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ARTICLE

Does postauricular fascial flap reduce suture complications in otoplasty?

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ABSTRACT

Numerous suture techniques and covering flaps have been described to minimize complications related to sutures in otoplasty. The split postauricular fascial flap is one of such techniques, and it has been used to pad otoplasty suture. The aim of this study was to evaluate complications related to nonabsorbable cartilage sutures in otoplasty, using a variation of the split postauricular fascial flap. In this retrospective case series, we analyzed otoplasty patients in whom simplified split postauricular fascial flap was utilized. A postauricular skin ellipse was de-epithelialized (preserving dermis) and a longitudinally split in half. Flaps were dissected, and they were positioned on the cartilage to promote additional soft tissue coverage to the sutures. The lateral flap covered conchoscaphal sutures while the medial flap covered the conchomastoid sutures. Both the flaps were not sutured to cartilage. Early and late postoperative complications were evaluated. A total of 142 patients were included. Twenty-four (16.9%) patients developed late complications: 13 (9.1%) patients had palpable and visible sutures, nine (6.3%) had suture extrusion and two (1.4%) had hypertrophic scars. In this case series, the simplified split postauricular flap did not prevent or reduce late complications related to suture extrusion in otoplasty. It is possible that suturing the entire length of the flaps may play a role in our results. So, anchoring the flap and possibly tightening it a little may be an important technical step to prevent extrusion of sutures whenever the postauricular flap is used.

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Surgical flaps; otologic surgical procedures; suture techniques; postoperative complications

Introduction

The prominent ear is characterized by an exaggerated lateral protrusion of the ear mainly caused by variable associations of overdevelopment of conchal wall and underdevelopment of the anti-helical fold. Secondary deformities may also play a role in prominence, especially the projection of the lobule. It is the most frequent ear deformity, occurring in about 5% of the Caucasian population and, most often, is bilateral. Frequently, family history is present, and there is no difference in incidence between the genders [1–3].

The first otoplasty description is attributed to Dieffenbach, in 1845, who performed excision of skin and conchomastoid fixation, joining the perichondrium of the concha to galea, in a case of auricular trauma. Several authors have improved the technique of otoplasty in the following years, but it was only in 1910 that Luckett introduced the important concept of the anti-helix restoration [4]. To this end, he used a technique of cartilage incision over the planned anti-helix margins and applied horizontal sutures to create the antihelical fold. In 1963, Mustardé described his technique for anti-helix restoration with a series of nonabsorbable conchoscaphal sutures and, in 1968, Furnas began the popularization of conchomastoid sutures [5–7].

Complications in otoplasty may be early or late. Early complications are a hematoma, infection, and wound dehiscence. Late complications include hypersensibility, asymmetry, keloids and hypertrophic scars, cartilage tearing with a recurrence of prominence, and problems with suture materials, such as visibility, palpability, and extrusion of sutures, granulomas and fistulas. In particular, extrusion of suture materials may be a consequence of problems such as superficially placed cartilage shaping sutures, excessive tension in cartilage repair and infection. Interestingly, type of suture material used may also play a role and monofilament sutures tend to present lower extrusion rates. Even established techniques such as Mustardé and Furnas have several reports of complications related to sutures [1,5,6].

In 2001, Horlock et al. used a postauricular adipofascial flap to create additional soft-tissue coverage to Furnas and Mustardé sutures in order to prevent complications related to them. Based on their experience with 51 patients, the authors described their technique to be simple, fast and reported no incidence of suture extrusion [8]. Ungarelli, in 2012, also described his experience with this flap in 24 patients, demonstrating efficacy in preventing complications with nonabsorbable sutures applied on auricular cartilage [7]. In 2014, Irkoren et al. described the split postauricular flap in a retrospective study with 100 patients. The purpose of this modification to the postauricular flap was also to promote additional soft-tissue coverage, using separate lateral and medial flaps to pad, respectively, conchomastoid and conchoscaphal sutures. The authors argued that this technique is also straightforward, fast and aids not only in preventing suture problems but also in prevention of recurrence of the prominence by better-distributing tension on cartilage sutures [9].

The aim of this study was to evaluate the incidence of complications related to nonabsorbable cartilage sutures in otoplasty, using a simplified split postauricular fascial flap.

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Figure 1. Demarcation with methylene blue on the conchal area to be resected.

