

## Modified Mustarde Otoplasty in Pediatric Patients: No Cartilage Scoring External Technique

TAREK G. SHOUKR, M.D.; KAREEM ALSHARKAWY, M.D.; MOHAMED M. KHEDR, M.D.; SHERIF A. HANTASH, M.D. and SAMEH ELGHAMRY, M.D.

*The Department of Plastic and Reconstructive Surgery, Faculty of Medicine, Tanta University, Tanta, Egypt*

### ABSTRACT

**Background:** Prominent ears are common encounter in the surgical practice. Generally speaking, current otoplasty techniques can be categorized into cartilage sparing and cartilage cutting techniques. In both methods the ear cartilage is addressed either by cutting or just scoring the sparing method. Visible irregularities are a common reported complication among patients managed by both techniques.

**Methods:** 46 pediatric patients-younger than 15 years-were enrolled in the study and managed Mustarde technique which was modified by putting the cartilage sutures externally to evade the hazardous cartilage unnecessary dissection. Moreover, we did no scoring at all in the cartilage in all the patients. All the patients were followed-up for at least 1 year; however, the final outcomes are reported after one year of follow-up.

**Results:** All the patients had satisfactory aesthetic results with ears that appear normal with a smooth antihelical fold. Only two patients had a complication in the form of partial skin necrosis which was managed conservatively.

**Conclusion:** Visible irregularities can be avoided in otoplasty for prominent ears by omitting extensive cartilage dissection, and the cartilage sutures can be safely placed from an external approach.

**Key Words:** *Prominent ear correction – Scoring – Pediatric – No touch technique – Otoplasty.*

### INTRODUCTION

Prominent ear occurs in 5% of the Caucasian population and is the most common congenital auricular deformity [1,12,13]. While it is a mild congenital defect within the spectrum of ear anomalies, its aesthetic and psychological impacts should not be neglected. Two-thirds of the prominent ear cases result from an underdeveloped antihelical fold, while one-third of the cases result from an excess of conchal bowl cartilage [2].

The first operation described for the correction of prominent ear was in 1845 by Dieffenbach [15]. The primary goal of auricular reconstruction is to preserve function and restore form in the anterior and lateral views. Specifically, McDowell described the following reconstructive principles: 1- Eliminate the protrusion in the superior third of the ear, 2- Both helices should be visible lateral to the antihelix from the frontal view, 3- Create a smooth and regular helical contour, 4- Minimize distortion to the postauricular sulcus, 5- Avoid placement of the ear too close to the head, and 6- Contours and positions of the two ears should be matched closely but not necessarily symmetric [3,14].

Surgical techniques can be divided into two basic strategies: Incision techniques that rely on incision and sometimes excision of cartilage to allow for repositioning and reducing of the ear structure, and bending techniques in which no incision is made and the cartilage is curved to create the desired positioning. Bending of the cartilage is accomplished by scoring and/or pulling the cartilage into position using sutures.

This dichotomy is somewhat oversimplified because many techniques that emphasize incisions may bend cartilage at a specific location, and bending techniques that are based on anterior scoring may use cartilage incisions for access [4].

Modern otoplasty techniques are based on two main surgical categories, cartilage sparing and cartilage cutting, along with many nuances. The anterior scoring methods are the most commonly performed cartilage-scoring procedures.

However, these methods have been criticized for their complications, such as hematoma, anterior

skin necrosis, chondritis, and irreparable cartilage damage. Conchoscaphoid suturing to create the antihelical fold and conchomastoid suturing to rotate the conchal angle are commonly described cartilage sparing methods [5].

Techniques that are based on scoring can be subdivided further into those that only superficially score the cartilage and those that score deeply enough to cut through the newly created antihelix. The scoring can be accomplished on either the anterior or posterior surface of the ear cartilage; however, full-thickness penetration of the cartilage usually results in a sharper antihelical fold, which is not desirable [5].

A disadvantage of anterior scoring is that to gain access either an anterior skin incision or a through-cartilage incision from a posterior skin incision must be used. The anterior skin incision has the obvious concern of being placed on the more visible side of the ear. A through cartilage incision creates the same potential for problems is that unnatural sharp, crenellated edges, ridges, and step-offs may be created which will lead to an operated-on appearance. Further, treating the anterior surface of cartilage has the potential for creating irregularities on the visible side of the cartilage [4].

In this article, we describe a technique that is effective in treating prominent ear while avoid the disadvantages of anterior scoring and investigate its complications rate, risk of recurrence and patients' satisfaction.

## PATIENTS AND METHODS

Forty-six patients, 36 males and 10 females, were enrolled in the study in the period between 2015 and 2018. Patient's age at time of surgery ranged from 4 to 15 years, with an average age of 9.5 years. The main of author conducted the surgery on all the patients.

### *Surgical technique:*

Under general anesthesia, the face and ears were prepared with an aqueous antiseptic solution and then draped. The site of the new antihelical fold was drawn anteriorly by folding the ear in the normal position without tension by digital pressure, then 10mm four skin abrasions were marked at the two limits of the new antihelical fold. A dumbbell shape skin excision was also marked posteriorly Fig. (1).

