

Combined Mustardé and Furnas type otoplasty: the experience of 85 patients

Kombine Mustardé ve Furnas tipi otoplastisi: 85 hastalık deneyim

Murat Songu^{1,2}

¹Department of Otorhinolaryngology, Dr. Behçet Uz Children's Hospital, İzmir, Turkey

²Department of Otorhinolaryngology, İzmir Katip Çelebi University Atatürk Training and Research Hospital, İzmir, Turkey

Abstract

Objective: To present combined technique (Mustardé and Furnas otoplasty) experience and to analyze the cosmetic results achieved and the incidence of complications and their management in otoplasty surgery.

Methods: A retrospective study was performed within the clinical databases for patients who had undergone combined Mustardé and Furnas otoplasty procedure. A total of 147 patients with protruding ears underwent otoplasty procedure from March 2008 and November 2012. Eighty-five of these 147 patients were operated with combined Mustardé and Furnas otoplasty procedure and met the eligibility criteria for the study. Data were tabulated and analyzed in regard to age, sex, method of otoplasty, side involved, and complications.

Results: Seventy-one patients underwent bilateral procedures and 14, unilateral, for a total of 156 ears reconstructed. One patient developed keloids treated with excision, and combination of topical and injected steroids. Suture extrusion, the most frequent but the most minor complication, was noted in eight ears. All extruded sutures were removed while the patient was under local anesthesia, and none of these patients required any additional procedures. Undercorrection was noted in seven ears which led to secondary correction.

Conclusion: The combined Mustardé and Furnas type otoplasty technique is a simple and safe procedure that does not cause anterior scarring or skin necrosis. In addition, the reconstructed ear shows reliable results in firmness and stability against external force or trauma.

Key words: Otoplasty, pinnaplasty, protruding ear, bat ear.

Özet

Amaç: Çalışmamızın amacı otoplasti cerrahisinde kombine teknik (Mustardé ve Furnas otoplastisi) deneyimimizi sunmak, elde edilen kozmetik sonuçların, komplikasyonlar ve tedavi insidansını incelemektir.

Yöntem: Kombine Mustardé ve Furnas otoplasti prosedürü geçirmiş hastaların klinik veri tabanları içinde bir retrospektif çalışma uygulanmıştır. Keççe kulakları olan toplam 147 hasta, 2008 Martıyla Kasım 2012 arasında otoplasti prosedüründen geçmiştir. Bu 147 hastanın 85'i kombine Mustardé ve Furnas otoplastisi amaliyatı olmuş ve çalışmaya uygunluk kriterlerini karşılamıştır. Veriler tablo haline getirilmiş, yaş, cinsiyet, otoplasti yöntem, etkilenen bölge ve komplikasyon açısından analiz edilmiştir.

Bulgular: Yetmiş bir hasta çift ve 14'ü tek taraflı prosedürlerden geçirilmiş ve toplam 156 kulağın rekonstrüksiyonu yapılmıştır. Bir hastada ekzisyon ve topikal ve enjektabl steroidlerle tedavi edilen keloidler gelişmiştir. Sekiz kulakta en sık görülen, ancak en minör komplikasyon olan sütür ekstrüzyonu dikkat çekmiştir. Bu dışarı atılan sütürlerin tümü lokal anestezi altında çıkartılmış ve bu hastaların hiçbiri herhangi bir ek prosedüre gerek göstermemiştir. Yedi kulağın yeterince düzellemediği dikkat çekmiş ve ikinci bir düzeltme prosedürünün uygulanmasına yol açılmıştır.

Sonuç: Kombine Mustardé ve Furnas tipi otoplasti tekniği basit ve güvenli prosedür olup kulak ön yüzünde nedbeleşme ve cilt nekrozuna neden olmamaktadır. İlaveten, yeniden yapılandırılan kulak, dış güç ve travmaya karşı sağlamlık ve stabilite açısından güvenli sonuçlar göstermektedir.

Anahtar sözcükler: Otoplasti, pinnaplasti, keççe kulak, yarasa kulak.

