BICEPS FEMORIS PERFORATOR FLAP (LATERAL-DISTAL THIGH FLAP)

The posterolateral region of the thigh is vascularized by several arteries from different sources and several angiosomes overlap each other in this area. Consequently, some confusion exists about flaps harvested on this region.

Baek in 1983[8] has been credited with the description of the posterolateral thigh region as a donor area for skin flaps. Baek described the "Posterolateral free flap" that was based on an artery from the third perforator of the profunda femoris artery.

Later, in 1989[88], described the vascular anatomy of what he called the "Lower posterolateral thigh flap" based on a direct *cutaneous branch from the popliteal artery* (96% of cases) and made a distinction with the "middle posterolateral thigh flap" described by Baek in the 1980s. The flap described by Laitung is also sometimes described as the "Lateral-distal thigh skin flap"[99]. It is nourished by a cutaneous branch arising from the first collateral branch of the popliteal artery, or the "Lateral superior genicular artery flap", based on the cutaneous perforator from the *Lateral superior genicular artery* (branch of the popliteal artery) Hayashi 1990[52]. Angrigiani et al. also described, in 1995, a pedicled musculocutaneous flap, based on the third perforator from the profunda femoris artery.

As Cavadas et al. stated[15], *"...the exact origin of these perforators may not be as important in the clinical setting as is its location relative to bony landmarks".*

Indications

As a regional pedicled flap it is useful to repair local defects around the knee[169]. While as a free flap it has been used for upper limb Cavadas[15], head and neck reconstruction Hayden[55,56].

Anatomy and vascularization

Vascular supply for the biceps femoris perforator flap comes from a large cutaneous branch (CB) arising from the *Lateral superior genicular artery* (first collateral) of the *Popliteal artery.* It emerges in a triangle formed anteriorly by the Vastus Lateralis, posteriorly by the short head of the biceps femoris and inferiorly by the lateral condyle of the femur at approximately 10 cm proximal to the knee joint. This is the pivot point of the flap. The vessels with all the areolar tissue around, can be isolated and the flap pivoted and rotated as a propeller flap.

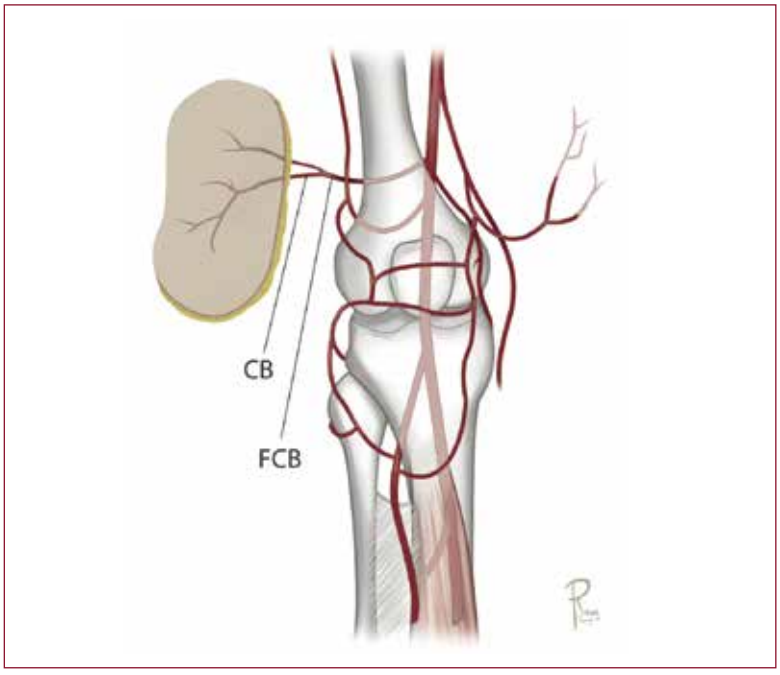

Figure 7.26. Vascular supply of the Biceps femoris perforator flap (Lateral-distal thigh flap), The First collateral branch (FCB) arises from the popliteal artery. Distal to the adductor hiatus it gives some muscular branches to the Vastus Lateralis and biceps, finally it extends like a large cutaneous branch (CB) that emerges between the Fascia Latae and the distal portion of the biceps femoris.

