RECONSTRUCTIVE CONUNDRUM

Pull-Through Subcutaneous Pedicle Flap for an Anterior Auricular Defect

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A 60-year-old man without significant previous medical history underwent two stages of Mohs micrographic surgery for removal of a basal cell carcinoma of the right scaphoid fossa and superior antihelix. Tumor extirpation was through the dermis and perichondrium, exposing bare and intact auricular cartilage. The resulting defect measured $18 \times 20$ mm (Figure 1). How would you reconstruct this defect?

Figure 1. Mohs defect of the scaphoid fossa and superior antihelix measuring $18 \times 20$ mm.

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Resolution

Excision of cutaneous tumors of the ear and their subsequent repair are commonly encountered in Mohs micrographic surgery. A defect of the anterior auricle presents a unique reconstructive dilemma in which specific concerns need to be addressed:

- Is the perichondrium intact?
- Is the cartilage intact?
- Can function (supporting glasses and hearing aids) be maintained?
- Where can skin be recruited from for the repair?

In reviewing the options for this anterior auricular defect, one could advocate for “nonrepair.” Second-intention healing is ideal for smaller, shallow defects of concave surfaces such as the scaphoid fossa, conchal bowl, temple, or nasion/medial canthus. In this case, there is little fear that contraction will alter a free margin or significantly alter function, but bare cartilage is a suboptimal, avascular wound bed that may need to be excised or perforated through to the opposing perichondrium to better support re-epithelialization. Healing time can be lengthy.

A full-thickness skin graft is a remarkably hardy option that can be employed for this defect. Hairless areas of the preauricular cheek or photo-protected areas of the postauricular scalp are suitable donor sites that can provide an acceptable color and texture match. For thin-skinned areas such as the scaphoid fossa, a split-thickness skin graft can also be a viable option. As in the case with second-intention healing, viability of the graft on bare cartilage may require excision or perforation of the cartilage to facilitate imbibition and inosculation from the opposing perichondrium. Significantly altering the cartilage to prepare for the graft may compromise the form and rigidity of the auricle. In addition, seroma and hematoma formation under the graft may compromise its viability. To ensure a vascular wound bed, delayed grafting is also an option but requires sufficient time for granulation tissue to form.

Some authors have proposed a staged interpolation, pull-through flap for this kind of anterior auricular defect.1–3 Using the postauricular scalp, a cutaneous flap is incised and pulled through a slit incision at the distal portion of the anterior defect. The flap is inset and allowed to take before being divided in a second procedure. This random pattern flap probably derives its vascular supply from tributaries of the posterior auricular artery. Cosmetic outcome is usually excellent.

We propose that a postauricular scalp-to-anterior auricle pull-through subcutaneous pedicle flap should be considered for this defect of the scaphoid fossa and antihelix. Masson4 first described this flap, which has been called the “revolving door” flap5,6 and the “flip-flop” flap,7 in the plastic surgery literature in 1972 to describe the general movement of the pedicled flap. It is a versatile reconstructive option that has been applied to defects of the scaphoid fossa, antihelix, and conchal bowl. The flap’s main advantages are that it can be used for large defects and uses skin that is protected and well vascularized. Furthermore, it is performed as a one-stage procedure.

In executing this flap, the auricle is reflected anteriorly, and an area of donor skin is measured and marked just posterior to the postauricular sulcus (Figure 2). This flap is incised as an island that

![Figure 2. Flap donor site marked.](image-url)
maintains a subcutaneous pedicle that originates from the postauricular sulcus. Reasonable hemostasis should be obtained without compromising the vascular pedicle. Returning the auricle to its normal anatomical position, a slit excision at the proximal aspect of the defect is taken through the auricular cartilage and to the base of the flap’s pedicle in the postauricular sulcus (Figure 3). The excision should be sufficient to accommodate the pedicle without vascular compromise; it may be necessary to excise a 1- to 2-mm strip of cartilage to accomplish this. The flap and its pedicle are pulled through the auricular excision (Figure 4) and laid atop the defect (Figure 5). Without tension, torsion, or impingement of the pedicle, the flap should be well perfused.

The flap is inset with fine nonabsorbable superficial sutures (Figure 6), and the secondary defect is easily closed primarily. A standard pressure dressing is applied, and the patient is instructed to protect the area from trauma. Envisioning the pages of a book can be a helpful analogy in visualizing the movement and execution of this repair (Figure 7).

In our patient, follow-up at 2 months revealed excellent aesthetic and functional results of the primary (Figure 8) and secondary (Figure 9) sites. Vascular supply from tributaries of the posterior auricular artery contribute to the viability of this flap.8 Other authors have stated that neurologic function is
maintained, and indeed, our patient regained minimal sensation at his flap site. A potential drawback of this flap includes pulling back or “pinning” of the ear. Also, overmanipulation and incision of auricular cartilage may lead to pain and chondritis. Pain, if prolonged, can be a symptom of subclinical infection, and a prophylactic course of an appropriate antibiotic, particularly in patients with diabetes mellitus, may be considered.

A subcutaneous, pull-through island pedicle flap is an ideal and versatile reconstructive choice for large defects of the anterior auricle that involve perichondrium.

References


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