

Use of the Retroauricular Pull-Through Sandwich Flap for Repair of an Extensive Conchal Bowl Defect With Complete Cartilage Loss

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Reconstruction of an extensive conchal bowl defect with notable cartilage loss is challenging due to the unique shape of the concha, the need for adequate structural support, and the lack of adjacent tissue reservoirs. Repair of a full-thickness conchal bowl defect has included 3-stage approaches, such as the anterior pedicled retroauricular flap. For an extensive conchal defect with substantial cartilage loss but intact posterior auricular skin, we recommend consideration of the retroauricular pull-through sandwich flap, which combines a cartilage graft and retroauricular interpolation flap pulled through a posterior auricular incision to resurface the anterior ear.

Cutis. 2023;112:46-48.

Practice Gap

Repair of a conchal defect requires careful consideration to achieve an optimal outcome. Reconstruction should resurface exposed cartilage, restore the natural projection of the auricle, and direct sound into the external auditory meatus. Patients also should be able to wear glasses and a hearing aid.

The reconstructive ladder for most conchal bowl defects includes secondary intention healing, full-thickness skin grafting (FTSG), and either a revolving-door flap or a flip-flop flap. Secondary intention and FTSG are appropriate for superficial defects, in which the loss of cartilage is not substantial.^{1,2} Revolving-door and

flip-flop flaps are single-stage retroauricular approaches used to repair relatively small defects of the conchal bowl.³ However, reconstructive options are limited for a large defect in which there is extensive loss of cartilage; 3-stage retroauricular approaches have been utilized. The anterior pedicled retroauricular flap is a 3-stage repair that can be utilized to reconstruct a through-and-through defect of the central ear:

- Stage 1: an anteriorly based retroauricular pedicle is incised, hinged over, and sutured to the medial aspect of the defect, resurfacing the posterior ear.
- Stage 2: the pedicle is severed and the flap is folded on itself to resurface the anterior ear.
- Stage 3: the folded edge is de-epithelialized and set into the lateral defect.⁴

The revolving-door flap also uses a 3-stage approach and is utilized for a full-thickness central auricular defect:

- Stage 1: a revolving-door flap is used to resurface the anterior ear.
- Stage 2: a cartilage graft provides structural support.
- Stage 3: division and inset with an FTSG is used to resurface the posterior ear.

The anterior pedicled retroauricular flap and revolving-door flap techniques are useful for defects when there is intact posterior auricular skin but not when

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The authors report no conflict of interest.

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doi:10.12788/cutis.0799

there is extensive loss of cartilage. Other downsides to these 3-stage approaches are the time and multiple procedures required.⁵

We describe the technique of a retroauricular pull-through sandwich flap for repair of a large conchal bowl defect with extensive cartilage loss and intact posterior auricular skin.

Technique

A 62-year-old man presented for treatment of a 2.6×2.4-cm nodular and infiltrative basal cell carcinoma of the right conchal bowl. The tumor was cleared with 3 stages of Mohs micrographic surgery, resulting in a 5.5×4.2-cm defect with complete loss of cartilage throughout the concha, helical crus, and inner rim of the antihelix



FIGURE 1. An extensive 5.5×4.2-cm defect of the right conchal bowl following 3 stages of Mohs micrographic surgery for basal cell carcinoma, with complete loss of cartilage throughout the concha, helical crus, and inner rim of the antihelix. The posterior auricular skin was intact.



FIGURE 2. In stage 1 of the repair, a cartilage graft was harvested from the left concha and sutured into the central defect for structural support.

(Figure 1). A 2-stage repair was performed utilizing a cartilage graft and a pull-through retroauricular interpolation flap.

Stage 1—A cartilage graft was harvested from the left concha and sutured into the central defect for structural support (Figure 2). An incision was then made through the posterior auricular skin, just medial to the residual antihelical cartilage, and a retroauricular interpolation flap was pulled through this incision to resurface the lateral two-thirds of the conchal bowl defect. This created a “sandwich” of tissue, with the following layers (ordered from anterior to posterior): retroauricular interpolation flap, cartilage graft, and intact posterior auricular skin.

A preauricular banner transposition flap was used to repair the medial one-third of the conchal defect. A small area was left to heal by secondary intention (Figure 3).

Stage 2—The patient returned 3 weeks later for division and inset of the retroauricular interpolation flap. The pedicle of the flap was severed and its free edge was sutured into the lateral aspect of the defect. The posterior auricular incision that the flap had been pulled through in stage 1 of the repair was closed in a layered fashion, and the secondary defect of the postauricular scalp was left to heal by secondary intention (Figure 4).

Final Results—At follow-up 1 month later, the patient was noted to have good aesthetic and functional outcomes (Figure 5).

Practice Implications

The retroauricular pull-through sandwich flap combines a cartilage graft and a retroauricular interpolation flap pulled through an incision in the posterior auricular skin to resurface the anterior ear. This repair is most useful for a large conchal bowl defect in which



FIGURE 3. In stage 1 of the repair, the retroauricular flap was pulled through the incision in posterior auricular skin and sutured to the anterior auricular surface. This “sandwich” comprised the following tissue layers (ordered anterior to posterior): retroauricular interpolation flap, cartilage graft, and intact posterior auricular skin.



FIGURE 4. In stage 2 of the repair, the retroauricular flap pedicle was incised and inset into the lateral aspect of the defect.

there is extensive missing cartilage but intact posterior auricular skin.

The retroauricular scalp is a substantial tissue reservoir with robust vasculature; an interpolation flap from this area frequently is used to repair an extensive ear defect. The most common use of an interpolation flap is for a large helical defect; however, the flap also can be pulled through an incision in the posterior auricular skin to the front of the ear in a manner similar to revolving-door and flip-flop flaps, thus allowing for increased flap reach.

A cartilage graft provides structural support, helping to maintain auricular projection. The helical arcades provide a robust vascular supply and maintain viability of the helical rim tissue, despite the large aperture created for the pull-through flap.



FIGURE 5. At 1 month following the takedown of the retroauricular pull-through sandwich flap, the surgical site was fully healed with a good aesthetic and functional outcome.

We recommend this 2-stage repair for large conchal bowl defects with extensive cartilage loss and intact posterior auricular skin.

REFERENCES

1. Clark DP, Hanke CW. Neoplasms of the conchal bowl: treatment with Mohs micrographic surgery. *J Dermatol Surg Oncol.* 1988;14:1223-1228. doi:10.1111/j.1524-4725.1988.tb03479.x
2. Dessy LA, Figus A, Fioramonti P, et al. Reconstruction of anterior auricular conchal defect after malignancy excision: revolving-door flap versus full-thickness skin graft. *J Plast Reconstr Aesthet Surg.* 2010;63:746-752. doi:10.1016/j.bjps.2009.01.073
3. Golash A, Bera S, Kanoi AV, et al. The revolving door flap: revisiting an elegant but forgotten flap for ear defect reconstruction. *Indian J Plast Surg.* 2020;53:64-70. doi:10.1055/s-0040-1709531
4. Heinz MB, Hölzle F, Ghassemi A. Repairing a non-marginal full-thickness auricular defect using a reversed flap from the postauricular area. *J Oral Maxillofac Surg.* 2015;73:764-768. doi:10.1016/j.joms.2014.11.005
5. Leitenberger JJ, Golden SK. Reconstruction after full-thickness loss of the antihelix, scapha, and triangular fossa. *Dermatol Surg.* 2016; 42:893-896. doi:10.1097/DSS.0000000000000664