Markings

Outlining starts by marking the knee joint line and localizing the tendon of the biceps femoris. A line is traced over the tendon and muscular belly of the biceps muscle. It is over that line that perforators will arise from the biceps muscle. A depression between the posterior border of the Fascia Latae and the Biceps Femoris can be easily localized (it can be "felt" pressing with the fingertip), it indicates the emergence point of the pedicle, that is usually about 10 cm proximal to the articular space.The skin paddle is outlined around this "emergence" point and can measure up to 18 cm length x 7 cm wide[99]. See legends below.

Elevation

See pictures and legends below.

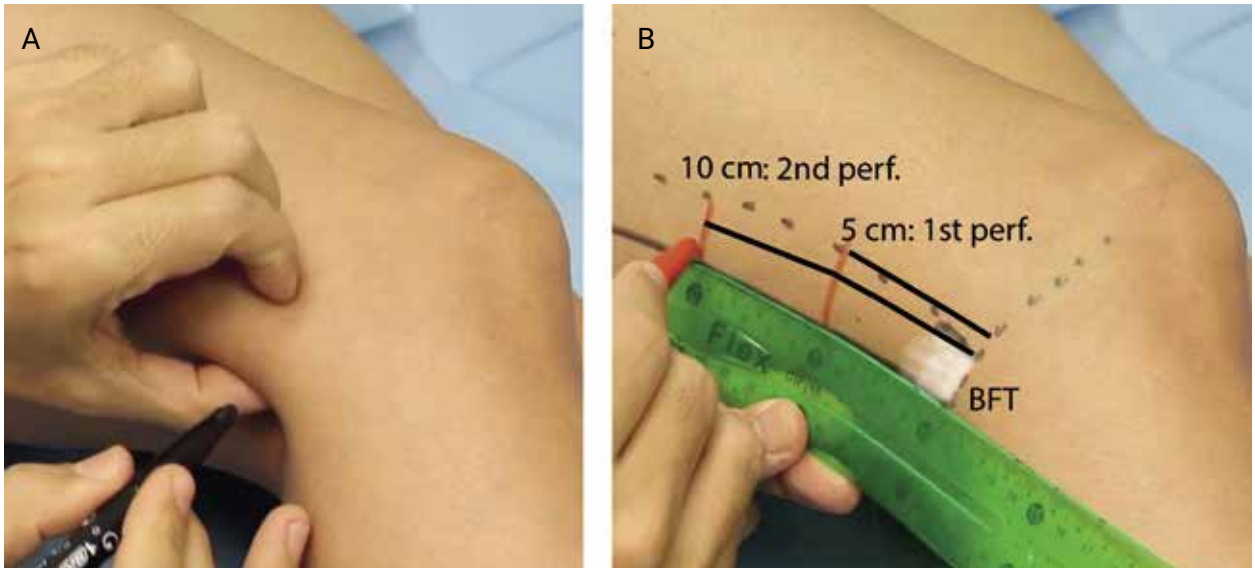

Figure 7.27. A) Tendon of the biceps femoris (BFT) is easily localized near its insertion at the lateral aspect of the Knee and marked out. B) The knee joint line (doted grey line) is traced on the lateral aspect, from this line and over the biceps tendon, two points are marked proximally at 5 and 10 cm. They represent the approximate emerging points of perforator vessels.

Figure 7.28. Doppler examination will, however, provide more accurate and better information about any perforator reaching the skin.

