

Separating The Helix from The Antihelix Technique Versus Mustardé Technique in Prominent Ear Correction

Mohamed Mohamed Salah Awad¹, Wesam Mohamed Ali Amr²,
Ayman Fikry Mehanna¹, Muhanad Khaleel Mohammed Aghweelah*¹
Departments of ¹Plastic Reconstructive, Microsurgery and Hand Surgery and
²General Surgery, Faculty of Medicine, Zagazig University, Egypt

*Corresponding author: Muhanad Khaleel Mohammed, Mobile: (+20)1094318011, E-mail: muhanedeg@gmail.com

ABSTRACT

Background: As many as 5% of the population has a prominent or bat-like ear malformation. Numerous methods of remedying the situation have been outlined. The fact that there is still research on it suggests that it is plentiful. The present techniques can be divided into two categories: those that preserve cartilage and those that split it.

Objective: The aim of the current work was to demonstrate novel ideas in otoplasty that avoid dealing with the antihelix cartilage.

Patients and methods: This Randomized central clinical trial was done at Plastic Surgery Unit, Zagazig University Hospital. 30 cases were included as a comprehensive sample performed prominent ear correction with Separating Helix from the Antihelix Technique and Mustardé Technique during the period from June 2021 to December 2021. Complete clinical and physical examinations and Early and late post-operative complications recurrence were assessed.

Results: There were non-statistically significant differences between the study groups regarding age, sex distribution, side of operation, operation time and follow up time. There was an increase in frequency of complication among Group I but without statistically significant difference.

Conclusion: It could be concluded that separating the Helix from Antihelix Technique is a new technique that yields natural-looking outcomes, with helix appearing straight and appearing to extend beyond the antihelix on the frontal view. There are no visible scars, no recurrences, and a very minimal risk of complications.

Keywords: Antihelix Technique, Mustardé Technique, Prominent Ear

INTRODUCTION

Five percent of the population suffers from prominent ear deformity ⁽¹⁾. Ear prominence can be seen anatomically through the absence of antihelical folding as well as a flat scapha and conchal hypertrophy. If the conchoscaphal and auriculocephalic angles exceed 90 degrees, the auriculocephalic angle exceeds 30 degrees, the distances between the height and width rise, and the distances between the scalp's helical rings grow (normally 10-12 mm superiorly, 16-18 mm at its middle and 20-22 at the lobule) ⁽²⁾.

Prominent ear restoration aims to define the antihelix and reduce the conchoscaphal angle and hypertrophy of the conchal lobe ⁽³⁾. As a result, there isn't a single, perfect way for correcting these issues just yet. There are now two types of methods: those that involve cartilage splitting (cutting) and those that do not (cartilage sparing) ⁽⁴⁾.

According to Mustardé, antihelical folds can be created with conchoscaphal mattress sutures. Furnas pioneered the use of cochomastoidal suturing for conchal setback ⁽⁵⁾.

The cartilage spring memory of the ear is totally broken when the helix and antihelix are separated by a thorough incision in otoplasty. The antihelix can be folded with sutures, and the helix and earlobe can be repositioned with posterior skin resection, all without causing any strain that might cause cartilage recurrence ⁽⁶⁾.

Ahmed *et al.* ⁽⁷⁾ reported helical free otoplasty approach is used to rectify the deformity via a posterior pathway and vision correction. No scarring is left behind, and there are no recurrences. Reducing the prominence of the external earlobe is a simple, quick, safe, and effective procedure, with almost no side effects and a high rate of patient satisfaction.

At the sulci between the helix tail and concha, we disrupt its memory and allow it to be shaped into a new shape by cutting through it at a straight angle to the triangular fossal in antihelix-specific design. A flexible helix is now possible ⁽⁸⁾.

The aim of this study was to avoid manipulating the antihelix cartilage during otoplasty, a new concept has to be devised.

PATIENTS AND METHODS

This Randomized central clinical trial was done at Plastic Surgery Unit, Zagazig University Hospital. 30 cases were included as a comprehensive sample performed prominent ear correction with Separating Helix from the Antihelix Technique and Mustardé Technique during the period from June 2021 to December 2021.

Ethical Consideration:

This study was ethically approved by Zagazig University's Research Ethics Committee. Written informed consent of all the participants' parents was obtained and submitted them to Zagazig

University (ZU-IRB#6892). The study protocol conformed to the Helsinki Declaration, the ethical norm of the World Medical Association for human testing.