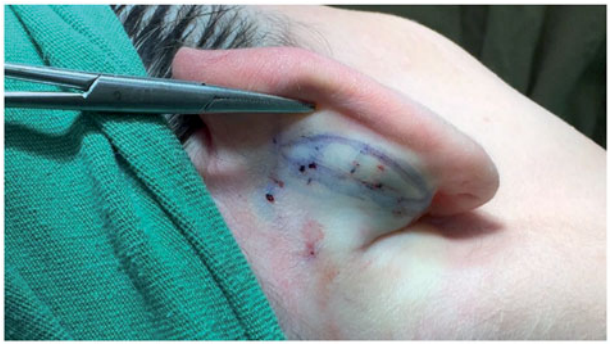

Figure 2. Demarcation with methylene blue on the ellipse of skin to be incised.

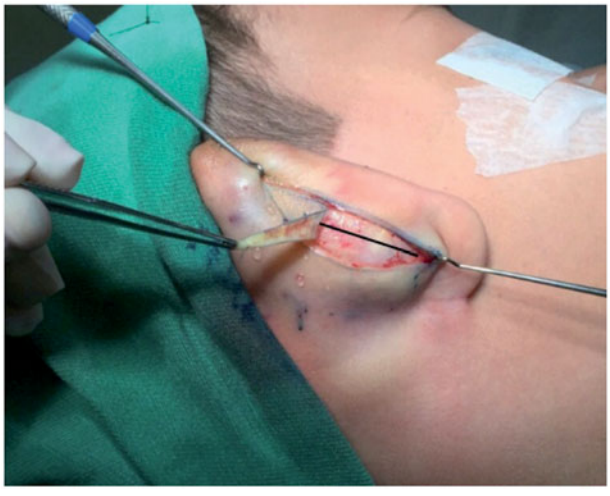

Figure 3. Demarcation of the longitudinal incision on flap after skin removal.

Methods

This was a retrospective case series of patients who underwent otoplasty for prominent ear correction using the simplified split postauricular fascial flap from September 2011 to August 2014. Their electronic medical charts were reviewed, with the support of a questionnaire to collect relevant data. There was no conflict of interest or source funding. This study was approved by our Institutional Review Board. Inclusion criteria were primary otoplasty to correct prominent ears, surgery supervised by the same surgeon, use of nonabsorbable conchomastoid and conchoscaphal sutures, and six months follow-up at least. Patients were evaluated at postoperative days 1,7,14, 42 and 180. For statistical purposes, patients were considered as subjects.

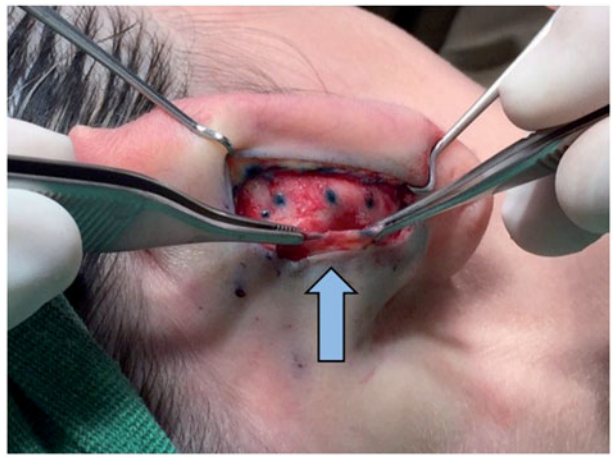

Figure 4. Split postauricular flap, proximal segment (marked with an arrow).

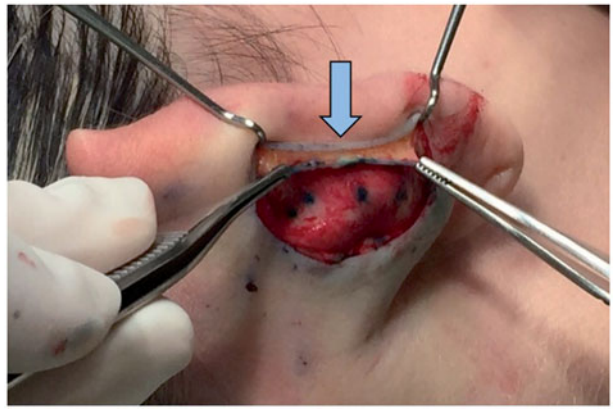

Figure 5. Split postauricular flap, distal segment (marked with an arrow).

All patients underwent surgery with general anesthesia or sedation, antibiotic prophylaxis administration with intravenous cefazolin and infiltration using lidocaine 2% with epinephrine. Suture guide points were marked in scapha and conchal cartilages with a 23 G needle and sterile blue methylene 4% (Figure 1).

