Effectiveness of Combined Technique for the Correction of Prominent Ears

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Abstract

Objective: Prominent ear is one of the most frequent congenital deformities of the ear. The major causes are often due to an underdeveloped antihelical fold, conchal hypertrophy, and a prominent ear lobule. More than 200 different techniques have been described so far. This report presents the effectiveness of a combined technique (Mustardé suture, Furnas suture, and conchal excision), which is frequently used in prominent ear treatment to prevent recurrence.

Material and Methods: Between 2014 and 2015, 18 patients with a mean age of 13.4 years were operated in our clinic. After preoperative measurements were taken to obtain the distance between the helix-mastoid and the angle between the concha-mastoid, patients with an enlarged concha were treated using three surgical techniques (Furnas suture, Mustardé suture, and conchal excision), whereas those who did not have a conchal enlargement were treated using two surgical techniques (Furnas suture and Mustardé suture). At 6 months postoperatively, the distance between the helix-mastoid and the angle between the concha-mastoid were measured as mentioned above, and the new measurements were compared with the preoperative findings.

Results: The desired esthetic results were achieved after the operation. The mean follow-up period was 10 months (range: 6–14 months). Compared with the preoperative findings, there was a statistically significant decrease in the concha-mastoid angle and in the helix-mastoid distance. Complications were not observed except in one patient who had a hematoma and in one patient who had asymmetry.

Conclusion: Asymmetry and recurrence are observed frequently after prominent ear treatment. Combined techniques appear to be effective in preventing recurrence and achieving ideal esthetic results.

Keywords: Prominent ear, combined techniques, posterior approach, recurrence

INTRODUCTION

Prominent ears are a congenital deformity of the head and neck area which is seen in approximately 5% of the general population.¹,² It is a deformity that can often lead to psychological disorders regardless of age and gender. Children with prominent ears can be often teased by their peers, bullied verbally or physically, and this can put them under social pressure. That being the case, otoplasty comes forth as the most frequent aesthetic procedure applied in childhood and adolescence, and the operation is often planned in preschool years.³

Although its etiology is not clear, neonatal position, muscle hypertonicity, collagen structural defects and possible genetic predispositions appear to be responsible of this type of deformity.¹ Concha hypertrophy, effacement of the antihelical fold, an excessively wide concha-mastoid angle, and protruded lobule, or any combination of these can be named among the characteristics of prominent ear deformity.⁴ A number of methods have been described in literature for the reconstruction of prominent ear deformities. These include, excision, cartilage folding and suturing, scoring, and repositioning the ear cartilage. Although a range of surgical techniques are being used, none is exclusively ideal in all patients. Identifying the extent and the causes of the deformity, and applying the proper technique are fundamental for achieving successful results.

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Surgical methods can be described under two main groups, namely, the cartilage incision technique and the cartilage sparing technique. Cutting the cartilage can lead to serious complications such as weakening of the cartilage, deformation caused by scar contraction, hematoma and asymmetry caused by wide surgical dissection. Today, cartilage-sparing techniques are more frequently used. These techniques, however, can also present some complications such as extrusion of the thread, granuloma formation along the suture line, recurrence of the deformity due to cartilage memory, or rupture of suture material.

In this article we present the results achieved by combining at least two techniques (concha-mastoid suture [Furnas], Mustardé suture) or at most three techniques (Furnas and Mustardé sutures, concha cartilage excision) and the complications that were encountered. The purpose of combining these surgical techniques was to prevent postoperative recurrence, reduce asymmetry and obviate complications.

MATERIAL AND METHODS

All patients were preoperatively informed about the planned surgical technique, their consent were obtained, and the study was conducted in line with the Declaration of Helsinki guidelines. Eighteen patients who applied to our clinic in 2014 and 2015 with prominent ear deformities were operated on for 35 ears. Ten of the patients were male and 8 were female with a median age of 13.4 (ranging from 8 to 18). In all cases, ear details were topographically observed, concha-mastoid angles and helix-mastoid distances were measured in local examinations. Conchal depth and lobule prominence were evaluated, and the operation was planned. Photographs of the patients were taken preoperatively, as well as postoperatively in the 1st week, and in the 1st and 6th months. In preoperative evaluation, mean concha-mastoid angle was measured 35.7° in the right ear and 35.3° in the left ear, while the mean helix-mastoid distance was measured 28 mm and 29.2 mm in the right and left ears respectively. Concha-mastoid angles and helix-mastoid distances were re-measured in the 6th postoperative month to calculate the statistical differences to preoperative values.

Statistical Analysis

Normality of the variables were analyzed using the Shapiro–Wilk test and statistical significance of the variances between preoperative and postoperative values were analyzed using a paired samples T-test. In all statistical comparisons, p-values lower than 0.05 were accepted as statistically significant.

SURGICAL TECHNIQUE

Except for one epileptic patient (age 8), all patients were operated on under local anesthesia. Following local anesthetic infiltration (1% Lidocaine and 1:200,000 adrenalin) into the planned incision line and the ear circumference, a 5-cm incision was made over the antihelix root to create a subcutaneous tunnel along the cartilage up to the superior crus. The frontal antihelix was weakened using cartilage abraders. Then, with an incision of about 3 cm over the skin behind the ear, both the skin and soft tissue were elevated from the subperichondrial plane to the distal scapha and to the proximal mastoid bone (Figure 1).

