

Original Article

Using Hairy and Non-Hairy Retroauricular-Temporal Composite Flap in Facial Reconstruction

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Background: The authors describe their experience with the retroauricular temporal flap in facial reconstruction.

Methods: Twenty-two (20 females, 2 males) patients with composite tissue defect of various areas of the face have been esthetically reconstructed with a modified Washio flap. This flap is a good choice for facial reconstruction, due to its color match, reliability, feasibility, and potential for modification including elements such as skin, hair, and cartilage. The donor site is inconspicuous.

Results: The 22 patients in this report underwent reconstruction without flap loss.

Conclusion: The Washio flap, with different modifications, is a useful technique for reconstruction of facial defects which may include hairy and non-hair bearing skin, preferably not larger than 7x5 cm in size, and particularly in young patients.

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Introduction

Facial skin defects present a unique reconstructive challenge due to the regional variation that exists in skin color and texture. In resurfacing the face, one seeks a single staged color match without leaving a visible scar. The postauricular skin is an ideal donor site to repair facial defects, because it provides a good color and texture match with facial skin and the secondary defect is well concealed behind the ear.

Loeb is credited with originally describing a temporo-mastoid flap.¹ Seven years later, Washio adopted its use in nasal reconstruction.² Washio who performed angiographic studies on the posterior branch of the superficial temporal and retroauricular arteries, defined its vascular anatomy. The flap was elevated and transferred without delay. The flap typically carries post

auricular, as well as mastoid skin, for facial reconstruction.

Multiple authors have subsequently employed postauricular skin in the reconstruction of facial skin defects. Fujino et al.³ reported the use of a retroauricular free flap to resurface the dorsum of the nose with microvascular techniques.

Orticochea⁴ addressed total nose reconstruction with a fronto-auricular flap. In this report, the flap was shaped into a tube and the ipsilateral branches of the superficial temporal vessels were used. Galvao⁵ reported a postauricular flap using the contralateral superficial temporal vessels. This approach required a delay and offered little advantage over the ipsilateral method of Washio. It may be of use, however, when the ipsilateral postauricular area is unusable. Dias and Chhajlani⁶ reported a similar flap, referred to as the “preauricular and retroauricular scalping” (PARAS) flap. Guyuron⁷ described the use of a retroauricular island flap for eye socket reconstruction.

Park⁸ used a chondrocutaneous postauricular composite free flap in three cases. Motamed⁹ reported a composite retroauricular flap for columellar reconstruction.

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Song et al.¹⁰ in their detailed study on the anatomy of the superior auricular artery, described the use of retroauricular arterial island flap based on the superior auricular artery. Bakhach et al.¹¹ reported a modified flap, the reverse auricular flap, for facial reconstruction.

In the present article, we describe our experience with the retroauricular-temporal flap (Washio flap) in 22 patients with upper two-thirds facial reconstruction, with some modifications in application and design.

Materials and Methods

Technique

The technique and design of the retroauricular temporal flap are illustrated in Figures 1A and 1B.

The flap can be elevated and transferred without delay. Adequate flap length for unfurling of the pedicle is achieved by a vertical backcut in the center of the paddle; the incision must be made with care to prevent severing the vascular loop of the flap. Doppler localization of the vessels would aid in this process. A strip of conchal cartilage can be carried with the flap to provide additional structural support, if needed. The thickness of the skin flap can be changed depending on whether mastoid, retroauricular or cervical skin is to be used. The flap may contain hair bearing skin of the mastoid area. The donor site may be temporarily grafted or treated with semioclusive dressing.

The pedicle of the flap is divided secondarily in the third week. Often a minor additional procedure for debulking and revision is necessary in the recipient site.

Results

Case 1: An 18-year-old woman with a right alar defect due to a congenital facial cleft

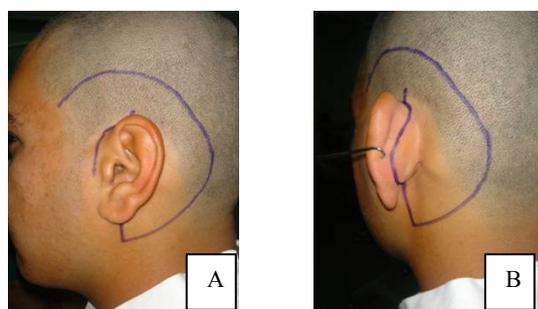


Figure 1. Plan of the flap: **A)** lateral and **B)** posterior section of the head. Mastoid hairy and non hairy, postauricular, upper cervical skin and conchal cartilage can be included as a part of the flap.

