Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

An Overview about Separating the Helix from the Antihelix Technique

Mohamed Mohamed Salah Awad [(1)], Wesam Mohamed Ali Amr [(2)], Ayman Fikry Mehanna [(3)] and Muhanad Khaleel Mohammed Aghweelah[(1)]

[(1)]Professor and Head of Plastic Reconstructive, Microsurgery and Hand Surgery Department, Faculty of Medicine - Zagazig University

[(2)] Professor of General Surgery, Faculty of Medicine - Zagazig University

[(3)] Professor of Plastic Reconstructive, Microsurgery Hand Surgery, Faculty of Medicine - Zagazig University

[(4)] M.B.B. Ch, Faculty of Medicine – Tripoli University
Physician Visitor in Zagazig hospitals

Corresponding author: Muhanad Khaleel Mohammed Aghweelah
E-mail: muhanedeg@gmail.com

Abstract

Background: Prominent ear deformity is affecting 5% of population. Prominent ear anatomically means absence of antihelical folding, flat scapha and conchal hypertrophy. Surgery for correction of prominent ears may at first seem to be a simple and easy procedure when some studies think that it only corrects the scaphocephalic angle to 30° in the preoperative and postoperative front view photos as a parameter of outcome. One of the most established techniques for management of protruding ears is the Mustardé technique or separating otoplasty technique of the helix from the antihelix with a full incision completely. Separating otoplasty technique of the helix from the antihelix with a full incision completely breaks the cartilage spring memory of the ear. This facilitates the folding of the antihelix with sutures, and the repositioning of the helix and the earlobe with resection of posterior skin, without any tension that would force a cartilage recurrence.

Keywords: Antihelix Technique

Introduction

The concept of separating the helix from the antihelix was described by **Chongchet (1), Crikelair and Cosman (2), and Caouette-Laberge et al. (3).** Their techniques expose the anterior surface of the cartilage to create a striation on the antihelix area (anterior scoring) with partial-thickness incisions, but the transcartilaginous incision is not specific to the antihelix shape and the scoring may cause visible irregularities. In 2000, Nordzell reported a technique based on a unique incision of the lateral border of the antihelical cartilage very similar to this author's and, on dissection of this cartilage, a release and abrasion of its anterior surface to take advantage of the natural tendency of the cartilage to curl in the opposite direction of the weakened side. Nordzell preferred abrasion to mattress suture for

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

maintaining the new position of the antihelix, not recognizing the importance of the separation between the helix and the antihelix that is responsible for the complete breaking of the cartilage spring-inherent memory **(4).**

Surgical technique

Uncooperative patients underwent general anesthesia; others were operated on under local anesthesia with sedation. Local anesthesia was administered by infiltration of anesthetic around and inside the auricular pavilion. Bilateral otoplasty was performed regardless of whether the degree of prominence was small or large. Operative time was approximately 60 minutes for both ears and the operation were a day surgery procedure. Patients were routinely administered systemic prophylactic antibiotics. The face was prepared with chlorhexidine-soap solution first, and chlorhexidine-alcohol solution followed. The position of the antihelix was determined with the push-back fingers maneuver. The cartilage was tattooed with methylene blue, introducing the needles through the full thickness of the ear, in as many places as necessary in the superior and posterior border of the antihelix precisely from the beginning of the triangular fossa to the tail of the helix. After this, the entire antihelix was tattooed precisely in the middle line, from the top to the bottom of the ear, to demarcate the posterior biellipti- cal incision site **(4).**

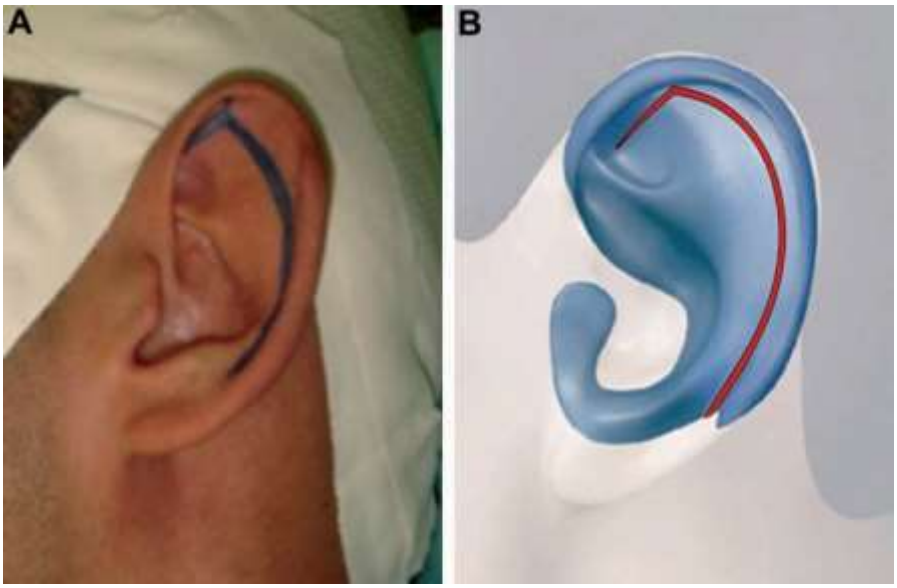


Fig. (1): (A) Preoperative marking of the skin. (B) The cartilage is cut on the posterior approach with a unique incision to completely disconnect the helix from the antihelix (red line).

