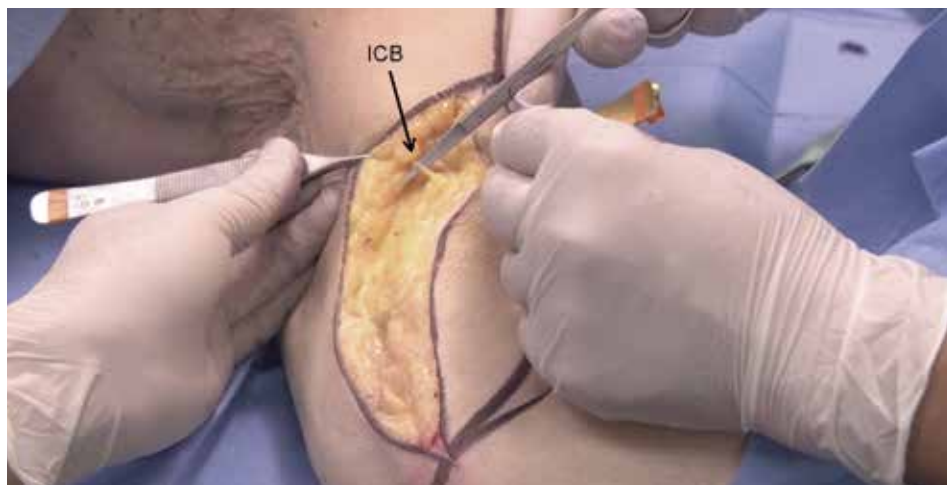
medial epicondyle. (Refer to legends in figure 6.19). The cutaneous island can be outlined over the entire area of the arm's inner skin. However, it is important to harvest the flap in such manner that the donor area can be repaired by direct closure; avoiding skin grafts on an area where structures of great importance are located; such as the *Brachial artery*, median and ulnar nerve.

### Elevation

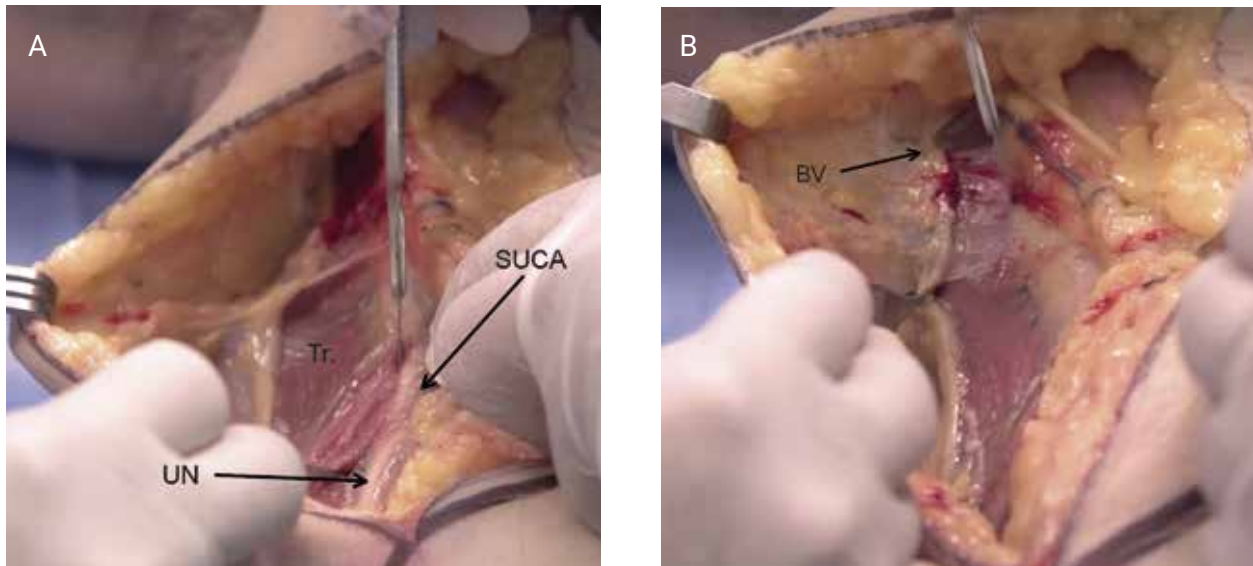
The same as with most perforator flaps, elevation always starts firstly on one of its sides and only when a reliable perforator and nourishing vessels have been identified, the rest of the perimeter can be incised deeply.