(Tessier's type 3) was treated. Previous approaches, such as an auricular composite graft insertion, had been performed in other centers but all had failed (Figure 2A). She did not accept the use of nasolabial or forehead flaps due to concerns about facial scarring. The defect of ala was reconstructed with a composite chondrocutaneous ipsilateral retroauricular flap (Figure 2B). The flap survived completely, and was divided and inset at the end of the second week. Three months later, debulking and revision were performed. The raw postauricular area closed by secondary intention. Figure 2C shows the final result after five years.

Case 2: After a severe motorcycle accident, an 18-year-old man was referred to our center because of a full-thickness defect of the left eyebrow, upper eyelid and forehead. He had an accompanying orbital rim/zygoma fracture (Figure 3A). The wound was repaired primarily and the fractures were stabilized. For the secondary reconstruction, additional skin was needed. Therefore, an expander was used. Due to severe fibrosis, the expander was exposed during the expansion process. An ipsilateral retroauricular flap (postauricular skin and mastoid hair bearing area) was used to reconstruct (both the forehead and eyebrow defects) the defect of forehead and eyebrow. The flap was divided and inset at the end of the second week.

Because of incorrect direction of the hairs, two additional procedures were performed on the

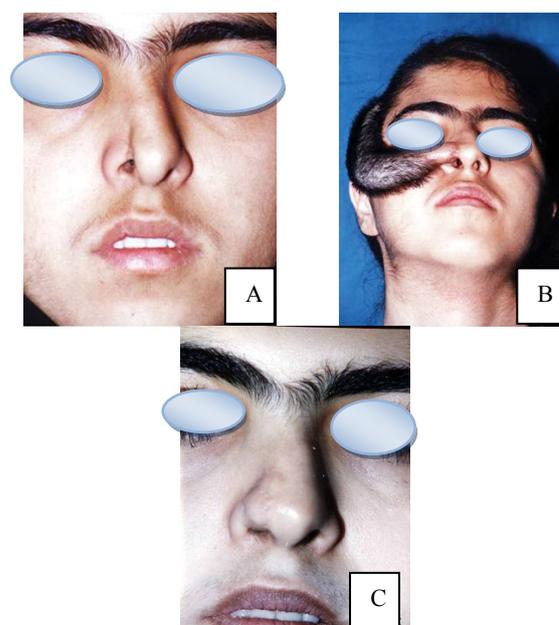


Figure 2. **A)** Right alar cleft after two attempts of unsuccessful composite graft; **B)** Flap in place; and **C)** The final result after five years.



Figure 3. A) An 18-year-old patient after a motorcycle accident; and **B)** Two years after using left retroauricular flap for reconstruction of the frontal skin, left eyebrow and part of the left upper eyelid.

eyebrow. The final result was satisfactory. The accompanying frontal bone defects were reconstructed with an iliac cancellous bone graft (Figure 3B).

Case 3: A 22-year-old woman with severe contracture of both nostrils and columella (Figure 4A) was treated. At the age of four, she developed an iatrogenic chemical burn in the nasal vestibules due to an unknown nasal drop for treating nasal bleeding. She complained of difficulty in nasal breathing and esthetic deformity. After release of the contractures, the defect was reconstructed with a retroauricular flap maintaining a good, constant skin color and a patent airway. The flap was divided during the third week postoperatively. The donor defect healed spontaneously. Minor additional procedures were undertaken to correct the scars (Figure 4B).

Case 4: A 16-year-old woman was referred to us with a severely damaged nose. Fourteen years before, she was injured in the war. She sustained a full-thickness defect of the right hemi-nose (Figure 5A). A turn down nasolabial flap was transposed for closing the mucosal lining on the right nostril,

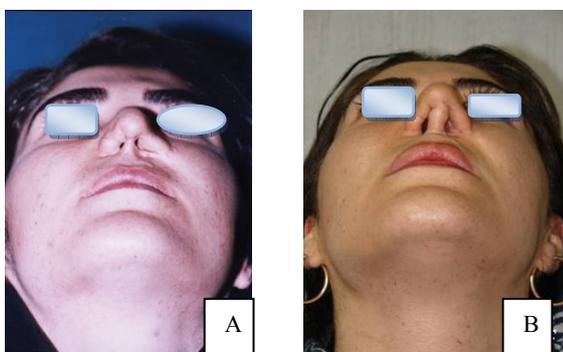


Figure 4. A) Iatrogenic nostrils, columella, and alae injury due to chemical nasal burns; and **B)** Four years after reconstruction with retroauricular flap.