Except for the three patients whose conchal depths were less than 15 mm, the concha was excised at varying depths (mean 15 x 5 cm). Then one concha-mastoid suture (Furnas) was used to reduce the conchal depth and to narrow the concha-mastoid angle. The patency of the external auditory canal was assessed before performing this procedure. The helical fold was reshaped and three Mustardé-type sutures were placed between the concha and the scapha to accentuate the antihelix (Figure 2). Helical symmetry was ensured and reconstruction was sufficiently performed to evenly level the helix and the antihelix folds. In all cases, 3/0 circle taper point polypropylene thread was used to suture after reshaping and repositioning. The skin was sutured using 5/0 polyglactin thread. Skin excision was not used in any of the cases. All ears were closed with vaseline dressing and cotton gauze. All patients were prescribed 375 mg sulbactam ampicillin (p.o.) BID for 5 days. Wounds were redressed on the 1st and 5th postoperative days. Patients were recommended to wear elastic bands to protect the shape of the ears for the next 6 weeks after the stitches were removed.

RESULTS

Patients were reevaluated postoperatively in the 1st week, and in the 1st and 6th months. All patients were followed-up on for an average of 10 months (6 to 14 months) and all patients were evaluated in regard of recurrence and asymmetry. In one patient, hematoma was observed on the 1st postoperative day and drained under local anesthesia before leading to deformity. In one patient, asymmetry was observed and corrected in the 2nd postoperative week with a single Mustardé stitch under local anesthesia. Neither necrosis nor infection was encountered in any of the patients. In the 6th postoperative month, mean concha-mastoid angle was measured 18.8° in the right ear and 20.42° in the left ear, while the mean helix-mastoid distance was measured 14.7 mm and 14.3 mm in the right and left ears respectively. Compared to preoperative

![Figure 1. a, b. Opening a tunnel along the antihelix using a 5-mm incision with an anterior approach (a), the 3-cm posterior incision and borders of dissection (b)](image-url)
measurements, statistically significant differences were found with respect to the concha-mastoid angles and helix-mastoid distances ($p<0.005$) (Table I). Hypertrophic scarring or keloid formation did not occur in any of the patients during the postoperative follow-up period. Desired outcomes were achieved in all of the patients (Figures 3 and 4).

**DISCUSSION**

Prominent ear incidences have been demonstrated to be 5% and familial history incidences to be 8%.1,2 It is a deformity that needs to be corrected since it can give rise to psycho-social traumas especially in childhood years. Anatomic disorders of the prominent ear are effacement of the anti-helical fold, an overdeveloped or deep concha, a wide auricular cephalic angle, inadequate helical rim and lobule abnormalities. The surgical procedure should cause minimal complication and attain the goal of satisfying the patient.

The first otoplasty was performed in 1881 by Ely8 who performed and published a technique using an anterior approach. The posterior approach was published by Marestin in 1903 and recognized as the standard approach. More than 170 techniques have been described after this date.9 While the rigidity and protrusion of the ear cartilage, the extent of its prominence vary across patient profiles, employing simply one technique falls short of satisfying the purpose of the surgery.

Early studies have envisaged reconstruction by cutting the cartilage using an open anterior approach. This, however, have been found to result in a sharp-edged antihelix and contour deformities.10 Techniques that spare the cartilage eventually became more popular in newer studies. In this study, the deformity was corrected by weakening the cartilage and using Mustardé11 and Furnas12 sutures, hence the cartilage remained unharmed. The closed anterior scoring technique using posterior approach was described by Stenström and
modified by Yugueros.13 In our study, however, considering that the cartilage could fracture and a potential hematoma compartment shift could occur causing damage to the anterior auricular skin, an occult incision over the antihelix root was made and the cartilage was weakened through a tunnel. Because of cartilage memory Brenda suggests further correction after placing the Mustardé sutures.14 In our study, further corrections were performed on all of the patients. Weinzweig15 has shown that 6-week stability of the cartilage will suffice to prevent recurrence. Therefore, all patients were recommended to wear headbands for 6 weeks after the surgery.

In Converse’s series involving the posterior approach in 292 cases, hematoma is reported at a rate of 0.8%, hypertrophic scarring at 0.7%, cellulitis at 1.2%, and chondritis at 0.7%.16 Pilz17 reports the rate at which hypertrophic scarring and keloid formation are seen after the reconstruction of prominent ears to range from 0.2% to 1%. In our study, infection or skin necrosis was not seen in any of our patients. Hematoma was encountered in only one patient and drained under local anesthesia. Hypertrophic scarring or keloid formation did not occur in any of our patients during the follow-up period.

There seems to be no consensus in the literature on the necessity of skin excision. Skin excision has been performed in some studies18 and not in others19. In our study, since we observed that the excessive skin tissue that formed after the reconstruction had settled in all cases, we did not find it necessary to perform skin excision in any of our patients.

Recurrence of the prominent ear deformity constitutes a troublesome outcome for both the patient and the surgeon. Recurrent procedures give rise to loss of both time and money. In our study, minimum two and maximum three surgical techniques were applied to each of the patients. The absence of any recurrences and the high patient satisfaction revealed in postoperative assessment demonstrates the efficacy of using combined techniques in prominent ear reconstruction procedures.

CONCLUSION

When choosing the proper surgical technique, it is recommended to consider that combined techniques provide higher efficacy than a single technique, as well as lower complication rates. This will help to achieve lower recurrence rates and enable higher patient satisfaction.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki “Ethical Principles for Medical Research Involving Human Subjects”, (amended in October 2013).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.


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