



A new retroauricular flap for facial reconstruction

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Received 25 February 2003; accepted 30 May 2003

KEYWORDS

Retroauricular flap;
Reverse flow; Forehead
and facial
reconstruction; One
stage procedure

Summary A retroauricular reverse flow flap based on the anastomosis of the frontal branch of the temporal superficial artery with the corresponding vessel of the opposite side as well as with the ipsilateral supraorbital and supratrochlear arteries, was used in two clinical cases for forehead and facial reconstructions. The arc of rotation associated with the length of the pedicle allows its transfer, in a one-stage procedure, to cover small to medium defects of any part of the forehead, face and parts of the scalp. The procedure is safe, simple and causes minimum donor site morbidity.

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Facial defects caused by trauma or excision of cutaneous malignancies, when repaired with skin grafts often tend to depressions, irregularities and contractures. Local and regional flaps provide tissue of similar colour and texture, minimising these problems.

The retroauricular area has one of the best matches for facial skin in terms of thickness and colour, allowing optimal reconstruction with minimal donor site morbidity. We describe a retroauricular flap with a reverse flow, that allows the reconstruction of small to medium defects of any part of the face and parts of the scalp.

Patients and methods

A reverse flow flap from the retroauricular area (Fig. 1) was used to reconstruct facial defects in two patients: one after ablation of a basal cell carcinoma of the forehead and the other with a traumatic defect of the face. In both cases the donor site was closed and scars are not visible in normal positions. None had major complications (Figs. 2 and 3).

Surgical technique

Under general anaesthesia with the patient in a supine position, the superficial temporal artery and its frontal branch are identified by Doppler and its courses drawn on the skin.

The retroauricular flap is designed, which includes the nonhair bearing skin of the retroauricular region, the incision is continued along the pre-auricular folds almost like in a face-lift. A

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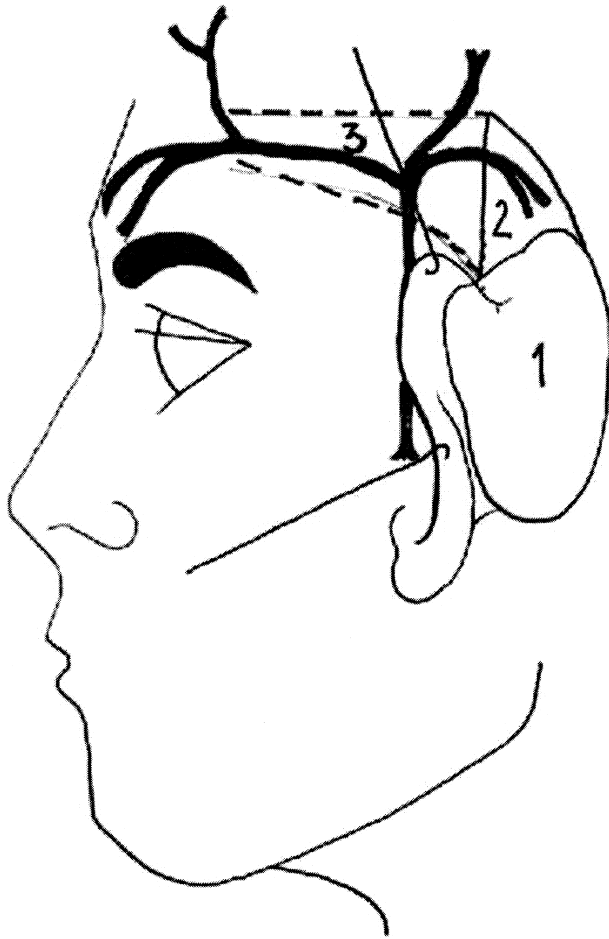


Fig. 1 Schematic representation of the flap with its three portions.

subcutaneous tunnel is created carefully in the forehead or facial region as necessary.

The flap has three portions. The first portion is the nonhairy skin of the post-auricular region. The second component is a deepithelialised triangle of composite tissue of the scalp, (with the base being the superior border of the post-auricular skin and the apex about 6 cm from the most superior portion of the junction of the ear with the scalp) and the third part includes the frontal branch of the superficial temporal artery which can be dissected almost until its anastomosis with the supraorbital and supratrochlear systems ([Fig. 1](#)).

The superficial temporal artery is ligated above the origin of the parietal branch and below the tragus. Once mobilised sufficiently the flap is tunnelled to the defect and inset.



Fig. 2 (A) 79-year old woman with basal cell carcinoma. (B) Aspect of the flap after ligation of the superficial temporal artery and the medium size defect with bone exposed. (C) The flap inset. (D) Six months later.



Fig. 3 26-year-old man with a facial defect and frontal abrasion following car crash. (A) The viability of the frontal branch of the temporal superficial artery was tested and the flap designed. (B) The flap inset. (C) Eight months later.

Finally, the donor area is closed by approximation of the skin or covered by a split-thickness skin graft. Two suction drains are placed and removed on the second post operative day.

Discussion

Apart from local flaps,¹ the post auricular area provides one of the closest matches to facial skin in

terms of thickness and colour. Full-thickness skin grafts from that area, while providing a simple method for closure of facial defects, may produce unacceptable aesthetic results that are inferior to those obtained by flap coverage.

Many retroauricular flaps based on branches of the superficial temporal artery have been described, although most of them requiring a delay^{2,3} or are based on large scalp pedicles and require multiple surgeries.^{2,4-6}

A one-stage retroauricular island flap was already described, namely, for eye socket reconstruction,⁷ but with a smaller pedicle than the flap described here.

The blood supply of the temporal region is derived from the superficial temporal, middle temporal, deep temporal, posterior auricular, transverse facial, zygomatico-orbital, zygomatico-temporal, zygomatico-facial, and middle meningeal arteries. The vascular network formed by these arteries can be divided into four arterial subsystems corresponding to the different layers of the temporal region.⁸ Furthermore, in a point about 2-3 cm above the zygoma, the superficial temporal artery divides into two or three branches, the most important ones being the frontal and the parietal. The veins follow the arteries.^{4,8-10} The capacity of the blood to reverse its direction of flow in the superficial temporal system, when the main trunks of these vessels are ligated, is a consequence of the excellent anastomoses that the branches of these vessels make across the midline with the contralateral arteries and the ipsilateral supraorbital and supratrochlear systems.^{2,9} Those constant communications allow the execution of at least three reverse flow flaps: a pre-auricular island flap developed by Bostwick et al.,¹¹ a condrocutaneous reverse island flap from the ear helix initially described by Bakhack et al.⁹ used to repair total defects of the lateral ala, columella or eyelids,^{9,10} and our retroauricular flap.

Based on those anatomical concepts we elevated a retroauricular randomised flap with a long pedicle. The reverse flow flap here reported has three portions; the first two quite similar to those of the flap described by Bahman,⁷ but the third includes the frontal branch of the superficial temporal artery allowing the flap to reach the contralateral side.

Concerning nerve injuries, the dissection can be considered a safe procedure, since the frontal branch of the facial nerve runs parallel and below the course of the frontal branch of the temporal artery.^{8,9}

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