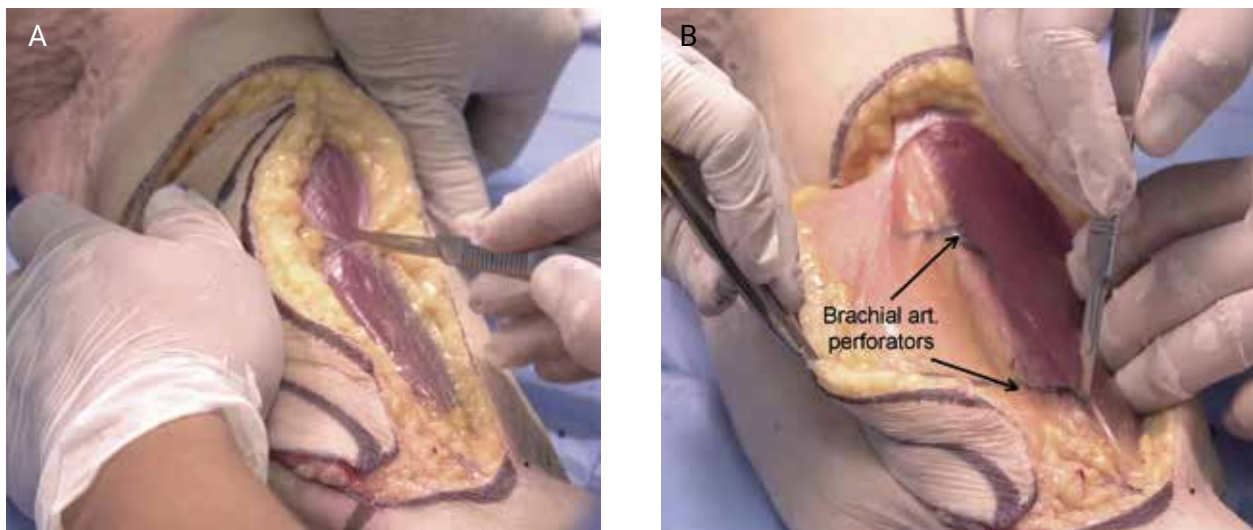
**Figure 6.19.** By pulse palpation, the brachial artery (Br. Art.) is marked reference over the skin of the inner aspect of the arm. Coracoid point (CP) and medial epicondyle point (ME) are marked out and a line is traced between them. The Mid point over this line is marked (MP) and represents the point where the superior ulnar collateral artery branches off from the brachial artery. The cutaneous paddle of the flap is outlined as an ellipse distal to this point.



**Figure 6.20.** Medial incision is carried deep to the fascia. Great care is taken to localize and preserve the intercostobrachial nerve. Later it will be decided how proximally it will be divided, to keep the flap sensitive.