The four skin incisions were done first followed by placement of the cartilage modifying sutures to create a smooth natural antihelical fold. Two 4/0 non-absorbable 'horizontal mattress style' sutures were placed to maintain the position of the new antihelical fold through the anterior skin incisions. The sutures were carefully tied with no excessive tension to avoid overcorrection. The knots were buried in a small subcutaneous pocket. Afterwards, the dumbbell excision of the posterior skin was done to expose the conchal cartilage. This was followed by exposure of the mastoid fascia to set the stage for the chocomastoid. All fibromuscular tissues were judiciously excised before placement of the sutures. The wound was closed using 4/0 absorbable sutures. A light bandage was applied at the end of surgery.

### *Post-operative care:*

The light bandage was applied for at least seven weeks. All patients had a weekly visit to the surgeon during the first month followed. The scar was managed afterwards using silicone preparations.

### *Study measures:*

The patients were followed-up at a regular interval of 1 month for one year. The patient was examined for contour irregularities and wound healing complications in addition to any changes in the antihelix contour. A standard photograph were taken and compared with the previous one. At the time of final evaluation, the final aesthetic outcomes were assessed using parents reported outcomes in addition to opinion of two consultant plastic surgeon in terms of their satisfaction regarding the final aesthetic outcomes. Besides, the conchomastoid angle was measured to assess the conchomastoid sutures.

## RESULTS

All the parents of the patients were satisfied at the end of follow-up period except for 3 patients who believed that the antihelix needs more definition. Moreover, the two consultant surgeons were satisfied with the aesthetic outcome in 81% of the patients. Only two patients developed mild partial skin necrosis Fig. (4) that was attributed to tight bandages. This was managed conservatively. One patient developed hypertrophic scar which was managed with compression.



Fig. (1): Marking of the ear.

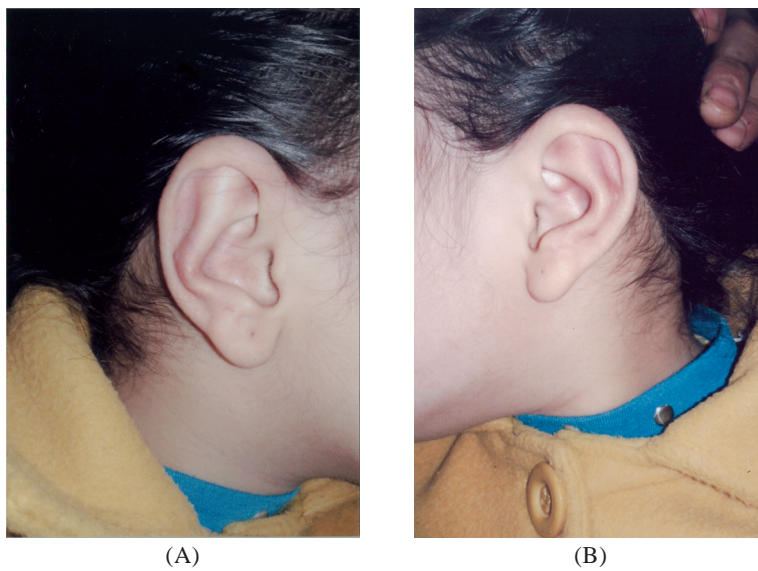


Fig. (2): Post-operative pictures of a child operated using our technique.