An ellipse was marked on postauricular skin using the tattooed guide points as lateral limits. Skin was de-epithelialized at this area preserving the dermis (Figure 2). An incision was made along the greater axis of this ellipse down to the cartilage (Figure 3). Two flaps of dermoperichondrial tissue were then developed (Figures 4 and 5): a laterally based one (lateral half of the ellipse) and a medially based one (medial half of the ellipse). Both flaps had a random pattern of blood supply from adjacent dermis and perichondrium. Nondestructive correction of conchal hyperprojection was always attempted with two to three mattress conchomastoid sutures, with black nylon 3–0. In cases where this maneuver narrowed the external ear meatus sutures were removed and conchal resection was carried out maintaining a 3 mm border of concha medially so that conchomastoid sutures could be reapplied to aid retropositioning of the concha [10].

After application of all sutures, skin was closed with running nylon 5–0. The split postauricular flap was expected to promote additional soft tissue coverage to the sutures despite not being sutured to it or being fixed on the cartilage (Figure 6).

Epidemiological characteristics, early and late postoperative complications, follow-up time and patient satisfaction were evaluated in all the patients included in the study.

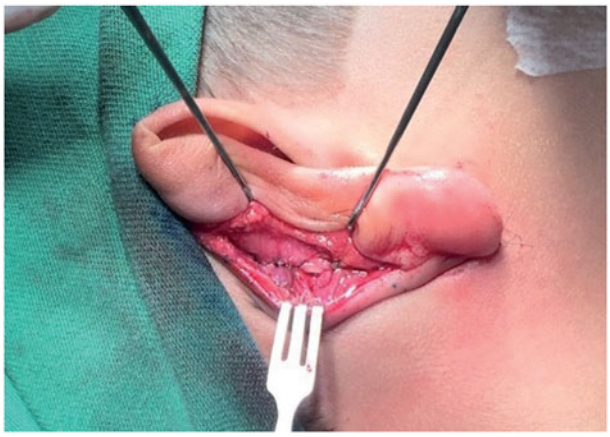

Figure 6. Split postauricular flap placed on the otoplasty sutures.

Results

A total of 142 patients met inclusion criteria. Eight patients underwent unilateral otoplasty and 134 had both ears operated. Forty-one patients had ear prominence corrected solely by conchomastoid and conchoscaphal sutures. The remaining 101 patients required association of additional surgical steps such as conchal resection and cartilage abrasion of the anterior scapha. Regarding gender, 51 patients were male and 91 female. Mean age was 19.3 years old, ranging from 7 to 40 years old. Mean follow-up time was 16.4 months, ranging from 6 to 35 months.

Considering all the patients, early complications included two cases (1.4%) of wound infection, both unilateral. None of the patients presented skin necrosis, dehiscence or hematoma. Late complications were more prevalent. Thirteen (9.1%) patients presented visible and palpable sutures, nine (6.3%) cases had extrusion of suture material and two (1.4%) patients developed hypertrophic scars.

Discussion

Postoperative complications are always distressful to patients, their families, and the surgical team, and otoplasty is no exception. The number of complications was calculated in relation to the number of patients, due to the fact that there were no statistical differences in left or right complications, and because we considered that a complication in a patient would result in an operative or non-operative procedure, regardless of the number of affected ears. In our case series, early complications were observed in two patients with wound infection (1.4%), within prevalence values found in the review of Limandjaja et al. (range, 0–2.4%) [1] and the work of Goode et al. (range, 2.4–5.2%) [11]. We believe our two cases of infection were probably associated with acute otitis in a child and local trauma in the recent postoperative period in an adult. Hematoma may occur in 0 to 3% of otoplasty patients [12–18] and we believe that routine infiltration of ears with dilute epinephrine solution (1:200,000) followed by careful hemostasis could be prevented hematomas in our patients. Skin necrosis in otoplasty is probably a very rare event, and although mentioned as a possible problem, we found no actual reports of such complication. Despite the use of vasoconstrictor solution, careful skin dissection and the excellent blood flow to the ear may justify the absence of necrosis in our series [19].

As in other studies [20], late complications in techniques that shape ears with non-absorbable suture materials are mostly related to sutures. Handler et al. indicated advantages of monofilament sutures such as nylon or polypropylene because they are associated with lower extrusion rates compared to multifilament sutures, although there is such a risk, especially in patients with a slim posterior coverage [19]. We utilize nylon to shape ears in otoplasty because previous experience in literature and our service agrees with this data.