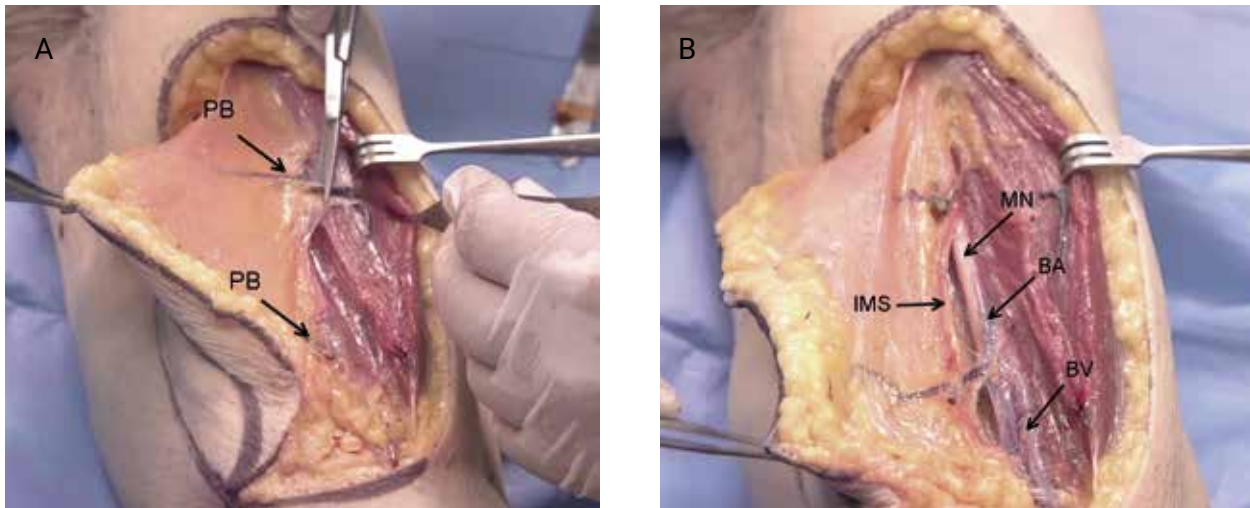


**Figure 6.21.** A) Fascia of the Triceps muscle (Tr) is localized and carefully incised deep to the muscle fibers. Ulnar nerve (UN) and Superior ulnar collateral artery (SUCA) are also identified and kept attached medially to the septum. B) Septum is completely freed from medial attachments to Triceps muscle. Basilic vein (BV) will appear when dissecting proximally.



**Figure 6.22.** A) With the septum free on the Triceps side, anterior skin incision is performed on the anterior aspect, deep into the Biceps brachialis muscle. B) Elevation continues medially to reach the intermuscular septum where some septocutaneous perforators emerging from the Brachial artery are usually found.