Inclusion criteria:

- Aged from 5 to 25 years.
- Both sexes.
- Patients who presented complaining from prominent ear deformities.
- Patients with unilateral or bilateral prominent ear deformities.

Exclusion criteria:

- Patients with infectious diseases.
- Patients with low auditory sign.
- Patients with neurological symptoms.
- Lob or cup ear are two examples of malformations characterized by prominent ears.
- Recurrent otoplasty.

All patients were subjected to the following:

1. Full history taking.
2. General and local examination.
3. Early and late problems recurrence following surgery

The included subjects were divided into two groups; **Group I** consisted of 15 patients performed prominent ear correction with Mustardé Technique. **Mustardé technique was performed according to Mustarde⁽⁹⁾ as original article.** **Group II** consisted of 15 patients performed prominent ear correction with Separating the Helix from the Antihelix Technique. **Separating the Helix from the Antihelix Technique was performed according to Valente⁽³⁾ as original article.**

Follow-up:

- Preoperative and post-operative photos (1-6 months) were compared and analyzed by computer program the evaluated the results.
- The patients were followed-up for 6 months (2 weeks, 3 and 6 months).
- Antibiotics for prevention were given to patients on a regular basis via systemic administration.

Chlorhexidine-soap solution was used to prep the face first, and then chlorhexidine-alcohol solution was applied.

- A head bandage was worn for four weeks, then removed for the final two weeks when the stitches were removed ten days later. .
- At four-week, two-month, and six-month follow-up intervals, patients were examined to see whether they had experienced any problems and to gauge their overall level of satisfaction.

Outcomes

The patient's and/or guardian's satisfaction was taken into consideration. Patients or their guardians were asked to complete a questionnaire at least six months after surgery, except for the final instance in the study. Components include the following:

1. It hurts to touch the ear.
2. Sensation felt via the ear.
3. Irritation of the skin is present. (wound).
4. Positions of the ears that are symmetrical.
5. Shape of ear.

Statistical analysis

The independent t-test (t) and the Mann-Whitney (MW) tests were employed to compare parametric and non-parametric data respectively on SPSS version 23, in the analysis of the differences between the groups. When there was a difference between two groups of non-parametric data, Proportions were compared using the Chi-square test (X²). Cut-off points and their associated values. P value 0.05 was considered statistically significant (S). It was judged highly significant (HS) when the P value was 0.001 and non-significant (NS) when the P value was >0.05.

RESULTS

The study enrolled 30 patients, who were placed into two groups at random: Group I: Mustardé Technique, and Group II: Separating the Helix from the Antihelix Technique.

It is evident from this table that there were no statistically significant variations in the age or sex distributions of the study groups (Table 1).

Table (1): Demographics of groups:

Variable		Group I (n=15)		Group II (n=15)		MW	P
Age: (years)	Mean ± Sd	12±7.18		11.08±7.51		0.01	0.99
	Median	9		9			
	Range	5-22		5.5-26			
Variable		No	%	No	%	χ ²	P
Sex:	Female	5	33.3	7	46.7	0.34	0.56
	Male	10	66.7	8	53.3		

There were no statistically significant differences inside of operation across the groups examined, as shown in the table 2.

Table (2): Side of lesion among the study groups:

Variable		Group I (n=15)		Group II (n=15)		χ^2	P
		No	%	No	%		
Side:	Bilateral	9	60	9	60	0	1 NS
	Unilateral	6	40	6	40		
	Rt	3	20	3	20		
	LT	3	20	3	20		

Table 3 illustrates that there were no significant differences in anesthetic type or operation time between the groups examined.

Table (3): Operation data among the study groups:

Variable		Group I (n=15)		Group II (n=15)		χ^2	P
		No	%	No	%		
Type of anesthesia:	General	15	100	15	100	--	---
Operation time: (min)	Mean ± Sd	36.67±6.83		34.17±6.65		t	0.64
	Range	30-50		25-40			

There was no statistically significant differences were seen in the follow-up times for any of the groups (Table 4).

Table (4): Follow up time among the study groups:

Variable		Group I (n=15)	Group II (n=15)	t	P
Follow up: (month)	Mean ± Sd	4.67±0.82	5±1.27	0.54	0.60
	Range	4-6	3-6		

There was no statistically significant difference in the frequency of complications in Group I compared to Group II (Table 5).