Prominent ears are the most common congenital deformity in the head and neck region, with an incidence described for Caucasians of about 5 percent (for microtia, the incidence is 0.01 percent).^[1] Prominent ears are usually not associated

with other abnormalities or syndromes but may be considered an aesthetic handicap.^[2] The forces governing the development of this deformity are unknown, and only 8 percent of patients with this condition have some family history of it.^[3,4]

Correspondence: Murat Songu, MD. Department of Otorhinolaryngology, Tepecik Training and Research Hospital, Gaziler Caddesi, No: 468, Yenışehir, İzmir, Turkey.
e-mail: songumurat@yahoo.com

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In the 1960s, Mustardé used permanent retention mattress sutures in a combined technique with a fusiform skin excision to recreate the antihelical fold.^[5] By its simplicity and good results obtained, this procedure has become a wide-spread application, especially with regard to the delicate form of the antihelix. In 1968, Furnas described a procedure based on Miller's technique (which was further developed by Owens and Delgado), which consisted of securing the concha to the mastoid periosteum posteriorly, thereby decreasing the concha-scapoid angle.^[6]

The aim of the present report was to present the author's combination-technique (combined Mustardé and Furnas otoplasty) experience and to analyze the cosmetic results achieved and the incidence of complications and their management.

Materials and Methods

Study Design

A retrospective study was performed within the clinical database of Dr. Behçet Uz Children's Hospital and İzmir Katip Çelebi University Atatürk Training and Research Hospital for patients who had undergone combined Mustardé and Furnas otoplasty procedure. A total of 147 patients with protruding ears underwent otoplasty procedure between March 2008 and November 2012. Written informed consent was obtained from all subjects, a legal surrogate, the parents or legal guardians. Persons with incomplete data or who required cosmetic otoplasty for correction of large, protruding "lop" or "cup" ears, revision cases, and patients followed-up less than one year were excluded from the study.

Eighty-five of these 147 patients were operated with combined Mustardé and Furnas otoplasty procedure and met the eligibility criteria for the study. All procedures were performed by the author. Data were tabulated and analyzed in regard to age, sex, method of otoplasty, side involved, and complications.

Surgical Technique

The hair is covered with a standard head bandage along the hairline. Surgical draping with Tegaderm® (3M Health Care, St. Paul, MN) keeps the hair out of the surgical field (Fig. 1). Drapes are so placed as both ears are simultaneously on view providing intraoperative comparison to obtain optimal symmetry. The procedure begins on the side affected more severely. The posterior auricular skin and mastoid soft tissues are infiltrated subcutaneously with 1% lidocaine HCl and 1:100,000 epinephrine solution. The estimated skin excision on the posterior surface of the ear can be done safely with the narrowest width at

the middle third to avoid "telephone ear" deformity. Hemostasis is meticulously maintained and dissection is developed peripherally to the free edge of the helix and posteriorly to the level of the mastoid bone. The bulky postauricular soft tissue, auricularis posterior muscle fibers, and fibrofatty tissues are cleanly excised off the perichondrium (Fig. 2). Creation of a deep, mastoid pocket accommodates the repositioned conchal cup, facilitates posterior rotation of the concha, removes the postauricu-

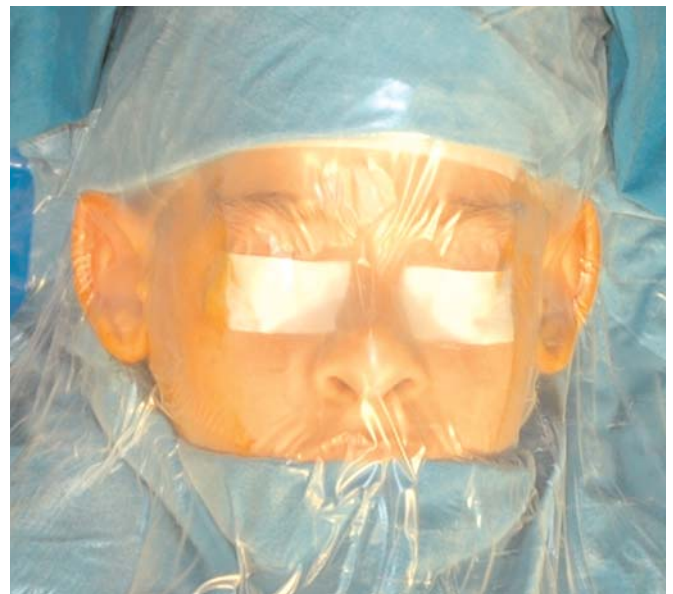


Fig. 1. Surgical draping shows both ears simultaneously on view providing intraoperative comparison.

