

Surgery of Severe Cauliflower Ear Deformity

Indri Lakhsmi Putri, MD, PhD*†
 Melia Bogari, MD*
 Auliai Khoirunnisa, MD†
 Faizal Rezky Dhafin, B.Des‡
 Djoko Kuswanto, B.Eng§

Summary: A cauliflower ear is an auricular deformity characterized by thickened soft tissue and cartilage. A subperichondrial hematoma or fluid collection causes this malformation. As a result of being cut off from the perichondrium blood supply, the ear cartilage becomes ischemic, developing scar tissue, fibrous tissue, new cartilage overgrowth, or necrosis beneath the skin, resulting in a permanent alteration in the shape of the external ear resembling that of a cauliflower. To properly fix defects, the surgeon must grasp ear anatomy and be familiar with a variety of reconstructive alternatives. It requires meticulous attention, due to the intricate design of the ear. Simple and complex techniques for treating cauliflower ears have been developed. However, in severe cases, simple techniques are often insufficient. As a result, complex techniques such as replacement with an auricular prosthesis or implant or autogenous costal cartilage framework were developed. We present a case of a 25-year-old man who experienced a severe cauliflower ear as a result of an infection during adolescence. The patient was concerned about the shape of his ear and was depressed. Ear reconstruction was accomplished using the costal cartilage framework engraved according to a three-dimensional cutting guide for surgical planning. Costal cartilage is chosen to provide a framework for reconstruction as it is strong and rigid, and its curved shape is similar to that of the external ear. There were no complications after surgery. The ear projection and shape have performed admirably. The patient was pleased with the outcome and felt more confident after surgery. (*Plast Reconstr Surg Glob Open* 2023; 11:e4953; doi: 10.1097/GOX.0000000000004953; Published online 19 April 2023.)

Cauliflower ear causes a lack of cartilaginous support, loss of natural ear contours, an uneven shape of the ear, and permanent aesthetic deformity.^{1,2} The reconstruction should include discreet incisions, removal of aberrant fibroneocartilage without jeopardizing the ear's structural integrity, and reinstatement of the ear's natural outlines.²

CASE REPORT

A 25-year-old man complained of the shape of his left ear (Fig. 1A) and requested reconstruction. From history,

the patient had sudden pain, swelling, and pus discharge in the left ear with no known cause. The patient had undergone multiple drainage procedures. The cartilage of the left ear was thickened, and the helices had shrunk into multiple folds, forming a cauliflower-shaped deformity extending to the entire ear. The auditory meatus was normal, and there was no hearing loss. The patient was a heavy smoker and had agreed to quit smoking six months before surgery.

A total ear reconstruction was performed. Incisions were made in the left auricula and scalp areas. The skin flap was elevated, and the aberrant fibroneocartilage tissue was excised and eliminated. Costal cartilages from the sixth to eighth contralateral rib were harvested, sculpted (Fig. 2), and inserted into the left ear. The temporoparietal fascia flap was raised to cover the framework, and vacuum drains were placed in the left auricular and scalp areas. The dressing chosen was paraffin gauze, which was subsequently covered with alginate and a thermoplastic splint for 7 days.

From the *Department of Plastic and Reconstructive Surgery, Faculty of Medicine, Airlangga University, Surabaya, East Java, Indonesia; †Plastic and Reconstructive Surgery Unit, Airlangga University Hospital, Surabaya, East Java, Indonesia; ‡PT Rekayasa Teknologi Medis Indonesia, Surabaya, East Java, Indonesia; and §Department of Industrial Design, Institut Teknologi Sepuluh Nopember, Surabaya, East Java, Indonesia.

Received for publication November 29, 2022; accepted March 3, 2023.

Copyright © 2023 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the [Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 \(CCBY-NC-ND\)](https://creativecommons.org/licenses/by-nc-nd/4.0/), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: 10.1097/GOX.0000000000004953

Disclosure statements are at the end of this article, following the correspondence information.

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.



Fig. 1. A 25-year-old man presented with deformity of the upper left ear due to infection. A, Preoperative image. B, Follow-up 4 months after the second stage reconstruction.

After 1 year of follow-up, there was no visible scarring or other complications, so the patient proceeded to the next procedure: ear elevation. An incision was made on the posterior side of the auricle. Elevation of the constructed ear was done using the residual costal cartilage from the prior surgery. A posterior auricular fascial flap was employed to cover the raised ear framework, and a

split-thickness skin graft from the scalp was placed on top of it. The same choice of dressing was applied as in the previous surgery.

After four months of follow-up, the ear shape and projection showed promising results with no complications (Figs. 1B and 3). The patient was pleased with the outcome, which included an excellent shape.