Table (5): Complication of operation among the study groups:

Variable		Group I (n=15)		Group II (n=15)		χ^2	P
		No	%	No	%		
Complication:	No	9	60	15	100	2.4	0.330 NS
	Infection	3	20	0	0		
	Hematoma	3	20	0	0		

DISCUSSION

Prominent ears have been reported by up to 22.5 percent of ENT patients as a common symptom. It has been shown that Otoplasty has a significant positive impact on the psychological well-being of patients with this type of malformation. The anatomy of the auricle must be thoroughly understood before surgery can be performed to treat a significant ear malformation. The perichondrium envelops a fibroelastic cartilage in this structure. Areolar connective tissue above the posterior perichondrium provides a separation between auricle skin and the perichondrium at the anterior surface ⁽¹⁰⁾.

There have been hundreds of surgical procedures for large ear correction, but none of them have been deemed the best. Despite this, it does not appear that the lack of a universally approved technique has hampered patient and parent satisfaction with surgical outcomes, as patient and parent satisfaction rates remain high regardless of the technique used ⁽¹¹⁾.

Zagazig University Hospital's Plastic Reconstructive Surgery Unit conducted this randomized clinical research. From June 2021 to December 2021, a representative sample of 30 patients underwent prominent ear repair using the Separating Helix from the Antihelix Technique and the Mustardé Technique. Patients were divided randomly into two groups: Group

I: Mustardé Technique and Group II: Separating the Helix from the Antihelix Technique.

According to the findings of this study, there were no statistically significant differences in age or sex distribution amongst the groups tested.

Salmerón-González et al. ⁽¹¹⁾, in a study included 188 patients underwent otoplasty, 85 of them were guys and the remaining 103 women. They were between the ages of six and fifteen (average: 9.97 years). **Boroditsky et al.** ⁽⁶⁾ reported that A total of 68 patients had Mustarde otoplasties; 25 were men (37%) with a mean age of 9 years (ranging 7-12 years) .

El Hariry et al. ⁽¹²⁾ found that in Group A included 10 patients treated by Mustarde technique., the mean age was 8.10±2.36 years (range 5–12), they were 8 (80%) males and 2 (20%)

Results from this study demonstrate no statistically significant differences between the study groups when it comes to operating procedures. **Salmerón-González et al.** ⁽¹¹⁾ 100 patients underwent the modified-Mustardé otoplasty procedure, and 83 underwent the modified-Furnas procedure; 168 patients underwent bilateral otoplasty and 20 underwent only one procedure; this was documented. **Boroditsky et al.** ⁽⁶⁾ reported that 51 (75%) patients underwent bilateral otoplasties and 17 (25%) patients underwent unilateral otoplasties.

El Hariry, et al.⁽¹²⁾ found that in Group A included 10 patients treated by Mustarde technique, all patients were bilateral 10 (100%).

The current investigation found no statistically significant variations in anaesthetic type or operating time between the groups tested.

Boroditsky et al.⁽⁶⁾ reported that (31–133 minutes) the median operative time was 95 minutes in order to perform modified-Mustardé otoplasty.

Ahmed et al.⁽⁷⁾ reported that a total of 31 patients had prominent ears on both sides, therefore the overall number of ears was 62. 90 minutes was the average time it took to do an operation (ranged from 85 to 120 minutes).

El-Beltagy et al.⁽¹³⁾ in a study included 16 patients treated with modified mustarde technique reported that the mean Operative time for each ear (min) was 30.43 ± 5.29 min.

In terms of follow-up time, no statistically significant differences were found between the groups examined in this study. **Boroditsky et al.**⁽⁶⁾ reported that Follow-up time for patients who underwent modified-Mustardé otoplasty ranged from 24 to 476 weeks, with a median of 72 weeks.

Ahmed et al.⁽⁷⁾ reported that for a mean of 24 months, the patients were monitored (ranged from two to 30 months).

Group I had a higher incidence of complications, although the difference was not statistically significant. **Boroditsky et al.**⁽⁶⁾ A total of 24 problems were documented in 17 patients who underwent a modified-Mustardé otoplasty. One patient had a hematoma (n = 1), while another had an extrusion of the suture (n = 20). One of the most serious issues involved two reoperations (n = 2).

