

# Bilateral Keloid Formation after Otoplasty in the Presence of Prolonged Mask Wearing

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**Summary:** Prominent ears are the most frequently observed congenital deformity of the head and neck. Various techniques have been proposed for their aesthetic correction. Typically, surgical treatment for protruding ears involves a combination of suture, cutting, and scoring techniques. Herein, we present the clinical case of an 11-year-old child who developed bilateral keloid formations 12 months after otoplasty. Keloids and hypertrophic scars can result from extensive retroauricular skin excisions that do not allow for tension-free wound closure. In addition, skin tension and friction on immature surgical scars are common risk factors for keloid formation. To comply with school guidelines aimed at reducing the transmission of SARS-CoV-2, the patient has consistently worn FFP2 masks with ear loops positioned behind the concha. Although masks play a critical role in preventing the spread of infectious diseases, they can lead to friction in the postauricular area. In light of the presented case, it is important to examine potential cofactors that may contribute to keloid formation after otoplasty, as well as suggest a strategy to safeguard the retroauricular scar. (*Plast Reconstr Surg Glob Open* 2023; 11:e5086; doi: [10.1097/GOX.0000000000005086](https://doi.org/10.1097/GOX.0000000000005086); Published online 30 June 2023.)

## INTRODUCTION

Prominent ears (PEs) are commonly attributed to hereditary factors or intrauterine malposition, which can result in school-age children being bullied.<sup>1</sup> Consequently, otoplasty is frequently performed during the preschool years. Auricular protrusion typically arises due to a hyperplastic cavum conchae or dysplastic/hypoplastic antihelix.<sup>2</sup> The surgical correction of protruding ears involves one of three standard techniques: the suture-only technique, as described by Mustardé; the scoring technique according to Stenström, Chongchet, and Crikelair; and the cutting-suture technique according to Converse.<sup>3</sup> The utilization of the aforementioned techniques has been associated with several complications such as hematomas, infections, necrosis, stenosis of the outer ear canal, extrusion of sutures, keloids, hypertrophic scars, and suboptimal corrections.<sup>4</sup> Excessive scarring occurs due to dysfunctions

in the regulatory mechanisms of normal wound healing, such as prolonged inflammation, uncontrolled collagen synthesis, and deficient remodeling.<sup>5</sup>

Masks are vital in preventing infectious diseases. However, ear-looped masks exert friction on the postauricular area, leading to potential complications in postotoplasty patients. The impact of mask usage on wound healing after otoplasty should be considered when making recommendation for prolonged mask wear.

## CASE REPORT

We present a case of an 11-year-old male patient who underwent bilateral otoplasty to correct his PEs, which were characterized by poorly developed antihelical folds and significant conchal hypertrophy on both sides (Fig. 1). Before the procedure, we conducted a comprehensive evaluation of the patient's psychological well-being, his individual aesthetic aspirations, and his ability to follow our postoperative instructions, taking into account his intellectual disability, in collaboration with his parents. The surgical procedure followed the technique described by Wurm,<sup>6</sup> which involves reducing the enlarged, deep conchal bowls and reconstructing the antihelix. Our surgical approach began by resecting a small, sickle-shaped piece of cartilage to reduce the deep cavum and cymba conchae, without altering the anterior perichondrium. We used PDS 5-0 (Ethicon) for interrupted sutures to close the cartilage gap in a tension-free manner. The Mustardé suturing technique was then employed with Ethibond

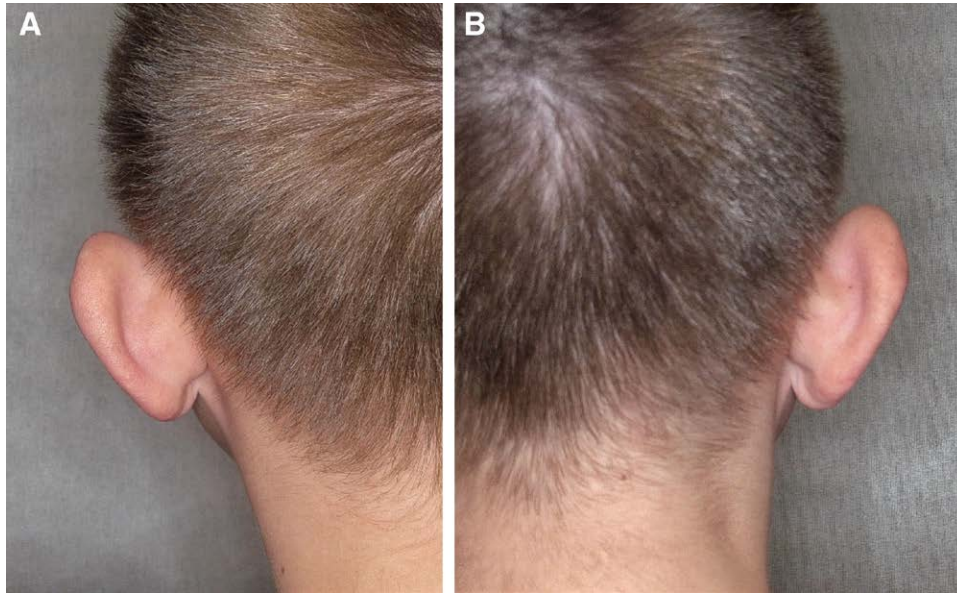
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**Fig. 1.** Preoperative view. A, Left prominent ear with weak antihelical fold and conchal hypertrophy. B, Right prominent ear with weak antihelical fold and conchal hypertrophy.