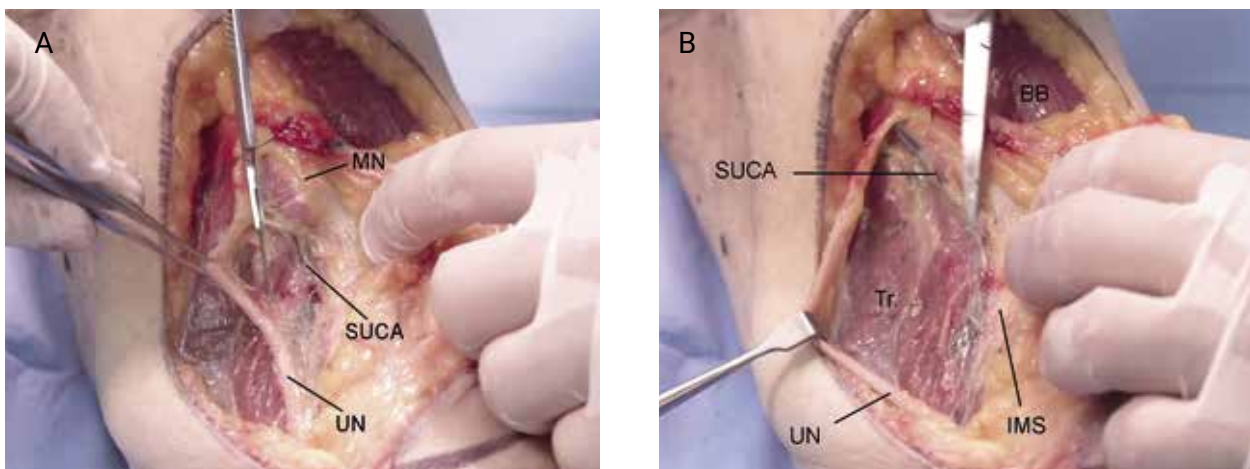




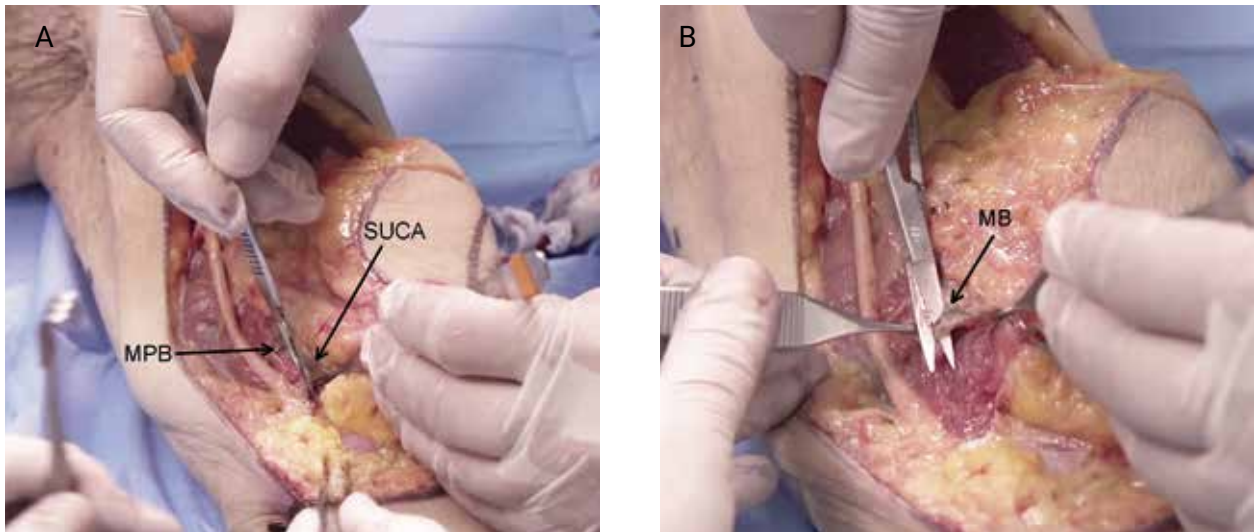
**Figure 6.23.** A) Cutaneous perforator branches (PB) from the Brachial artery (BA) are divided and ligated to expose the Median nerve. B) As dissection proceeds medially, all branches from the Brachial artery are divided and ligated and the intermuscular septum (IMS) freed from the Median nerve (MN), Brachial Artery and Brachial vein (BV).



