

Posterior Scalping Flap Revisited

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Objective: To report our experience in a case series of 5 posterior scalping flaps.

Design: Retrospective review of a case series.

Setting: A tertiary academic care otolaryngology-head and neck surgery referral center.

Patients: Five patients having undergone posterior scalping flap reconstruction of cutaneous midface defects.

Methods: Reconstruction was performed for 4 cheek

defects, 1 of which included the lateral third of the upper and lower lips, and 1 combined midfacial and lateral nasal wall defect.

Results: All 5 patients had excellent cosmetic and functional results. The only complication was a single case of partial-thickness distal flap necrosis.

Conclusion: The posterior scalping flap offers a reliable source of skin with appropriate color and texture and minimal donor-site morbidity.

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THE RECONSTRUCTIVE options for midfacial defects, including defects of the nose, cheek, and orbital cavity, are limited due to the requirement for donor skin of similar color and texture to that of native facial skin. From the experience of World War I, when surgeons were commonly faced with the dilemma of treating traumatic midface defects, the use of local skin flaps for facial reconstruction was described and popularized.¹ The 2-stage anterior scalping flap, described by Converse² during World War II, was a variation of Gillies' "up-and-down" flap.³ By mobilizing scalp with its abundant blood supply, a greater amount of forehead skin could be transferred to the face. However, regardless of attempts to limit the resultant donor-site defect,⁴ the anterior scalping flap has enjoyed limited popularity.

Arena was the first to recognize that posterior neck skin offered a source of tissue that maintained qualities similar to facial skin. In 1977, he described the 2-stage posterior scalping flap.⁵ As an extension of the retroauricular-temporal flap introduced by Washio⁶ in 1969, the posterior scalping flap accomplishes many of the objectives of the anterior scalping flap with-

out the disfigurement of a forehead scar. The donor site, in the nape of the neck, is easily camouflaged, particularly in women with long hair. Since Arena's article, to our knowledge, no subsequent reports have been published in the English-language literature describing the use of the posterior scalping flap.

APPLICABLE ANATOMY

The scalp consists of 5 layers which, from superficial to deep, are the skin, subcutaneous tissue, galea aponeurotica, loose connective tissue, and the periosteum of the skull. The galea is continuous anteriorly with the paired frontalis muscles and posteriorly with the paired occipital muscles. The skin, subcutaneous tissue, and galea aponeurotica are tightly adherent to one another, moving and acting as a single unit known as the "epicranium." The loose areolar connective tissue layer represents the avascular plane in which the posterior scalping flap is raised.

Most nerves and blood vessels to the scalp enter and traverse superficial to the galea aponeurotica. The blood supply to the posterior scalping flap is derived from the superficial temporal, supraorbital, and supratrochlear

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Figure 1. Thirty-three-year-old man with a left cheek arteriovenous malformation. A, Posterior scalping flap, outlined. B, Posterior scalping flap, raised. C, Gracilis free flap, inset to reconstruct facial mimetic musculature. Short arrow indicates arterial anastomosis; long arrow, motor nerve of flap, to be anastomosed to proximal stump of lower division facial nerve. D and E, Posterior scalping flap, rotated into midface.



Figure 2. Same patient as in Figure 1. A, Preoperative appearance. B, Margins of planned resection. C, The surgical specimen. D, The resulting defect, with lower division of facial nerve and facial mimetic muscles resected.

arteries. The occipital and postauricular arteries are transected during the raising of the flap. The veins of the scalp run alongside the arteries and are in communication with the cranial venous sinuses via a complex network of emissary veins.

RAISING OF THE POSTERIOR SCALPING FLAP

The patient's midface defect is first measured. Then, the area of nonhair-bearing posterior neck skin that will be



Figure 3. Same patient as in Figures 1 and 2. A, Preoperative appearance, in repose. B, Appearance 16 months postoperatively, in response. C, Preoperative appearance, smiling. D, Successful restoration of facial function demonstrated 16 months postoperatively.

transferred to the face is marked (**Figure 1**, A). A vertical midline incision is made from the vertex to the posterior midneck. The length of the incision can be extended in a caudal direction to obtain greater distal flap length. A second, postauricular incision is then made, parallel to the midline incision, along the anterior border of the trapezius muscle. The postauricular incision should

not be carried any further superiorly than the superior attachment of the helix, to avoid transection with the parietal branch of the superficial temporal artery. The postauricular incision is continued caudally to the same level as the previous midline incision (approximately 8 to 10 cm below the earlobe). The 2 vertical incisions are then connected horizontally at the base of the neck. Next, the

flap is elevated, including skin, subcutaneous fat, and the fascia overlying the trapezius and splenius muscles. This dissection is carried to the level of the superior nuchal line, which marks the superior insertion of the paired occipital muscles and the beginning of the scalp. The junction between the occipital muscles and galea aponeurotica is incised, and the dissection continues deep to the galea, in the loose areolar connective tissue layer of the scalp, where perforating occipital and posterior auricular vessels are encountered and divided. The flap, pedicled superiorly, is then rotated anteriorly, over the ear, and sutured into the recipient site (Figure 1, D and Figure 1, E). The vertical midline incision can be extended further superiorly to achieve greater arc of rotation of the flap into the midface. A split-thickness skin graft is used to resurface the donor site. Between 3 and 4 weeks postoperatively, the pedicle is transected, and that portion of the flap that is not used in the reconstruction is returned to its anatomic site.

REPORT OF CASES

A total of 5 patients (4 men and 1 woman) have undergone the posterior scalping flap procedure at Mount Sinai Hospital, New York, NY (**Table**). A demonstration of 1 of these cases is provided (Figure 1, **Figure 2**, and **Figure 3**). The only complication has been a single case of partial-thickness distal flap necrosis, which resolved with local wound care. Ischemic complications are more likely to occur in cases in which a large amount of skin is harvested. The maximum amount of skin that can be harvested safely is still unknown.

COMMENT

The optimal reconstruction of midfacial cutaneous defects requires tissue of similar qualities to that of native facial skin. While microvascular free tissue transfer offers the advantage of a single-staged procedure, often it is cosmetically unsuitable for reconstruction of midface cutaneous defects because of the donor tissue color mismatch. Available techniques for the reconstruction of cutaneous midface defects include cervicofacial advancement flaps, tissue expansion techniques, forehead flaps, and the recently described submental island flap.⁷ The anterior scalping flap provides adequate facial skin cov-

Posterior Scalping Flap Case Reports

Year	Age, y/Sex	Pathologic Condition*	Site
1998†	67/M	SCCa	L cheek
1998	68/M	SCCa	L cheek and nose
1997†	33/M	AVM	L cheek and lips
1976	21/M	AVM	R cheek
1975	42/F	Basal cell Ca	L cheek and nose

*SCCa indicates squamous cell carcinoma; AVM, arteriovenous malformation; basal cell Ca, basal cell carcinoma.

†Indicates posterior scalping flap performed in combination with a gracilis free flap for facial reanimation.

erage; however, the donor site defect may be highly visible. The posterior scalping flap avoids the disfigurement of a forehead scar while providing tissue of similar color and texture to that of native facial skin. Although introduced more than 20 years ago,⁵ the posterior scalping flap has been infrequently performed, and should be reconsidered as an important and viable reconstructive technique for patients with midface cutaneous defects. The combination of a posterior scalping flap with a gracilis free flap may provide cosmetic and functional midfacial restoration.

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