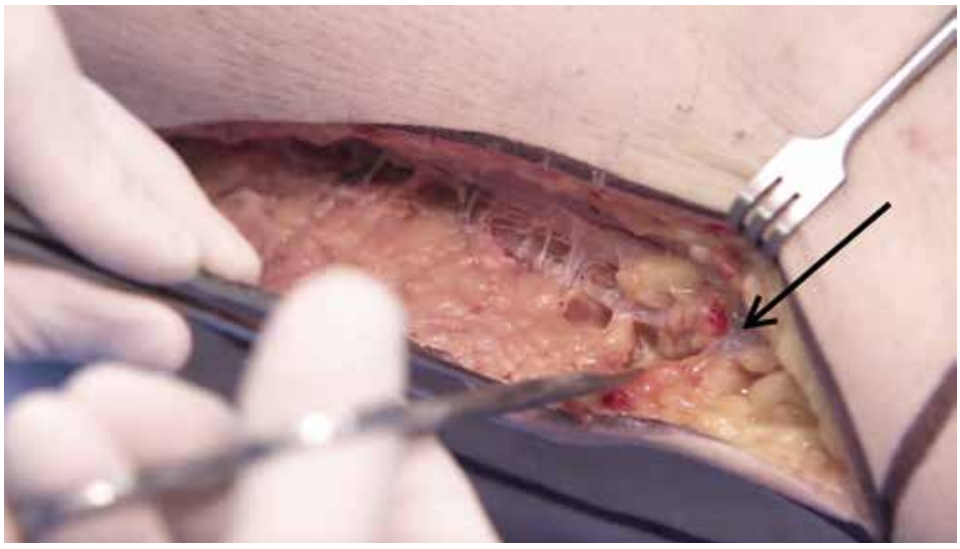

Figure 7.29. The flap is incised initially from the anterior border and elevated over the Fascia Latae (which is not included into the flap). Elevation is carefully performed as perforators can arise all along the axis of the biceps femoris (black arrow).

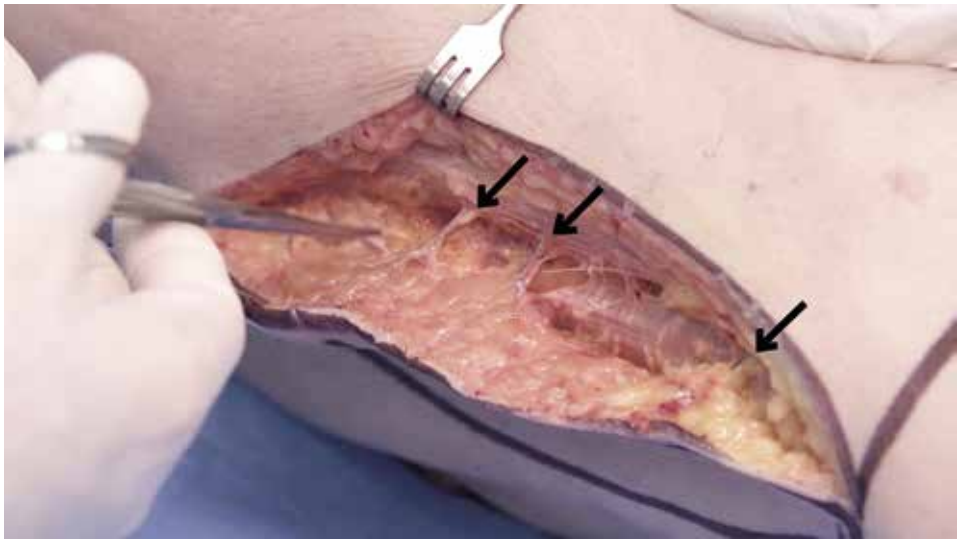

Figure 7.30. Every perforator has to be identified and preserved until it is decided which one will be used as a pedicle.