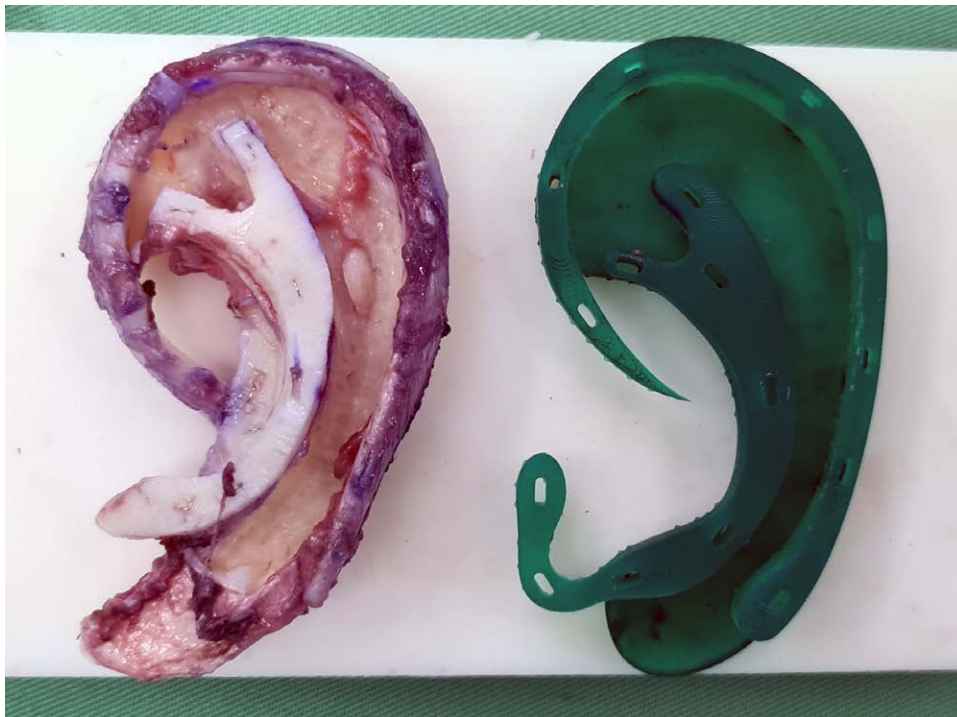


Fig. 2. The costal cartilages were sculpted according to the three-dimensional template and inserted in the left auricle region.

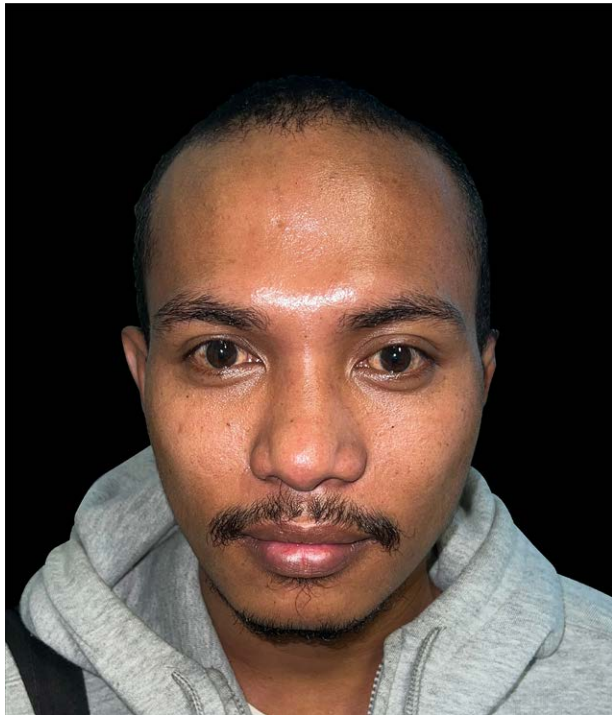


Fig. 3. The symmetrical ear projections were achieved postoperatively.

DISCUSSION

Cauliflower ear patients seek therapy for two reasons: discomfort and aesthetics.³ Our patients' main issue is aesthetic deformity. Prior knowledge has shown that treating a cauliflower ear is difficult and unsatisfying. The goal of treatment should be to produce a near-normal look.