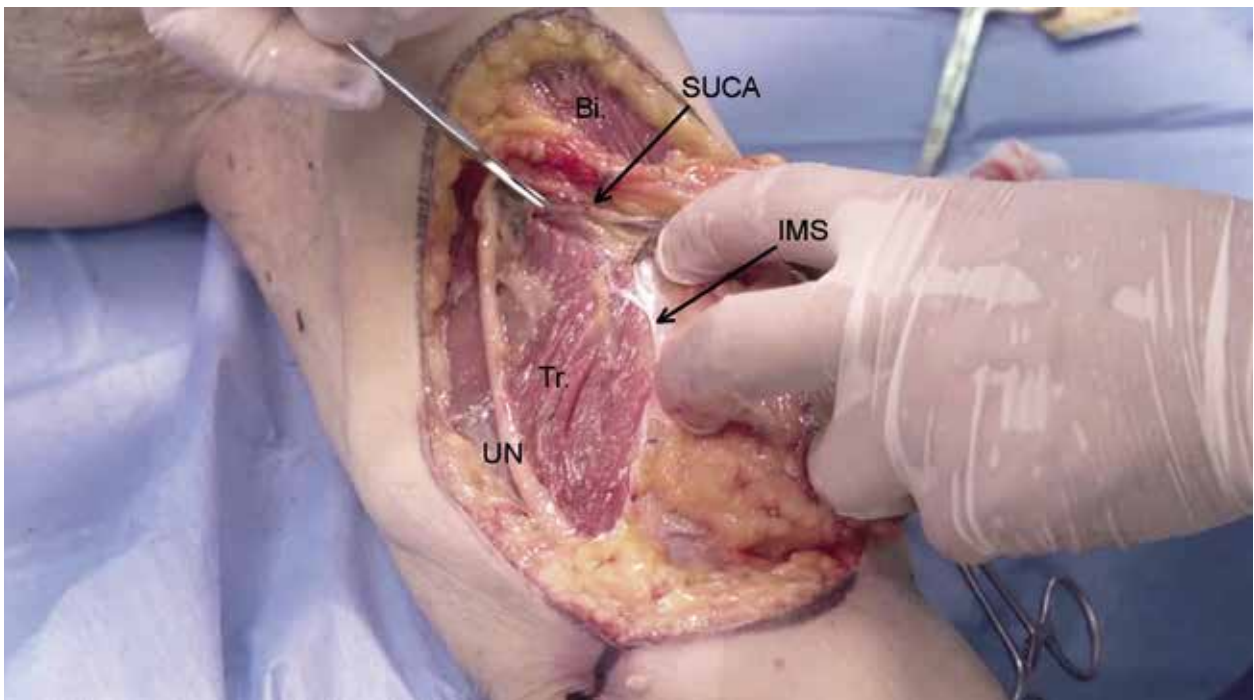
**Figure 6.24.** Both sides of the flap have been elevated from Biceps Brachii and Triceps muscles. The Intercostobrachial nerve is now divided at the desired level, depending on how and where the nerves are, at the recipient side.



**Figure 6.25.** Ulnar nerve (UN) is freed from the septum to facilitate access to the Superior ulnar collateral artery (SUCA), which also has to be liberated from the Intermuscular septum attachments.