Figure 5. A) War injured patient with severe nasal bone and soft tissue destruction; and **B)** Seven years after retroauricular flap and iliac bone graft to the dorsum of the nose.

and simultaneously, the skin defect was reconstructed with the Washio flap. Iliac bone graft was used for nasal framework reconstruction. The flap was secondarily divided on the 21st postoperative day. The flap survived completely. Three months later, the nasal dorsum was resurfaced with a full-thickness skin graft and healed uneventfully. The final result, after a minor revision, is presented in Figure 5B.

Case 5: One year after rhinoplasty, an 18-year-old girl was referred to us for nasal tip necrosis (Figure 6A). She had a contracted tip with no cartilage. Several local flaps had been used previously to correct the deformity, but none were successful.

After excising the scar tissue, a two-layered conchal cartilage graft was used for reconstruction of the nasal tip, followed by a Washio flap for the skin defect (Figures 6B and C). Figure 6D shows the final result.

Discussion

Facial reconstruction, because of its special requirements for different components that include fat, cartilage, hairy and non-hair bearing skin, needs highly sophisticated techniques. Since many decades ago, multiple flaps and grafts were introduced as a part of reconstruction challenges in the face.

The concept of using postauricular skin is not new. Washio² described a retroauricular temporal flap based on superficial temporal and retroauricular arteries in 1969.

The flap is easy to dissect and raise without prior delay. It can reach nearly the upper two-thirds of the face—from the hairline to the upper

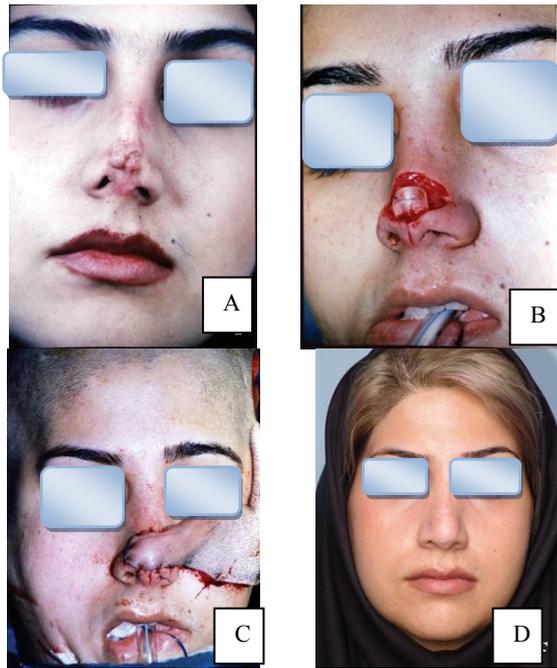


Figure 6. A) Severe nasal tip destruction after malpractice rhinoplasty in a young girl; B) After excision of the scar and putting conchal cartilage for supporting of tip; C) Flap was elevated and sutured in place; and D) Two years after surgery.

lip. A main advantage over forehead and nasolabial flaps is that the donor site is not visible from either the front or the lateral view. The skin of the retroauricular region provides fine textured tissue with scant fatty tissue.

The safety record of this flap in our series was good. However, despite the development of various procedures to transfer retroauricular skin as an island flap, it is not readily used as an island or free flap, because the relevant vessels are either narrow or exhibit considerable anatomic variation.⁸ Venous congestion of a retroauricular island flap in the immediate postoperative period provides reason for concern.⁶

Hematoma, infection, injury to the temporal branch of the facial nerve, graft loss, loss of the distal portion of the flap, and total loss of the flap are possible complications of this procedure. But none of these complications have occurred in our patients. If the flap has a broad pedicle (from hairline to the preauricular crease), the procedure is completely safe and reliable. In spite of using a backcut in the flap, flap necrosis has not occurred.

One disadvantage is its limited donor site; that

is, the available area of non-hair bearing skin is not extensive. If the defect is larger than the available area, hair bearing or thicker skin must be included in the flap which results in uneven thickness of the reconstructed area. A second disadvantage is that the use of a Washio flap requires a “two-stage” skin transfer.

Microsurgical methods are very interesting because they permit a “one-stage” reconstruction. However, the inherent risks of microsurgery in a situation of variable vascular anatomy should be seriously considered.⁸

Even though our clinical series is not large, our experience makes us believe that this flap may be a useful addition to the various flaps used for facial reconstruction. We believe that the Washio flap is an excellent alternative when dealing with upper and midfacial hairy and non-hair bearing skin defects, especially in young patients, as younger children exhibit more prominent scarring than older patients. This may detract from otherwise excellent results using forehead and scalping flaps.

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