Vogelin et al used a posterior incision to remove the hardened component and re-sculpt a portion of remnant cartilage.³ Greywoode et al used a blade and a diamond burr to reconfigure the cartilage.² Schonauer et al utilized ipsilateral spare cartilage to rebuild the helix through a posterior incision.⁴ Fujiwara et al stressed the necessity of preserving posterior cartilage after excising the anterior fibrous connective layer.⁵

Yotsuyanagi et al developed surgical treatments for the deformity, which differ depending on the level of the auricle involved.⁶ The first type of distortion is one that does not modify the contour of the ear and may be repaired by trimming the distorted cartilage using appropriate approaches. The second type of malformation is one that is characterized by an alteration in the contour of the ear. A conchal cartilage graft is utilized if the ear is firm; if it is compromised, a costal cartilage graft is used to give firmness.⁶

We used a postauricular or posthelical incision, removing the deformed cartilage before doing costal cartilage grafting, replacing the brittle and distorted ear cartilage, restoring the shape and projection of the ear, and offering strong structural integrity to the ear. Costal cartilage is used because it is robust, solid, and has a curved form comparable to the external ear.⁷ It was also malleable and could be molded to resemble natural ear outlines.

We also constructed a three-dimensional printed model of a healthy ear to aid in the sculpting of a costal cartilage structure that is as close to a healthy ear as possible. It is critical to ensure that the framework has an appropriate blood supply to facilitate the healing of wounds and protect the viability of the costal cartilage.

We used a transfixion incision with a backcut, as described by Firmin.⁸ This forms a space for the framework's inferior part, which, when inserted, reproduces the lobule. The transfixion incision and backcut placement were assessed by dragging the remnant posteriorly until it reached the optimal spot.

However, despite sufficient skin availability, the quality of the skin flap was poor. This might impact the perfusion of the skin flap, so we decided to wrap the costal cartilage framework with a temporoparietal fascia flap before covering it with the skin flap. In the second stage of surgery, we used the posterior auricularis fascia flap to cover the elevated ear framework and achieve correct auricular projection.

The postoperative care of the rebuilt ear is critical. The risk of bleeding is significant in the early postoperative period.⁶ Infection, scarring, and relapse of the deformities can all result from a hematoma. In the initial surgery, we used a small vacuum drain to remove dead space and evacuate fluid accumulation. In the second surgery, we did not use a drain because the area of the raised flap was not as wide as in the first surgery.

One of the most essential therapies is maintaining consistent pressure with a secure and uncomplicated dressing.^{9,10} Layers of paraffin gauze and alginate dressings were used to shape the ear contour, and a thermoplastic splint was placed on top.

Repairing a cauliflower ear with significant scar tissue is much more difficult than reconstructing an auricle with healthy skin. The best treatment comprises inconspicuous incisions, resection of fibrocartilage while ensuring sufficient perfusion, and reinstatement of the ear's natural forms. (See figure, Supplemental Digital Content 1, which displays the management of cauliflower ear deformity: prevention, reconstruction, and postoperative result. <http://links.lww.com/PRSGO/C516>.) For secure and efficient pressure, considerations in method selection, drainage, and dressing selection are also required. The reconstruction not only corrects the discordant form of the ears, but also boosts the patient's self-confidence, improving the patient's quality of life.

Indri Lakhsmi Putri, MD, PhD

Department of Plastic Reconstructive and
Aesthetic Surgery
Faculty of Medicine
Airlangga University
Jl. Mayjend Moestopo 6-8
Surabaya 60286
East Java, Indonesia
E-mail: indrilakhsmiputri@fk.unair.ac.id

PATIENT CONSENT

The patient gave written informed consent for the use of his image.

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

1. Jones SEM, Mahendran S. Interventions for acute auricular haematoma. *Cochrane Database Syst Rev.* 2004;2004:CD004166.
2. Greywoode JD, Pribitkin EA, Krein H. Management of auricular hematoma and the cauliflower ear. *Facial Plast Surg.* 2010;26:451–455.
3. Vogelin E, Grobbelaar AO, Chana JS, et al. Surgical correction of the cauliflower ear. *Br J Plast Surg.* 1998;51:359–362.
4. Schonauer F, La Rusca I, Pereira JA, et al. Redefinition of the helical rim in cauliflower-ear surgery. *Br J Plast Surg.* 2002;55:66–68.
5. Fujiwara M, Suzuki A, Nagata T, et al. Cauliflower ear dissection. *J Plast Reconstr Aesthet Surg.* 2011;64:e279–e282.
6. Yotsuyanagi T, Yamashita K, Urushidate S, et al. Surgical correction of cauliflower ear. *Br J Plast Surg.* 2002;55:380–386.
7. Gault D. Post traumatic ear reconstruction. *J Plast Reconstr Aesthet Surg.* 2008;61:S5–S12.
8. Firmin F. State-of-the-art autogenous ear reconstruction in cases of microtia. *Adv Otorhinolaryngol.* 2010;68:25–52.
9. Stuteville OH, Janda C, Pandya NJ. Treating the injured ear to prevent a “cauliflower ear.” *Plast Reconstr Surg.* 1969;44:310–312.
10. Ghanem T, Rasamny JK, Park SS. Rethinking auricular trauma. *Laryngoscope.* 2005;115:1251–1255.