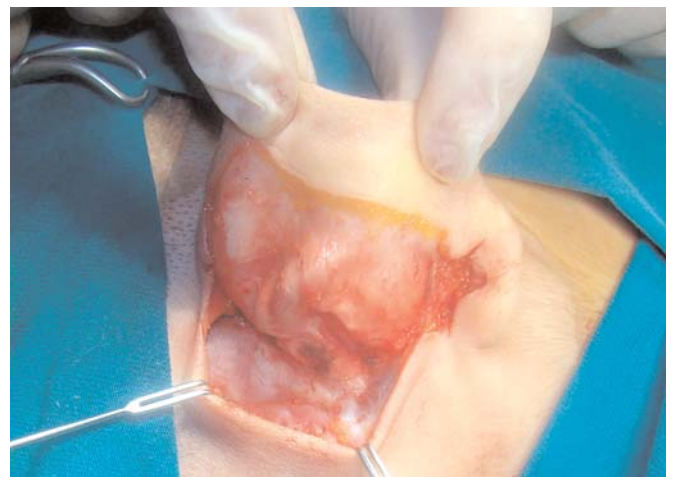


Fig. 2. The bulky postauricular soft tissue, auricularis posterior muscle fibers, and fibrofatty tissues excised.

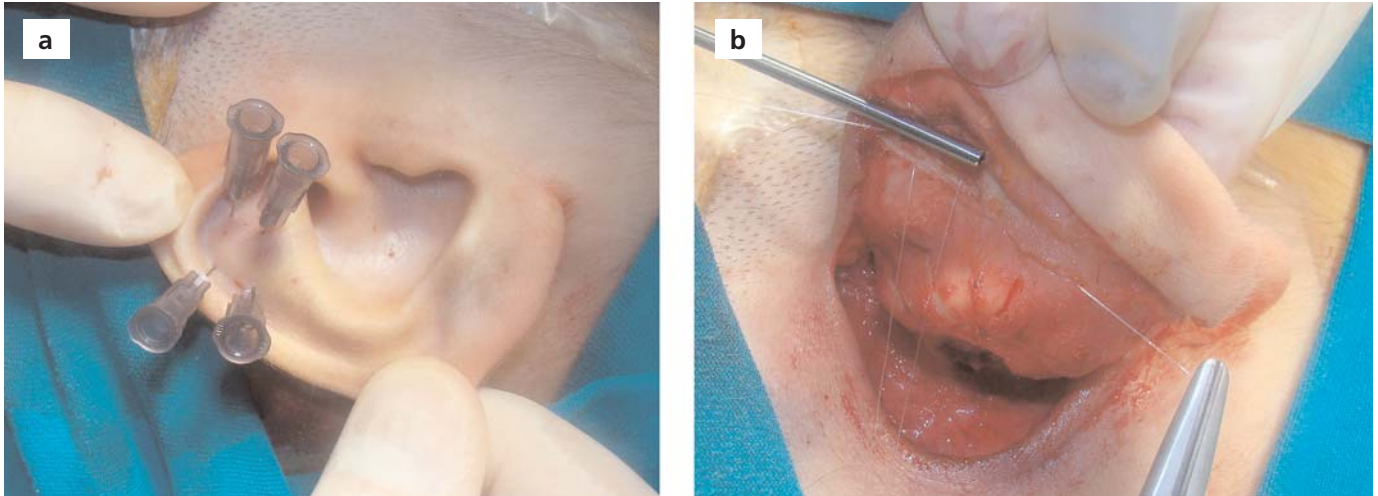


Fig. 3. Dental needles marking the lines of antihelical sutures **(a)**, and placing the Mustardé sutures **(b)**.

lar tissues that may act as a lever producing excessive prominence and enhances the setback by effectively reducing conchal height. The cartilage under the desired fold is marked by inserting dental needles at two or three points from anterior to posterior fashion (Fig. 3a). Treatment of the antihelix is done via two to four precisely placed Mustardé-type horizontal mattress sutures with 4-0 colorless coated braided polyester suture (Surgibond®, Ethicon Inc., Boston, MA, USA) (Fig. 3b). When the antihelical position is set, the authors use three Furnas-type horizontal mattress sutures to secure the concha with the same suture material (Figs. 4a and b). The final lobule positioning can generally be accomplished with re-sectioning the

skin posteriorly. Posterior lobule skin and fibrofatty tissue can be excised in a V-shape, heart shape, and eccentric elliptical patterns producing the desired setback.

