Minimally Invasive Technique for Correction of Prominent Ear

Ahmed Abdelmoneim Teaima, Mohammed Saad Hasaballah, Ossama Mustafa Mady

Department of Otorhinolaryngology, Ain Shams University Faculty of Medicine, Cairo, Egypt

OBJECTIVES: Prominent ear is not an uncommon deformity with 5% prevalence in population worldwide. Although there is no physiological handicap in this deformity, it affects the psychology and social integration, especially in children. Many surgical techniques are performed to correct this deformity. In this study, we illustrate a minimally invasive technique in cases of prominent ear and evaluate its efficacy.

MATERIALS and METHODS: A total of 16 patients were operated by incisionless otoplasty in both ears simultaneously. Therefore, 32 ears were included in the study. Postoperative follow-up was carried out for 6 months to determine the efficacy of this technique, complications, and recurrence of the abnormal shape.

RESULTS: Two ears (2/32) were presented with slight protrusion three months postoperatively. Three ears had postoperatively exposed sutures that needed to be embedded again under local anesthesia. The satisfaction rate was found to be 88% by the visual analog scale. No perichondritis or other complications occurred postoperatively. The technique results in correction of the deformity without any visible evidence of surgery.

CONCLUSION: This technique is effective and safe for correction of prominent ear with negligible rate of complications and rapid recovery time.

KEYWORDS: Ear, auricle, deformity, technique

INTRODUCTION
Prominent ear is not an uncommon deformity. It affects about 5% of the population [1]. It is presented by the absence of the antihelix and deep concha with increase in auriculomastoid angle [2]. Therefore, the goals of its correction involve the formation of the antihelix and reduction of the concha [3]. Many surgical procedures and techniques were developed to correct this deformity, but the outcome, recurrence, and results remain unsatisfactory [4]. An ideal technique is still missing. In this study, we present our case series of minimally invasive technique for the correction of prominent ear and we think it may be the best in comparison with other techniques.

MATERIALS AND METHODS
This study was conducted in our otorhinolaryngology department from January 2017 to August 2018. Sixteen patients were included. The age of the patients was between 8 and 33 years (15.31±6.3); 11 were males and 5 were females. Both ears were operated simultaneously; therefore, a total of 32 ears were operated. The operation time was about 50±13 minutes. There was no need for dressing or hospitalization postoperatively. The patients can return to work on the second day of surgery. They were followed up for 6 months postoperatively to see the results.

Technique
The technique is performed under general anesthesia; it can also be performed under local anesthesia especially in cooperative patients. We mark the site of anchoring sutures in the head surface of the auricle using a blue marker pen. Each auricle must have three anchoring remodeling sutures. The sites of the three sutures are marked by pushing the auricle medially against the skull.

The first suture is placed in the area of anterior helix to create a reasonable superior root of the antihelix. The second suture is placed in the upper part of the antihelix main stem. The third suture is placed in the lower part of the expected antihelix just above
the lobule and antitragus. Then, a local injection of saline adrenaline 1:100,000 is administered in both surfaces of the auricle.

Each suture passes through four points:
Point A, back of the concha
Point B, back of the concha 1 cm from point A
Point C, back of the scaphoid 1 cm from point B
Point D, back of the scaphoid 1 cm from point C

By using the tip of a surgical blade knife 15, we start to make about 1-mm incisions in the four points, especially entrance A, as it must be wider to embed the final suture inside it (Figure 1).

By using a small-tapered scissor passing through point A, we separate the skin from the underlying perichondrium between the four points.

We pass a curved needle of nonabsorbable 4/0 PROLENE® (Polypropylene sutures, Ethicon Inc, Bridgewater, New Jersey, United States of America) from point A to point B passing through the cartilage of the auricle, but we take care not to pass through the opposite surface of the auricle. We then pass the needle from point B to point C subcutaneously not passing through the cartilage. Then, we pass the needle from point C to point D through the cartilage. Finally, we return the needle from point D to point A subcutaneously not passing through the cartilage (Figure 2).

The entry and exit are through point A, and the thread is looped between the four points and is completely nonvisibly embedded. We ligated the suture several times (so that the tension of the suture will not be lost over time) and completely embedded it nonvisibly. We adjust the tension of the ligature as needed, and overcorrection is suggested because some relaxation may occur later in the tension of the suture during the first 3 months after surgery.

RESULTS

The patients were followed up for 6 months. There was no postoperative hematoma or extrusion of sutures. Three suture knots (at point A) protruded from the incision at 10 and 14 days postoperatively. We embedded them again under local anesthesia in the clinic. There was no perichondritis or granuloma formation during follow-up.

Protrusion is assessed by the distance between the mastoid and the most prominent point on the helix. When this distance is >25 mm, the ear is considered prominent. Therefore, we measured all cases postoperatively, and only two patients had prominent ears; the protrusion distances 3 months after the operation were 26 and 28 mm (slight protrusion) and needed reoperation. Tightening of the sutures was performed. Table 1 shows the preoperative and 3-month postoperative protrusion. The preoperative protrusion distance was 28.625±2.07 mm, and the 3-month postoperative protrusion distance was 18.094±2.97 mm.

Almost all the patients, except two, were satisfied after the operation according to the visual analog scale.

DISCUSSION

Prominent ear is not an uncommon deformity with 5% prevalence in population. Although there is no physiological handicap in this deformity, it affects the psychology and social integration, especially in children. Therefore, surgery is usually required at even a younger age [1, 5]. Since the surgery was first performed by Diefenbach in 1845, many surgical techniques have been developed to correct this deformity. More than 200 techniques are in use for the correction of prominent ears, including the percutaneous technique, cartilage sparing, cartilage splitting, perichondroplasty, and incisionless and endoscopic techniques. The availability of various techniques suggests that there is no single globally accepted and ideal procedure [3, 4].

