

A New Modified Method of Correcting Cryptotia with a Subcutaneous Pedicled Flap

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Summary: We developed a surgical technique to correct cryptotia using a subcutaneous pedicled flap raised from the retroauricular region. A skin paddle over the caudal part of the auricular sulcus is designed and transferred to the skin defect of the upper posterior surface of the auricle. This procedure has been performed on 17 ears in 14 patients with cryptotia since 1992. There were no postoperative complications, such as necrosis of the flaps or deformities, and cryptotia did not recur in any patient. A satisfactory auricular contour with a sufficiently deep auriculotemporal sulcus was preserved in all cases. The intraoperative procedure to correct cryptotia and outcomes obtained are presented herein and compared with other procedures. (*Plast Reconstr Surg Glob Open* 2017;6:e1548; doi: 10.1097/GOX.0000000000001548; Published online 24 October 2017.)

INTRODUCTION

Cryptotia is a congenital deformity of the ear auricle. Although it is rare in Caucasians, cryptotia is frequently observed in Asian patients, particularly in Japan, in which its incidence has been reported to be as high as 1:400.¹ The upper portion of the auricle is buried beneath temporal skin and may be pulled out by the fingers; however, it returns to its original state when released. The buried state of the upper auricular portion makes wearing glasses or a mask difficult, and it is not cosmetically acceptable.

Nonsurgical ortho treatments for mild cryptotia using splints or tape achieve the correct form, and the younger the patient, the better the outcomes.² Surgical treatments are indicated for patients with moderate-to-severe deformities, including those that cannot be corrected with nonsurgical treatments, and for elderly patients.

Various surgical methods for the correction of cryptotia have been reported. Nakajima et al.³ was the first to describe a method using a subcutaneous pedicled flap in 1991. Although the reconstruction methods of other subcutaneous pedicled flaps have been described, we modified and developed a method in 1992 to set the donor at the temporo-auricular sulcus behind the auricle and indicated subcutaneous tissue as the pedicle, which led to a good auricular form and no conspicuous scars around the auricle.

This modified method and our experiences of 17 ears in 14 patients with cryptotia who underwent this procedure are presented herein.

SURGICAL METHODS

An incision line is set along the auricular sulcus after retracting the buried portion of the auricle. One half of the skin paddle is taken from the mastoid region, and the other half from the posterior surface of the auricle. The size of the skin paddle is selected according to the amount of tissue needed to cover the skin defect of the upper posterior surface of the auricle.

The posterior auricular muscle and superior auricular muscle are marked with sutures and detached at the attachment site to auricular cartilage to more easily move the auricle laterally. If necessary, collapsed auricular cartilage is corrected. After pulling the buried portion of the auricle superiorly, the deep portion of auricular cartilage is fixed to the temporal periosteum with a few anchoring sutures to maintain the natural form of auricular cartilage and prevent recurrence.

The flap is raised above the superficial mastoid fascia with a subcutaneous pedicle taken posterosuperiorly. The flap is rotated 150° and positioned to cover the skin defect of the upper posterior surface of the auricle without tension. The edges of the temporal area are undermined and advanced toward the postauricular sulcus, and the dermis of the temporal edge is sutured to the temporal periosteum to ensure firm fixation. The marked auricular muscles are fixed to proximal carti-

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Received for publication May 31, 2017; accepted September 5, 2017.

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DOI: 10.1097/GOX.0000000000001548

Disclosure: The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.

Supplemental digital content is available for this article. Clickable URL citations appear in the text.

lage. The donor-site wound is closed primarily to make a temporo-auricular sulcus with anchor sutures (see figure, **Supplemental Digital Content 1**, which displays a schema of the operative procedure, <http://links.lww.com/PRSGO/A592>). Bolster fixation is adapted for 2 weeks.

There are some key points regarding the operative design. One half of the skin paddle is taken from the mastoid region, and the other half from the posterior surface of the auricle. Therefore, the suture line itself becomes the temporo-auricular sulcus. In addition, the upper part of the auricle is buried under temporal skin and the caudal part projects outward in many cases of cryptotia. By taking the skin paddle from the posterior surface of the auricle and suturing, the caudal part moves medially and improves the morphological balance of the auricle.