Valente⁽³⁾ Complications from otoplasty included two cases of small hematomas (3.3 percent) that did not necessitate drainage, two cases of epidermolysis (3.3 percent), one case of a hypertrophic scar (1.7 percent), and one case of an unnatural appearance in six of the 60 patients (10 percent) who underwent otoplasty (1.7 percent). There were no reports of infection or dehiscence.

Ahmed et al.⁽⁷⁾ reported that two patients experienced late problems on 2/31. (6.4%). In the first case, severe anterior scoring resulted in an antihelix with abnormalities and sharp edges. This time around, the surgeons used permanent sutures to smooth off some of the edges and to modify the contour. Similarly, in the other illustration, the superior crus of one ear was not well defined. Slightly larger cartilage incision, cartilage wrapping, and restricted anterior scoring were used to treat this patient's problem.

Smittenberg et al.⁽¹⁴⁾ reported higher complication rates; 20% in cartilage sparing and 21% in cartilage cutting.

CONCLUSION

It could be concluded that separating the Helix from Antihelix Technique is a new technique that yields natural-looking outcomes, with helix appearing straight and appearing to extend beyond the antihelix on the frontal view. There are no visible scars, no recurrences, and a very minimal risk of complications. It is a quick, easy, and safe operation for reducing the size of a protruding ear. This new technique appears to be working in the early stages, but the sample size is too tiny to be certain of its long-term effects.

Financial support and sponsorship: Nil.
Conflict of interest: Nil.

REFERENCES

1. **Cihandide E, Kayiran O, Aydin E et al. (2016):** A new approach for the correction of prominent ear deformity: the distally based perichondrio-adipodermal flap technique. *J Craniofac Surg.*, 27:892-897.
2. **Nazarian R, Eshraghi A (2011):** Otoplasty for the protruded ear. *Semin Plast Surg*, 25:288-293.
3. **Valente A (2010):** Separating the helix from the antihelix: A new concept in prominent ear correction. *Aesthetic Surgery Journal*, 30(2): 139-153.
4. **Gualdi A, Daniel J, Gatti J et al. (2018):** Double triangular cartilage excision otoplasty. *Plast Reconstr Surg.*, 141: 348-356.
5. **Mohamed A, El-Rouby M (2019):** Otoplasty: New Modification of the Mustardé Technique. *Egypt J Plast Reconstr Surg.*, 43(2): 185-189.
6. **Boroditsky M, Van Slyke A, Arneja J (2020):** Outcomes and Complications of the Mustarde Otoplasty: A "Good-Fast-Cheap" Technique for the Prominent Ear Deformity. *Plast Reconstr Surg Glob Open*, 8(9): 3103-8.
7. **Ahmed M, Alkhalaf H, Ibrahim E (2019):** Helix free otoplasty for correction of prominent ear. *Asian Journal of Surgery*, 42(5): 621-627.
8. **Sadhra S, Motaharisl S, Hardwicke J (2017):** Complications after prominent ear correction: A systematic review of the literature. *J Plast Reconstr Aesthet Surg.*, 70(8):1083-1090.
9. **Mustarde J (1963):** The correction of prominent ears using simple mattress sutures. *Br J Plast Surg.*, 16: 170-8.
10. **Ismail A (2020):** Otoplasty: a graduated approach. *The Egyptian Journal of Otolaryngology*, 36(1): 1-6.
11. **Salmerón-González E, García-Vilariño E, Gutiérrez-Ontalvilla P et al. (2018):** Evaluation and comparison of two different cartilage-sparing techniques in 356 otoplasties performed in children. *Annals of Pediatric Surgery*, 14(3): 143-145.
12. **El Hariry M, El Bahrawy M, Elsoud A (2021):** Comparative study between Mustarde and Stenström techniques in treatment of prominent ear. *Al-Azhar Assiut Medical Journal*, 19(2): 326-31.
13. **El-Beltagy S, Abdallah H, Gamaan A et al. (2021):** modified mustardé technique for correction of protruding ear (bat ear) in children. *Al-Azhar Medical Journal*, 50(4): 2499-2510.
14. **Smittenberg M, Marsman M, Veeger N et al. (2018):** Comparison of cartilage-scoring and cartilage-sparing otoplasty: a retrospective analysis of complications and aesthetic outcome of 1060 ears. *Plastic and Reconstructive Surgery*, 141(4): 500-506.