**MAIN POINTS**

- This surgical technique is minimal invasive, effective, safe.
- It is cartilage sparing technique.
- Three anchoring sutures is required for each auricle.
- Sutures are embedded and nonvisible.
The incisionless technique is not completely new. It has been used for decades, including anterior scoring and suture percutaneously. Peled et al. [6] defined the technique for the antihelix, where Fritsch illustrated concho-mastoid and lobe sutures.

In our study, the mean age of the patients was 15 years. There were 11 males and 5 females. There are variations in the literature regarding the age of operation and sex according to each country because the aesthetic complaint is the main indication for surgery. In the literature, the mean age of patients ranges from 7 to 38 years, and 35% to 70% are female patients, and this percentage increases after the age of 20 years [7].

The incisionless technique we are using is safe and easy to perform. It has less complications than other techniques described in the literature. It provides good results with natural appearance, and there is no need for dressing or bandage or hospitalization. Only 2 of the 32 (6.2%) ears had a slight protrusion and needed reoperation to just increase the suture tension. Three ears developed exposure of the suture knot, which were embedded again under local anesthesia in the clinic. There were no perichondritis or hematoma or other complications. Among the 16 patients, 14 were satisfied (88% satisfaction rate).

After analyzing the data of 3,493 patients in the literature who underwent otoplasty for prominent ear, Sadhra et al. [8] stated that the hematoma incidence ranges from 1.4% to 3.8%, infection from 0.4% to 1.3%, wound problems from 1.4% to 5.1%, suture problems from 0.8% to 2.6%, pain from 5.4% to 23%, and revision surgery from 2.9% to 7.7%

Regarding postoperative complications, Punj et al. [9] stated that bleeding occurred in 2.2%, wound infection in 0.9%, and recurrence rate in 10% in Chongchet technique and 2.9% in Mustarde technique. Both the techniques may need antiemetics (3.2% to 14.3%) and opioid analgesics (30% to 35%) postoperatively.

Smittenberg et al. [10] reported a high percentage of complications in cartilage cutting. It was about 20%, of which 7% needed reoperation. Maricevitch et al. [11] reported a complication rate of 12.8%. Valentines stated that the complication rate is about 10%, and that 10% of these complications needed reoperation [12].

CONCLUSION
This technique is effective and safe for correction of prominent ear with negligible rate of complications and rapid recovery time.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Ain Shams University School of Medicine.

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

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – M.H.; Design – A.T.; Supervision – M.H.; Resource – A.T., O.M.; Materials – M.H., O.M.; Data Collection and/or Processing – A.T., M.H.; Analysis and/or Interpretation – M.H., O.M.; Literature Search – A.T., O.M.; Writing – A.T., M.H.; Critical Reviews – M.H., O.M.

Conflict of Interest: The authors have no conflict of interest to disclose.

Financial Disclosure: The authors have no financial sponsorship to disclose.

REFERENCES
1. Songu M, Kutlu A. Health-related quality of life outcome of children with prominent ears after otoplasty. Eur Arch Otorhinolaryngol 2014; 271: 1829-32. [Crossref]
2. Ahmed M, Alkhalaf H, Ibrahim E. Helix free otoplasty for correction of prominent ear. Asian J Surg 2019; 42: 621-7. [Crossref]
3. Cihandide E, Kayiran O, Aydin E, Uzunismail A. A new approach for the correction of prominent ear deformity: the distally based peri-chondrio-adipo-dermal flap technique. J Craniofac Surg 2016; 27: 892-97. [Crossref]

4. Gualdi A, Daniel J, Gatti J, Wurzer P, Slijivich M, Scherer SS, et al. Double triangular cartilage excision otoplasty. Plast Reconstr Surg 2018; 141: 348-56. [Crossref]

5. Kotler H, Robertson K, Tardy M. Pre and postoperative management in otoplasty. Facial Plast Surg 1995; 10: 244-54. [Crossref]

6. Fritsch M. Incisionless otoplasty. Otolaryngol Clin North Am 2009; 42: 1199-208. [Crossref]

7. Kajosaari L, Pennanen J, Klockars T. Otoplasty for prominent ears - demographics and surgical timing in different populations. Int J Pediatr Otorhinolaryngol 2017; 100: 52-56. [Crossref]

8. Sadhra S, Motahariasi S, Hardwicke J. Complications after prominent ear correction: A systematic review of the literature. J Plast Reconstr Aesthet Surg 2017; 70: 1083-90. [Crossref]

9. Punj P, Chong HP, Cundy TP, Lodge M, Woods R. Otoplasty techniques in children: a comparative study of outcomes. ANZ J Surg 2018; 88: 1071-5. [Crossref]

10. Smittenberg M, Marsman M, Veeger NUGM, Moutes CM. Comparison of cartilage-scoring and cartilage-sparing otoplasty: a retrospective analysis of complications and aesthetic outcome of 1060 ears. Plast Reconstr Surg 2018; 141: 500-06. [Crossref]

11. Maricevich P, de Amorim NFG, Duprat R, Freitas F, Pitanguy I. Island technique for prominent ears: an update of the Ivo Pitanguy clinic experience. Aesthetic Surg J 2011; 31: 623-33. [Crossref]

12. Valente A. Separating the helix from the antihelix: a new concept in prominent ear correction. Aesthetic Surg J 2010; 30:139-53. [Crossref]