Upon completion of the procedure the wounds are carefully cleansed and dressed with greasy gauzes soaked in Bepanthen Plus® (50 mg dekspantenol, 5 mg chlorhexidine HCl). It is extremely important that the greasy gauze be carefully molded to fit the new folds and contours of the ear and to gently pad the postauricular surface (Fig. 5). The dressing is removed on the first postoperative day to inspect the ears. This facilitates early identification of complications such as skin ischemia or early hematoma

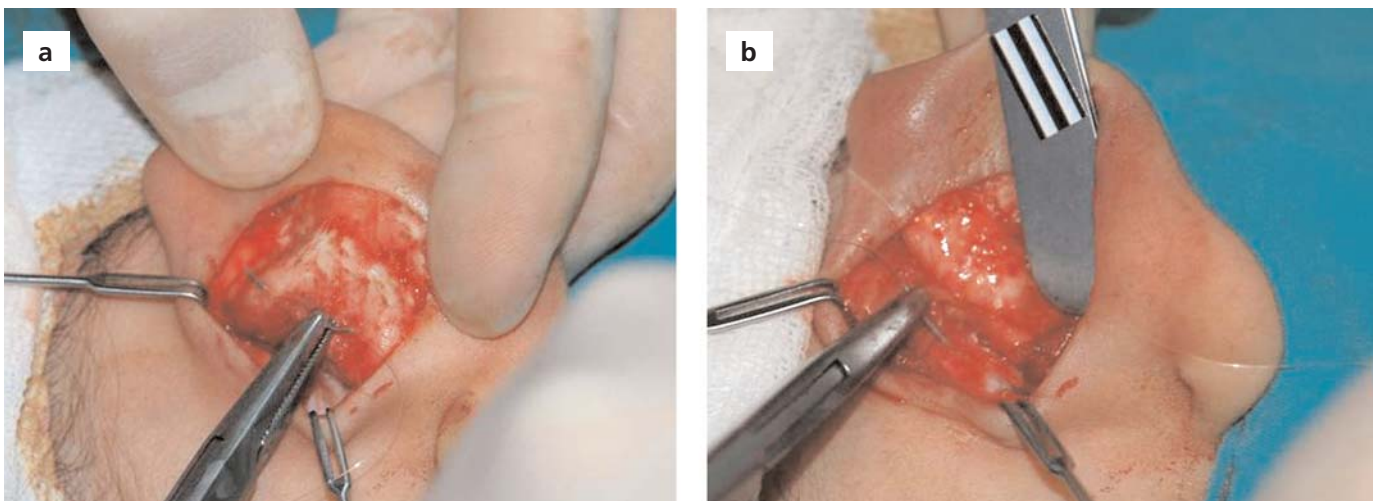


Fig. 4. Furnas-type horizontal mattress sutures from concha **(a)** to mastoid periost **(b)**.

formation. A slightly lighter dressing is placed and is changed every other day for a further 10 days. After removal of the dressings, patients are instructed to wear a headband nightly for one month to prevent inadvertent nocturnal trauma (Figs. 6a and b).

Results

Seventy-one patients underwent bilateral procedures and 14 unilateral, for a total of 156 ears reconstructed. Of the 85 patients (46 males, 39 females) whose charts were reviewed, the mean was 16.4 ± 9.3 (range: 4 to 42) years.

Major complications were defined as a large hematoma requiring evacuation, tissue necrosis, wound separation, gross cosmetic deformity, or a significant wound infection requiring intravenous antibiotics and/or incision and drainage. One patient in the current study developed keloids treated with excision, and combination of topical and injected steroids. There were no other major complications in this study.

Minor complications included suture extrusion, hypertrophic scarring, irritation, hypesthesia, and persistent or recurrent protrusion of the auricle. Suture extrusion, the most frequent but the most minor complication, was noted in eight ears. All extruded sutures were removed while the patient was under local anesthesia, and none of these patients required any additional procedures to correct loss



Fig. 5. The wounds are dressed with greasy gauzes to fit the new folds and contours of the ear.

of the initial good correction, because it did not occur. Undercorrection was noted in seven ears which led to secondary correction. Four ears had slight recurrence of the superior pole prominence, which was corrected by simple postauricular skin excision under local anesthesia. Three ears required replacement of one or more sutures under general anesthesia for recurrent deformities.