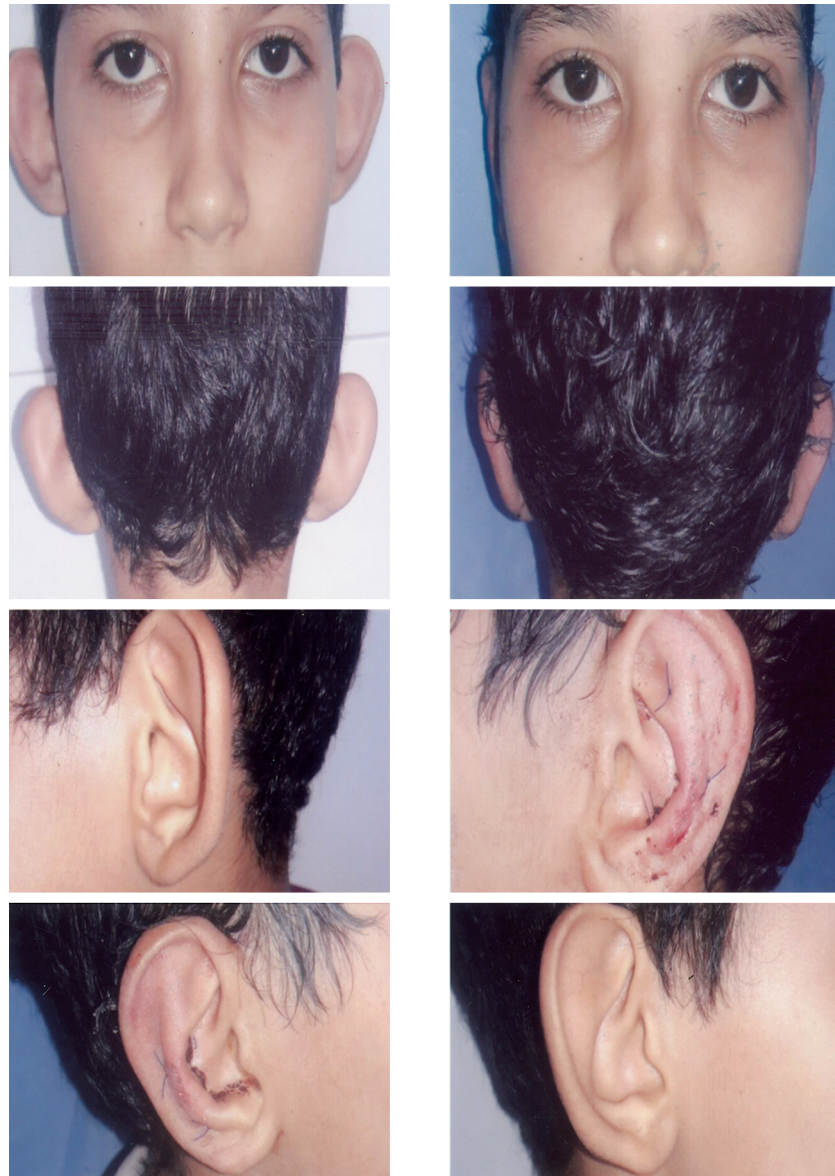


Fig. (3): Pre-operative and post-operative pictures of a child operated using our technique.

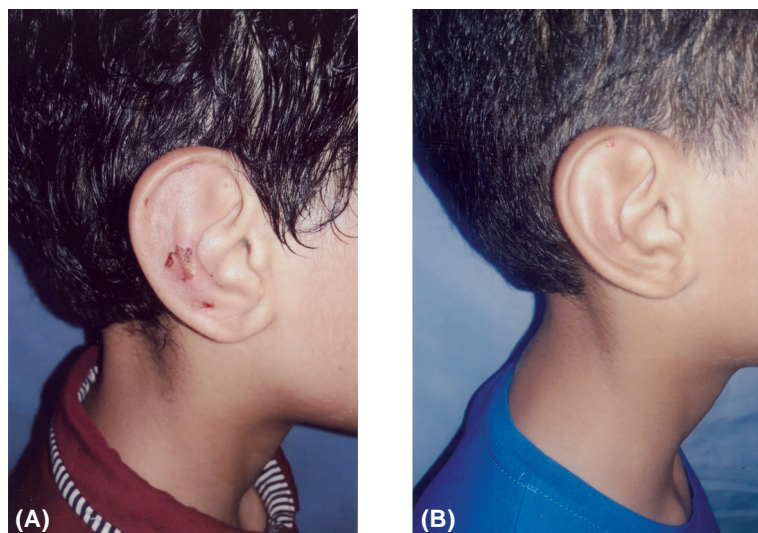


Fig. (4): Mild partial skin necrosis post-operative and after healing.

## DISCUSSION

Prominent ears are the most common congenital anomaly affecting ears making them a common clinical encounter. Several surgical procedures were described to address this problem. Among the procedures, Mustarde suturing otoplasty with cartilage scoring is a very common procedure. Contour irregularities and unnatural sharp antihelical fold is a common unsatisfactory outcome. In this study, we describe modification to Mustarde technique to preclude complications and improve the aesthetic outcomes.

Over the years, hundreds of techniques have been described for the correcting of a prominent ear reaching up to 200 [10,11]. Surely, anterior scoring is one of the most widely used techniques however; its disadvantages are also widely described such as hematoma, anterior skin necrosis, chondritis, and irreparable cartilage damage [5].

A disadvantage of anterior scoring is that to gain access either an anterior skin incision or a through-cartilage incision from a posterior skin incision must be used. The anterior skin incision has the obvious concern of being placed on the more visible side of the ear [4]. In our described technique we use a posterior incision to avoid this disadvantage. Moreover, posterior incision of anterior scoring via a-through cartilage incision is used with potentials of unnatural sharp, crenellated edges, ridges, and step-offs creation. This has been linked to an operated-on appearance which we avoid in our technique. In our described technique we use a posterior rhomboid incision instead of the liner incision in the anterior scoring. The rate of complication reported in literature range between 0 to 47.3% [6,10]. It has been reported that the rate of infection after otoplasty is between 0 to 15.5% [7,8,10] while the rate of bleeding is up to 7.9% and the rate of keloid formation is up to 6.2% [6,10]. In our study, we did not encounter any complications such as infection, bleeding or hematoma. In the literature, recurrence rate is between 0 to 12% [6,9,10] while in our study no patient had recurrence. Some limitations that faced us are the necessity of general anesthesia to perform the operation due to the average age of patients and it is only effectively performed in patients with soft auricular cartilage so it will not be a sufficient technique to correct hard auricular cartilage type.

## Conclusion:

Visible irregularities can be avoided in otoplasty for prominent ears by omitting extensive cartilage dissection, and the cartilage sutures can be safely placed from an external approach.

## Conflict of interest statement:

The authors declare that they have no conflict of interest.

The authors declare that they have not received any funds.

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