



ELSEVIER



CASE REPORT

Helical rim reconstruction using two bi-pedicled tube flaps



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Summary Thermal injury can result in substantial auricular deformity and subsequent psychosocial morbidity. Helical rim repair, in particular, poses formidable challenges to the reconstructive surgeon. Bi-pedicled tube flaps are one option that have the potential to restore much of the helix's natural contours. This case report discusses the unique strengths and weaknesses of the flap, as well as the reasoning that must be implemented when deciding which situations are appropriate for its utilization. Superior outcomes resulting in a high degree of patient and surgeon satisfaction are possible when the techniques of this report are employed appropriately. © 2013 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

Introduction

The external ear is an intricate structure composed of a delicate framework of thin cutaneous tissue and cartilage. The complex and elegant contours of the auricle pose a formidable challenge to the surgeon attempting reconstruction.¹ Acquired auricular defects frequently result from trauma in the form of lacerations, bite injuries, and burns.² Thermal injuries to the ear are among the most difficult to repair because they are often characterized by loss of skin elasticity secondary to scarring and loss of

cartilaginous support, scarring of potential graft and local flap sites, and perichondritis with cartilage loss.³

Auricular deformity is often associated with significant psychosocial morbidity. Many techniques of repair, ranging from local cutaneous flaps, to implant retained prosthesis have been developed with the goal of restoring the natural appearance of the ear and easing the psychosocial burden.⁴ This case report presents the use of two bipedicled retroauricular tube flaps as a technique for reconstruction of a complete helical rim defect following thermal injury.

Case report

A 33-year-old Caucasian male sustained thermal injuries to his right ear, face, upper extremity, and chest in a gas line

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explosion 30 years prior to presentation. The patient sought reconstruction following the complete loss of the helical rim of his right ear (Figure 1).

Surgical technique

Stage 1

An area of retroauricular skin was not scarred, so the patient was felt to be a candidate for a bipediced tube flap to repair the superior helical rim defect. This reconstruction involved 3 stages, performed at 2-week intervals as outpatient procedures under general anesthesia. A bipediced tube flap was designed behind the right ear measuring 1.5 cm wide and 6 cm long and was outlined on the hairless post-auricular skin adjacent to the right post-auricular sulcus. The flap was raised at the subcutaneous level, with care taken to preserve the subdermal plexus and some fatty tissue on the flap's undersurface. The flap was then tubed using fine non-absorbable interrupted sutures (Figure 2). The donor site was closed with absorbable continuous subcuticular sutures. Suture lines were covered with light gauze dressings impregnated with antibiotic ointment.

Stage 2

Two weeks later, the caudal limb of the bipediced tube flap was divided and the inferior portion of the helical rim defect was opened and elevated off the underlying cartilage. The flaps were splayed to maximize the insetting. The caudal portion of the flap was inset and sutured with



Figure 1 Patient before reconstruction.



Figure 2 Bipediced tube flap raised on retroauricular skin.

interrupted fine non-absorbable sutures until approximately 50% of the flap insertion was achieved. A V-flap insertion was incorporated to prevent notching of the helical rim. There appeared to be adequate vascular supply to the inset limb of the bipediced flap. The donor site was closed with fine non-absorbable sutures.

Stage 3

After another two weeks, the remaining superior end of the bipediced flap was detached and inset completing the helical rim reconstruction of the upper part of the ear (Figure 3).

The second bipediced flap

While the surgeon was happy with the reconstruction, the patient desired further correction if possible. Ultimately, because there was still an area of non-burned post auricular skin, a second tubed flap was designed, elevated and transferred in a similar three-stage procedure. A graft was needed in the flap donor site to prevent the ear from being pulled too close to the scalp with donor site closure. The flap and donor site healed satisfactorily without complication. This completely reconstructed the helical rim down to the level of the lobule (Figure 4).

Discussion

Numerous case studies report excellent results with the use of bipediced retroauricular tube flaps for the reconstruction of helical rim defects.⁵⁻⁹ However, these cases describe successful reconstruction of the helical rim using a single flap. Often in burns the prospective bipediced flap

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