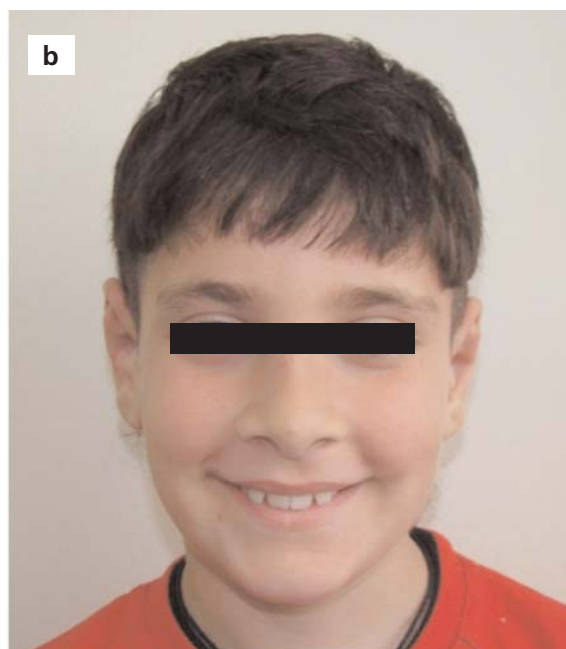


Fig. 6. Pre- (a), and postoperative (b) views of a 14-year old boy [Published with kind permission of the parent of the patient].

Discussion

The anatomical basis for the auricular deformities observed in prominent, protruding, or lop ears can usually be attributed to a weak antihelical fold, a deep conchal bowl, or a combination of the two. While some of the earliest otoplasty techniques focused on reducing the distance between the auricle and scalp by excising soft tissue, Luckett is believed to have first recognized the importance of an absent or weak antihelix in the formation of the deformity.^[7] Later methods thus tended to focus on reestablishing an antihelical fold through suturing or cartilage-scoring procedures. The most widely used suture technique was developed by Mustardé in the early 1960s.^[5] A postauricular approach is used to achieve adequate exposure of the cartilaginous framework just above the posterior perichondrium. Next, 3 to 4 horizontal mattress sutures are placed at specific locations to recreate the antihelix.^[8] From the posterior surface, each stitch should pass through the cartilage and anterior perichondrium, avoiding the anterior dermal and epidermal layer. Precise suture location is paramount to achieve a permanent, natural result without risk of extrusion, buckling, or auricular reprotrusion. Bull and Mustardé recommended outer cartilage bites of 1 cm, with each being 2 mm apart, and a 16-mm separation between outer and inner cartilage bites.^[9] While some authors advocate using a Mersilene™ suture for this technique, Bull and Mustardé preferred natural white silk material that could be cut close to the knot.^[5,9,10] When used properly, the Mustardé suture technique can be a reliable method in properly selected patients. In a review of his 25-year experience with the procedure, Bull concluded that it “continues to give good results,” with a low incidence of suture extrusion.^[10] Despite meticulous technique, Bull still found recurrence of the auricular deformity in approximately 7% of patients.^[10] In those less experienced with the method, improper suture placement can lead to an even higher incidence of reprotrusion. Especially in patients with strong, thick cartilage, many surgeons have realized that cartilage-weakening procedures would have to be added to break the cartilage’s spring and inherent memory and help achieve good long-term results.^[8] The conchal setback technique was described by Furnas in the late 1960s and involves the use of permanent sutures to narrow a large space between the concha and mastoid process.^[6] As this method does not address the antihelix, it was advocated by Furnas “when excessive cupping of the concha is the only cause for prominence of an ear.” Small ellipses of skin are removed from the postauricular surface and mastoid, and three or more permanent sutures are then passed

between the conchal cartilage and deep mastoid fascia and periosteum. The ear is subsequently drawn posteriorly and medially by tightening of the stitches. The conchal setback is an effective maneuver in the appropriate patient, but proper suture location is imperative or impingement of the external auditory canal may result.^[6]

In contrast to the anterior approach, the suture otoplasty from the posterior approach causes some effacement of the postauricular sulcus and leaves a scar that is longer and often less refined than the anterior conchal scars. However, these flaws are hidden from view. It provides precision, symmetry, and quality results, and only requires a brief recovery time.^[11] However, there is a higher possibility of keloids due to the thick skin and subcutaneous tissue compared with the anterior surface of the auricle. One patient in the current study developed keloids treated with excision, and combination of topical and injected steroids.

