# Superiorly Based Preauricular Tunneled Perforator Flap for Anterior Auricular Surface Defects



Auricular reconstruction is challenging due to the delicate cartilage and thin skin. Small defects are difficult to close primarily due to the lack of skin mobility, risking complications like chondrites or infections. The avascular cartilage further complicates healing, making skin grafts over exposed cartilage unfeasible and might result in chondrites or local infection. Various surgical techniques have evolved, with local flaps offering specific advantages.[1–3] The preauricular area provides pliable skin matching the auricle's texture and color, supported by a reliable vascular network. In this article, the authors share their experience in 1-stage reconstruction procedure of the anterior surface of the auricle, even when the external meatus is compromised, by a superiorly based preauricular (SBPA) perforator flap, transferred in a subdermal tunnel.

## Patients and Methods

Sixteen patients requiring ear reconstruction were treated between January 2020 and January 2022. Eligibility criteria was the reconstruction of the anterior ear portion after tumor excision. Data collected comprised demographics, histology, procedure data, surgical outcomes, and complications. Pre-and postoperatory patient's photographs were collected in a standard condition. Surgeries, performed under local anesthesia (lidocaine 2% plus adrenaline 1: 1,00,000) by the senior author, involved strict monitoring by an anesthesiologist. Follow-up ranged from 12 to 24 months. Complications were classified as major (flap necrosis, infections, dehiscence, hematoma) and minor (delayed healing, flap remodeling). Investigation was conducted to identify the vascular axis before flap design. Preoperatory ecocolor Doppler investigation was conducted to identify the vascular pedicle before flap design. All patients provided written informed consent, adhering to the Declaration of Helsinki.

## *Surgical Technique*

Procedures started with assessing defect size and location, followed by lesion excision according to oncological principles. Flaps were harvested from the preauricular area, marked to match defect dimensions, centered on the superficial temporal artery lower branch. Flap planning started with marking the skin paddle, following an ellipse drawn with the main axis along the preauricular groove, according to the natural relaxed skin tension lines. The ellipse including the skin paddle, and the pedicle were proximally based with the posterior incision in the pretragal area as in the aesthetic lifting procedure. This vascular support allowed flap proportions to exceed safely the traditional 1:4 limits. The width and the length can be tailored on the defect dimensions, and the shape could exceed safely beyond 2.5 cm from the auricular earlobe. The donor site was closed primarily without undermining, even for larger harvests. Flap harvesting used electrocautery, avoiding hair-bearing skin, and proceeded in a tapered manner to maintain a thick base. A tunnel through the crus helices cartilage enabled flap transfer without compressing

**Figure 1.** Preoperative appearance of the skin lesion involving the posterior surface of the external meatus, concha cymba, the anthelix, and the scaphoid fossa.


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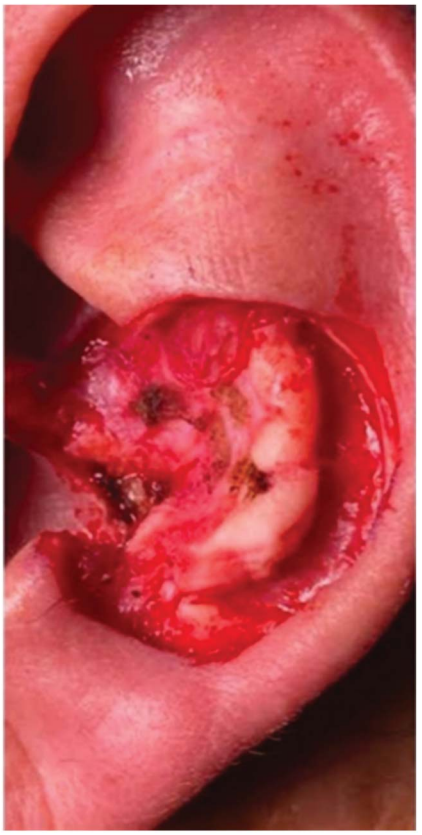

**Figure 2.** Defect after tumor excision showing the exposed cartilage.

the vascular pedicle (See **Supplemental Digital Content 1**, Video 1, http://links.lww.com/DSS/B521). The vascular network ensured safe deepithelization, defatting, and plication during insetting. In the presence of defects involving the external meatus, the flap can be tailored in a *racquet shape* for recontouring. The flap was tunneled, tailored, and sutured with minimal tension (Figures 1–4; see **Supplemental Digital Content 1**, Figures S5–S9, http://links.lww.com/DSS/B520). After surgery, patients received antibiotic therapy.

## Results

Of the 16 patients included (12 men and 4 women, mean age 65.18 years), all underwent successful anterior auricular surface reconstruction using the SBPA tunneled perforator (SBPA) flap. A total of 3 squamous cellular carcinomas and 13 basal cell carcinomas were removed. All the lesions were removed in solid with the underlying perichondrium for oncological reasons. Follow-up averaged 18.43 months. Defects ranged from 1.4 to 5.7 cm in major axis size. Three patients required additional reconstruction of the helix, antihelix, scaphoid fossa, and external meatus. The average surgery duration was 56.56 minutes. There were no major complications, whereas 3 minor complications required flap remodeling. No tumor recurrences were observed.

**Figure 3.** Preauricular tunneled perforator flap in setting.

## Discussion

Anterior auricular reconstruction is particularly challenging due to the region's specific profile and characteristics. Crikelair[4] highlighted the goals of ear reconstruction: appropriate skin thickness and texture, aesthetic outcome, and simplicity. Auricular defects vary from skin-only to full-thickness cartilage defects. Direct primary closure is often unfeasible due to skin characteristics, risking anatomic

**Figure 4.** Appearance after 18 months of follow-up.

distortion, dehiscence, and cartilage exposure. Cartilage's avascular nature makes it prone to complications like chondrites or infections resistant to medical treatments. Large defects further complicate reconstruction due to limited skin availability and inability to use skin grafts over exposed cartilage. Moreover, the thinner skin graft may result in distortion consequent to retractions and mismatch. Therefore, local flaps are usually required.

Various techniques have been described for anterior auricular surface reconstruction, often affected by cancerous lesions and trauma. The preauricular area is a reliable donor site, vascularized by the superficial temporal artery, which branches into 3 main arteries supplying different auricular regions.[5] This vascular support allows for safe flap defatting and custom tailoring to reconstruct even the external acoustic meatus if necessary. The extra skin in the preauricular area can cover large defects, providing natural outcomes following the local–regional natural grooves and ridges of the auricular contour. On the contrary, the posterior auricular area, has poor skin laxity and could require skin grafting or a second step procedure; moreover, the presence of the great auricular nerve might represent an unsafe area for the larger harvesting. However, in male patients, beard presence can complicate the preauricular technique, necessitating secondary laser hair removal.

## Conclusion

The SBPA perforator flap technique offers a reliable, 1-stage solution for anterior auricular surface reconstruction, leveraging the vascular advantages of the preauricular area. It ensures aesthetic and functional restoration with minimal complications, making it a preferred method for complex anterior auricular reconstructions even of large dimensions.

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