4-0, followed by conchal set-back sutures with PDS 3-0. It is noteworthy that no skin was excised during the entire procedure. Finally, we performed skin closure using a running suture with Vicryl 5-0.

On postoperative day 1, the patient reported no pain, and no visible hematomas were noted. The initial postoperative appointments (1 week, 2 weeks, and 3 months) (Fig. 2) showed a significant improvement in the appearance of the ear, and no complications were observed.

The patient and his mother returned to our hospital 17 months postsurgery, reporting detection of solid

masses behind both ears, first noticed 5 months earlier. On examination, nonmoveable, firm, subcutaneous masses were observed, indicative of keloid formation (Fig. 3). The patient was instructed to wear ear-loop masks for 5 days/week during school but declined occipital hooks to relieve tension. Cortisone injections were avoided due to the patient's disability, and surgical revision is currently not feasible.

### DISCUSSION

Surgical techniques for correcting PEs have evolved, with cutting techniques in the antihelical subunit being replaced by suture-only techniques.<sup>7</sup> In around a third of cases, an increased scaphomastoidal angle is due to a prominent, deep concha. Suture-only and/or scoring techniques alone may not effectively address this issue, potentially resulting in overcorrection with a concealed helical rim. To overcome these hurdles, cutting techniques limited to the conchal subunit have gained popularity.



**Fig. 2.** Postoperative view: 3 months after bilateral otoplasty.



**Fig. 3.** Bilateral keloid formation on the posterior area of the pinna 17 months postoperatively.

Wurm found this technique to be both safe and effective. Complications such as keloids and suture fistulas were rare, with an incidence of 1.3% and 1.5%, respectively.<sup>6</sup> Notably, avoiding skin excisions can help reduce skin tension and lower the risk of excessive scarring.<sup>6</sup> To date, our experience showed no keloid formation with the presented techniques and materials. However, all potential cofactors for keloid development should be considered and discussed.

Suture material choice is crucial in otoplasty outcomes and complication incidence. However, there is no consensus on the optimal suture material for cartilage or skin sutures. Hence, the particular properties and features of various suture materials should be carefully considered. Iamphongsai et al reported that using absorbable sutures for cartilage reshaping may reduce the incidence of complications such as suture extrusion and prominence.<sup>8</sup> Yet, a potential drawback of this technique is the risk of auricle deformity recurrence due to the decreased strength of the suture. Nonetheless, animal studies have demonstrated that PDS, the absorbable suture material used in our procedure to fixate the concha to the mastoid, is sufficiently durable to maintain the cartilage folds in place until the concha's new position is stabilized.<sup>8</sup> Moreover, it is crucial to avoid applying tension on the cartilage during the excision of the hypertrophic part of the concha. Instead, the suture should be used to precisely adapt the edges of the excision. Maslauskas et al found no significant differences when comparing the efficacy of different suture materials (4/0 Monocryl, 4/0 PDS, and 4/0 Mersilene) in forming a new antihelical fold, based on the skull-helical rim distance before and after the operation.<sup>9</sup>

Pressure therapy has been proposed as a potential treatment for keloid scars in the literature, but its effectiveness remains questionable.<sup>5</sup> In our case, we suspect that the patient's keloid is more likely caused by friction, possibly due to the mask's positional changes or itching behind the ear. It is worth noting that friction can induce the biosynthesis of proteins encoded in fibrotic genes, which may contribute to the development of excessive scar tissue.<sup>10</sup>

In brief, the use of ear-looped masks could potentially result in keloid formation, although it is necessary to conduct further detailed analyses of additional cases to confirm any definitive causal link. The COVID-19 pandemic has taught us valuable lessons about the importance of masks in preventing the spread of infectious diseases.

As we prepare for the future, we suggest advising patients to avoid friction on the retroauricular area and to opt for plastic hooks or straps following otoplasty to safeguard the retroauricular scar over the long term.

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#### DISCLOSURE

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

#### PATIENT CONSENT

*Written informed consent to participate and for publication of the images was obtained from the parents.*

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