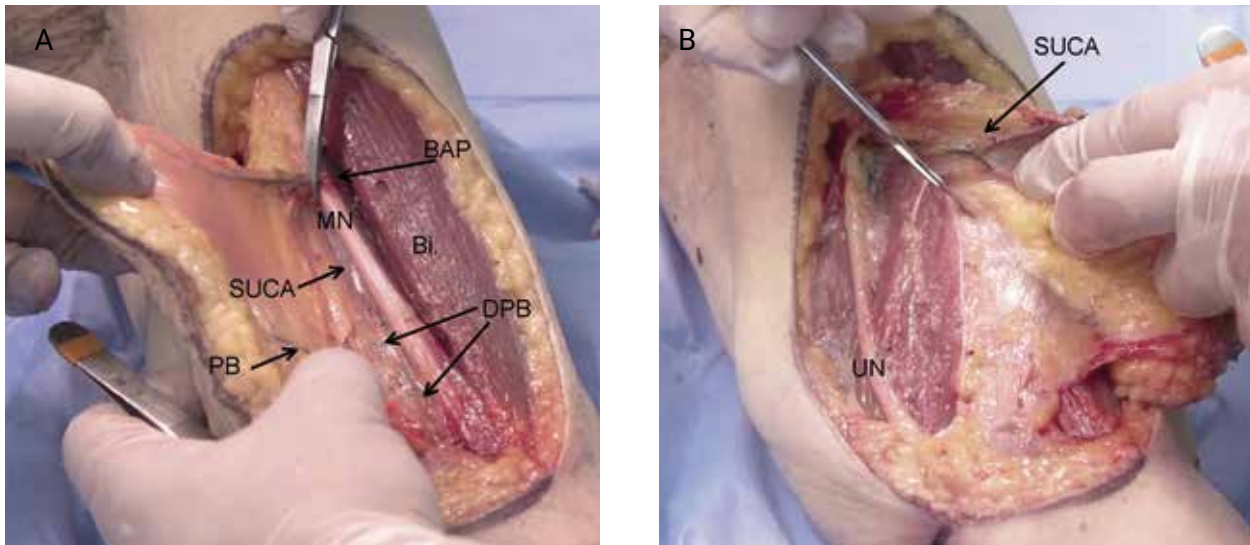


**Figure 6.26.** A) For proximally based flaps, SUCA is divided distally. As elevation proceeds proximally, muscular branches (MB) from the SUCA to the Triceps are divided and ligated.

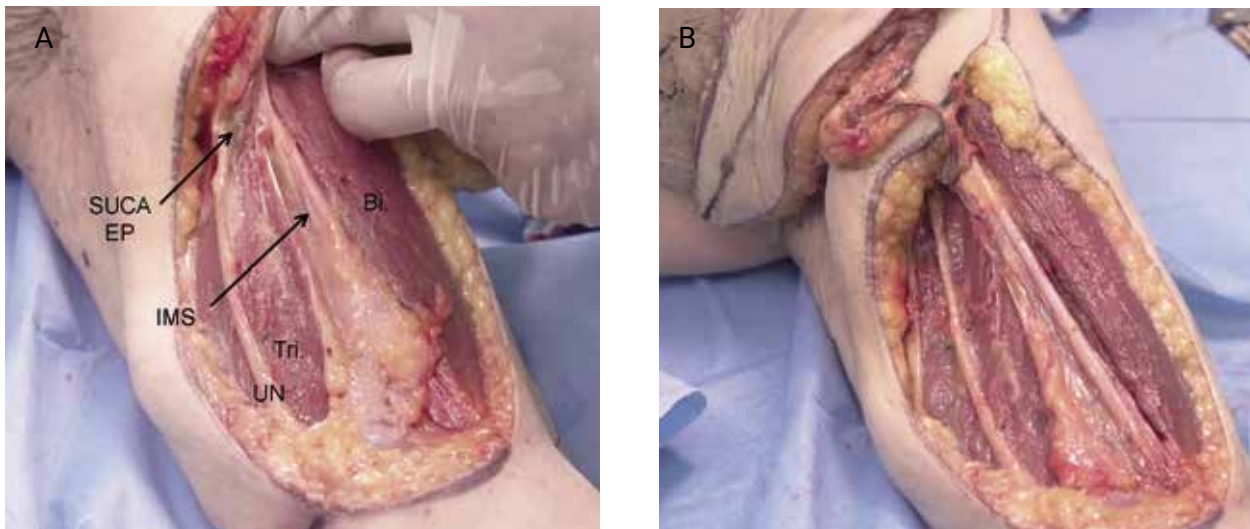


**Figure 6.27.** Superior ulnar collateral artery (SUCA) is completely freed from the intermuscular septum (IMS) up to the emerging point from the brachial artery. In this specimen, the emerging point of the SUCA is unusually high or proximal.





**Figure 6.28.** A) On the Biceps Brachii (Bi) aspect, elevation of the septum over the median nerve (MN) is completed and any vessel still emerging from the brachial artery is severed. SUCA can be seen at the bottom of the septum and some septocutaneous perforator branches, proximal (PB) or distal (DPB) can be seen arising from the SUCA and entering the subcutaneous tissue of the flap. B) Back to the Triceps side, the flap is freed from the last septal attachments.



**Figure 6.29.** A) The flap and its pedicle are elevated as proximal to the emerging point of the Superior ulnar collateral artery (SUCA-EP). Blunt and careful dissection is carried out around this area. B) The completely free, proximally based flap is easily transferred to the axilla.