RESULTS

Between 1992 and 2016, this technique was performed on 17 ears in 14 patients with cryptotia (Table 1). Six patients had type I cryptotia, whereas the other 8 had type II according to Hirose's classification,² which divides cryptotia into 2 types according to the cartilage constriction type: type I (transverse muscle type or superior crus type) and type II (oblique muscle type or inferior crus type). Their ages ranged between 3 and 22 years old (mean ± SD, 6.4 ± 4.9). There were 8 male and 6 female patients. The follow-up period was between 7 months and 3.5 years (mean ± SD, 1.8 years ± 1.0). There were no postoperative complications, such as necrosis or infection of the flaps. Cryptotia did not recur, and revision surgery was not required by any patient. A satisfactory auricular contour with a sufficiently deep auriculotemporal sulcus was preserved in all cases. All patients may now wear glasses or masks.

Case Report (Patient 3)

A 5-year-old boy presented with type I cryptotia of the right ear. Cryptotia was repaired using the technique described. There was no significant cartilaginous deformity. A satisfactory auricular contour with a deep auriculotemporal sulcus was noted at the 10-month follow-up. The resulting scar was inconspicuous 3 years after surgery (Fig. 1), there was no recurrence, and revision surgery was not required (see figure, **Supplemental Digital Content 2**, which displays a 5-year-old boy with type I cryptotia. Postoperative appearance after 3 years, <http://links.lww.com/PRSGO/A593>).

DISCUSSION

Various surgical methods for correcting cryptotia, including skin grafts, local flaps, and tissue expansion, have been reported.¹⁻⁹ Local flap methods are the most commonly indicated because the auricle with a natural texture is reconstructed in a 1-stage operation. To date, Kubo's V-Y advancement flap,⁴ Z-plasty,^{5,6} a rotation flap,⁷ transposition flap,⁸ and subcutaneous pedicled flap³ have been employed in local flap methods. However, in most of these techniques, a visible scar is left and/or the hair line is disturbed.

Table 1. Summarized Data of Cases

Patient	Sex	Age (year)	Side	Type
1	F	3	R	I
2	F	5	L	I
3	M	5	R	I
4	M	5	B	I
5	M	8	B	I
6	M	13	R	I
7	M	3	L	II
8	F	4	L	II
9	M	5	R	II
10	M	5	R	II
11	F	5	R	II
12	F	6	R	II
13	M	9	R	II
14	F	22	B	II

B, bilateral; F, female; L, left; M, male; R, right.



Fig. 1. Case (patient 3): a 5-year-old boy with type I cryptotia. A, Preoperative view. B, Preoperative design. C, Immediately after surgery. D, In the 10-month follow-up, the satisfactory contour of the corrected auricle was maintained.

The application of a subcutaneous pedicled island flap generally allows for the proper freedom of flap movement and setting the donor. Nakajima et al.³ reported a method using a subcutaneous pedicled flap from the temporal region. This method led to minimal postoperative scarring and no distortion of the hair line.

Yoshimura et al.⁹ modified Nakajima's method and developed a technique with a superiorly based superficial mastoid fascia and skin paddle. However, since the flap needs undermining deep to the superficial mastoid fas-

cia, this method may be a highly invasive and complicated procedure. A subcutaneous pedicled flap is provided with abundant vascularity.

We propose a new modified method with a subcutaneous pedicled flap from the retro-auricular region, which is technically straightforward, uncomplicated, makes a good auricular contour, and only leaves a scar on the invisible postauricular region along the auricular sulcus with no noticeable complications.

We have treated all surgical cases of cryptotia using our technique since its development, and good outcomes have been achieved. Regarding the conditions for applying this technique, the accumulation and consideration of further cases are needed.

CONCLUSIONS

The method, which applies a subcutaneous pedicled island flap to treat cryptotia, achieves a deep temporoauricular sulcus, natural auricular contour, and no conspicuous scars or noticeable complications.

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PATIENT CONSENT

Parents or guardians provided written consent for the use of the images.

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