Prevalence of suture extrusion in our study was 6.3%, similar to the data obtained by other authors, with ranges from 0 to 22.2% [1,21]. Previous studies in which postauricular flaps were used to provide additional coverage to suture materials in otoplasty have mixed results. Irkoren et al. and Horlock et al. had no cases of extrusion of sutures in samples of 100 and 51 patients, respectively [8,9]. In contrast, Mandal et al. and Sinha et al. had suture extrusion in 7.3% and 2.64% of patients, respectively [22,23]. Extrusion of suture materials was treated by direct removal of such material in an outpatient setting under local anesthesia after a minimum of 180 postoperative days. This did not alter the aesthetic result previously achieved nor caused recurrence of prominence.

These controversial numbers regarding the effectiveness of adipofascial flaps in preventing late suture complications in otoplasty are indeed intriguing. All techniques describe a general concept of using postauricular flaps in otoplasty, however, flaps have notable differences among the studies [7,9,23,24].

Horlock et al. were the first to describe an adipofascial postauricular flap, which was sutured to the back of the helical rim without tension and eventual lateral excesses of flap were trimmed [8]. Ungarelli, utilized Horlock's technique, with the difference of not trimming any flap excesses [7]. Mandal et al. modified Horlock's technique in a way they anchored the flap to the posterior (lateral) skin flap, not to cartilage [22], and Sinha et al. also modified Horlock's technique so that anchoring of the flap was oblique, both to the back of the helix and the concha [23]. Irkoren's approach to the postauricular flap is different from Horlock (and variations) in a way they longitudinally split the flap and suture the halves together under tension [9].

Another possibly important characteristic to consider is suture material applied to fold cartilage. Horlock, Mandal, and Sinha utilized 4–0 braided polyethylene (Mersilene) [8,22,23], Ungarelli used 4–0 and 3–0 nylon [7], and Irkoren applied 4–0 nylon sutures to cartilage [9]. There is a report that polyethylene could lead to more granulomas and suture extrusion than nylon [24]. However, no further studies thoroughly compared suture materials in otoplasty.

It is unlikely that difference of prevalence of complications with suture materials could be due to patient follow-up time, which had a median of at least 11 months for the cited studies. Sinha's study is an exception because their study does not inform follow-up time [23]. However, they analyzed only patients who had complications, a fact that atones the lack of mention to patient follow-up time.

To us, this raises two interesting hypotheses: first, that inexistence of standardized steps in postauricular flap tailoring, positioning and anchoring may play a role in late suture complications; second, that the type of suture material might also affect these complications. Also, of all techniques cited, only Irkoren et al. performed abrasion of the scapha [9], but this variable is difficult to relate to suture problems with currently available data.

Our study adds the information of the prevalence of suture complications when a split postauricular flap similar to Irkoren's is not anchored, with a much higher incidence of granulomas and extrusions than when the flap is anchored to itself.

The technique of split postauricular flap was chosen because of its easy reproducibility, not significantly increase the operational time and the premise that a fascial layer between the skin and sutures could prevent complications. We chose not to anchor the flap at the end of the procedure because we believed that the sole variable of additional soft tissue was enough in order to adequately cover suture materials and prevent complications from such materials. Since we did not anchor the flap, we considered it a 'simplified' version of Irkoren's split postauricular flap.

With data from this study, we currently believe that anchoring the flap and possibly tightening it a little may be substantial technical steps whenever a surgeon utilizes postauricular flaps to prevent extrusion of sutures. Although, other uncontrolled variables (such as suture type and length of follow-up) may also play a role on these results.

Regarding pathological healing, Sinha et al. reported rate of 1.32% of keloids [23], while our study showed a rate of 1.4% of hypertrophic scars [14].

Our data did not indicate recurrence of prominent ears. Handler et al. showed a rate of recurrence in the literature from 6.5 to 12% [19], while for Irkoren et al., 1.5% of the patients enrolled in their study were operated again to improve ear symmetry [9]. In our study, no patient required surgical reintervention.

The use of the split postauricular fascial flap in otoplasty was considered easily reproducible. In this case series, this flap did not prevent or reduce late complications related to suture extrusion in otoplasty. It is possible that the absence of flap anchorage may have played a negative role in our results. Also, tightening the flap a little over suture materials may influence the effectiveness of this technique. We believe that these two technical steps may be necessary to prevent extrusion of sutures whenever the postauricular flap is used.

Disclosure statement

The authors report no conflicts of interest.

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