A higher incidence of recurrence is seen with absorbable sutures, poor cartilage purchase, and too few sutures. Residual cartilage spring and stiffness also cause trouble.^[1,2] The incidence of recurrence is lowered by using permanent sutures placed carefully through the cartilage. We prefer a colorless coated braided polyester suture to avoid dark suture material that can be visible beneath the thin cover of the ear. Plus, a non-cutting round-type needle, instead of a cutting-type needle, is used to prevent any tearing of the cartilage. In the present study, recurrence was noted in seven ears, which led to secondary correction.

The possibility of late postauricular skin thinning with the surfacing or near-surfacing of the sutures from the concha to the scapha is a distinct disadvantage of the Mustardé technique and any of its modified procedures.^[5,9,10] In the present study, suture extrusions developed in eight ears. However, the extruded sutures were removed, and there was no effect on the ear position because the newly formed cartilage was already positioned.

Surgical experiment in otoplasty surgery is much more important than other surgeries. Complications such as bleeding, infection, renewal of the inappropriate shape and deformity were encountered in 20% with inexperienced surgeons and 9% with experienced surgeons.^[12] This study also found that 73.4% of unpredictable results were due to insufficient planning before surgery and 26.6% due to poor surgical technique.^[12] In our study, the major complication rate was 0.6% (1/156 ears), and the minor complication rate was determined as 10.3% (16/156). Revision surgery was required in eight ears, one due to keloids and seven due to recurrence (5.1%).

The main limitation of our study was the retrospective design of our series. Secondly, some details of history and factors that may influence the outcome may not be completely documented. Due to these restrictions, associations should be interpreted with caution.

Conclusion

In conclusion, the combined Mustardé and Furnas type otoplasty technique is a simple and safe procedure that does not cause anterior scarring or skin necrosis. In addition, the reconstructed ear shows reliable results in firmness and stability against external force or trauma. Plus, sharp cartilaginous ridges and a narrow roll can be avoided.

Conflict of Interest: No conflicts declared.

References

1. Songu M. The surgical technique of otoplasty. In: Hathiram BT, Khattar VS, editors. The international atlas of operative ENT and head & neck surgery. New Delhi: Jaypee; 2013. p. 3-21.
2. Songu M. Négrevergne otoplasty technique. In: Shiffman MA, editor. Advanced cosmetic otoplasty: art, science, and new clinical techniques. Berlin: Springer; 2013. p. 149-62.
3. Songu M, Adibelli H. Otoplasty in children younger than five years of age. *Int J Pediatr Otorhinolaryngol* 2010;74:292-6.
4. Songu M, Negrevergne M, Portmann D. Négrevergne otoplasty technique. *Ann Otol Rhinol Laryngol* 2010;119:27-31.
5. Mustarde JC. Correction of prominent ears using simple mattress sutures. *Br J Plast Surg* 1963;16:170-8.
6. Furnas DW. Correction of prominent ears by concha-mastoid sutures. *Plast Reconstr Surg* 1968;42:189-93.
7. Lockett W. A new operation for prominent ears based on the anatomy of the deformity. *Surg Gynecol Obstet* 1910;10:635-7.
8. Nachlas NE. Otoplasty. In: Papel ID, editor. Facial plastic and reconstructive surgery. 2nd ed. New York, NY: Thieme; 2002. p. 309-21.
9. Bull TR, Mustarde JC. Mustarde technique in otoplasty. *Facial Plast Surg* 1985;2:101-7.
10. Bull TR. Otoplasty: Mustarde technique. *Facial Plast Surg* 1994; 10:267-76.
11. Converse SM, Wood-Smith D. Corrective and reconstructive surgery in deformities of the auricle. In: Paparella MM, Shumrick DA, editors. Otolaryngology. Vol 3. Philadelphia: WB Saunders; 1973: p. 500-27.
12. Calder CJ, Naasan A. Morbidity of otoplasty: a review of 562 consecutive cases. *Br J Plast Surg* 1994;47:170-4.

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