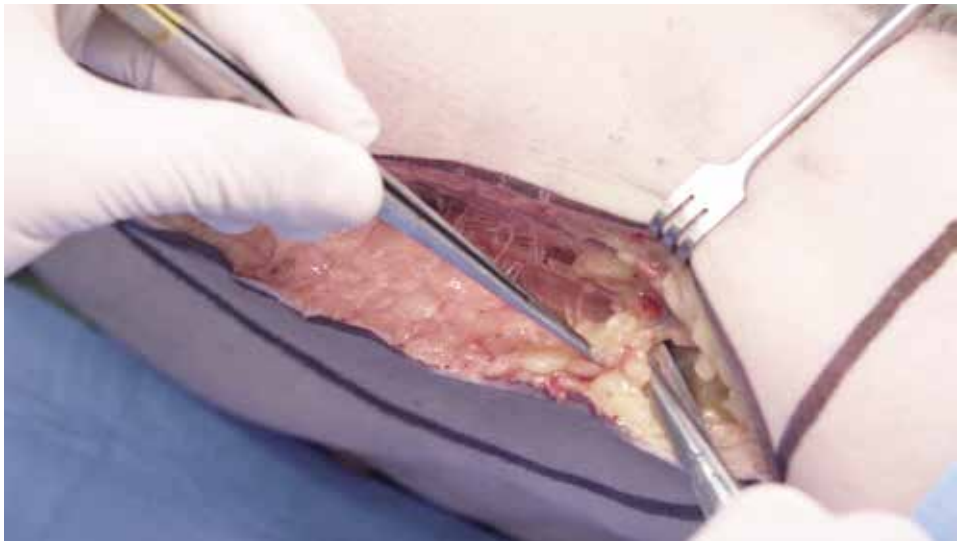

Figure 7.31. If distal rotation is planned, the more distal perforator has to be identified. It has to be carefully isolated with a generous cuff of loose areolar tissue. Damage to this vessel will definitively challenge adequate rotation of the flap.

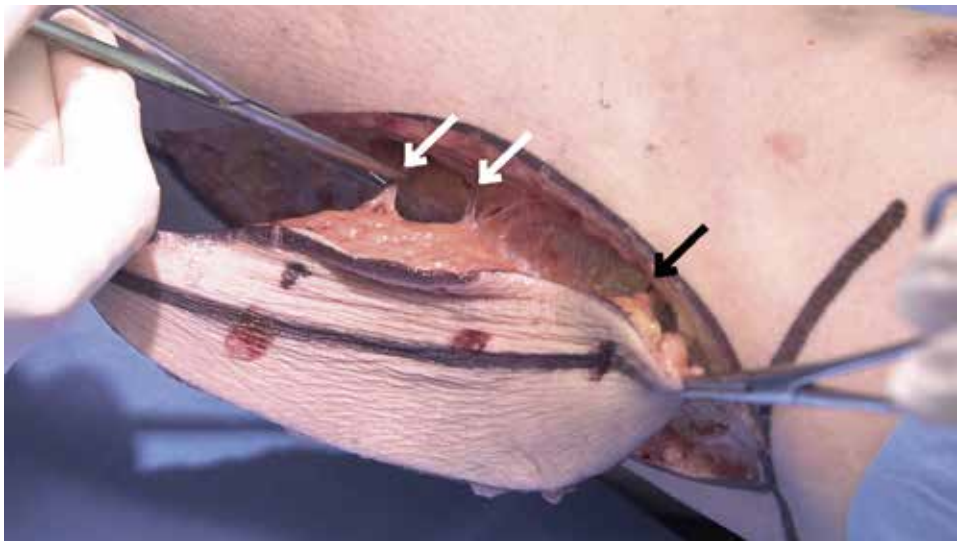

Figure 7.32. Based on the distal perforator, the flap can be rotated downward as a propeller flap to cover the anterior, posterior or lateral aspects of the knee. If this is the case, upper perforators (white arrows) are divided.

Figure 7.33. Anterior rotation of the flap. As can be seen it can also rotate very easily to the posterior and lateral aspect of the knee.