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

Fig. (2): The cartilage is tattooed with a needle

A posterior skin incision was made in the form of a dumbbell with a narrow bridge in the middle third of the auricle, running almost the whole length of the ear. The design of the incision was very important in con- trolling the helix and the earlobe position. A narrow bridge incision in the middle third was necessary to avoid the overcorrection of this segment. The amount of posterior skin resection defined the exact position of the helix and the earlobe **(4).**

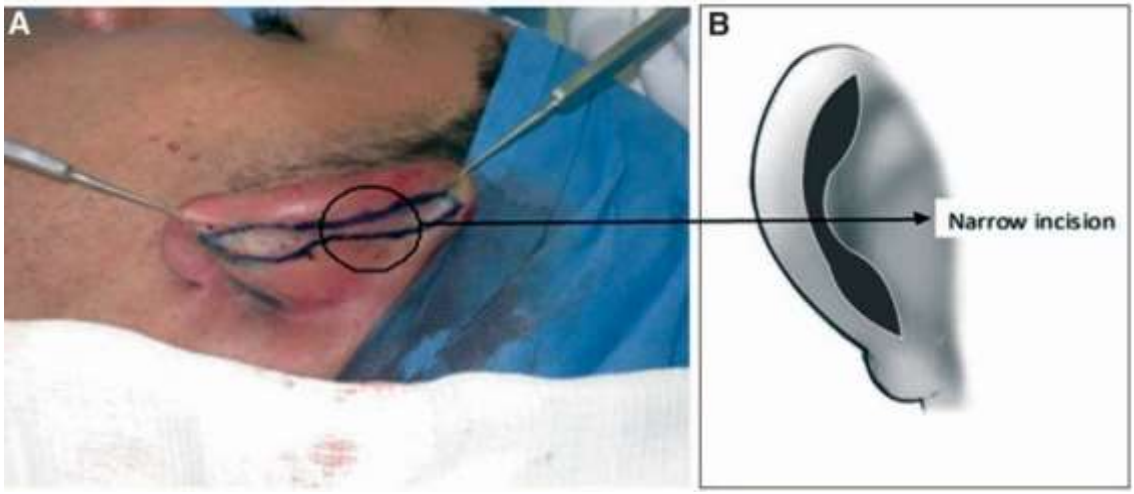


Fig. (3). Bielliptical incision with a narrow bridge in the middle third of the posterior skin. The narrow bridge is very important to avoid overcorrection in the middle third of the ear. The sizes of the superior and inferior ellipses are determined based on the degree of ear prominence and are important for the correct helix and earlobe position

After the markings were complete, a hydrodissection with 2% lidocaine with epinephrine 1:200,000 solution was performed in the entire posterior side of the ear and in the anterior side in the area of the antihelix, followed by undermining and suturing. It was vital to extend the undermining throughout the posterior side, mainly in the superior pole, and to ensure systematic cauterization of the vessels. After total exposition of the posterior side

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

of the cartilage, the methylene blue marks were identified, and another mark was made in the cartilage to be incised. The auricular cartilage was cut through this line with a #15 blade along the entire superior and pos- terior border of the antihelix, beginning in the triangular fossa and continuing to the tail of the helix in the right ear (with the incision starting from below on the left side for a right-handed surgeon) and disconnecting both structures completely. At this point, the index finger was positioned at the anterior aspect of the ear, with the thumb holding the skin hooks to force the cartilage forward, facilitating the incision. In the scapha region, the incision was made 2 mm distal to the tattoo marks to maintain the normal size of the scaphoid fossa and to allow appropriate positioning of the antihe- lical fold in the final result. This single incision in the antihelix cartilage completely disconnected the helix and scapha from the antihelix and concha. After making the incision the antihelix was undermined with the Stevens scissors and easily freed from the anterior skin, which released the structure, and it was then shaped with sutures **(4).**

It was not necessary to perform any kind of weakening maneuver (incision, excision, abrasion, rasping, etc.) regardless of cartilage thickness because the incision that separated the border of the antihelix broke the strength of the spring. Once this was accomplished in both regions, the antihelix and the helix could be easily molded in the desired position. Three 4-0 monocryl (Ethicon, Inc., Somerville, New Jersey) mattress sutures were applied to reshape the new antihelix. A fourth suture was applied to position the tail of the helix. It was not necessary to employ a nonabsorbable suture because the antihelix had lost its spring strength. The first suture was placed in the superior part of the antihelix and this knot was tied with more slack than the second one, which was placed next to the first in the middle third of the antihelix **(4).**

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

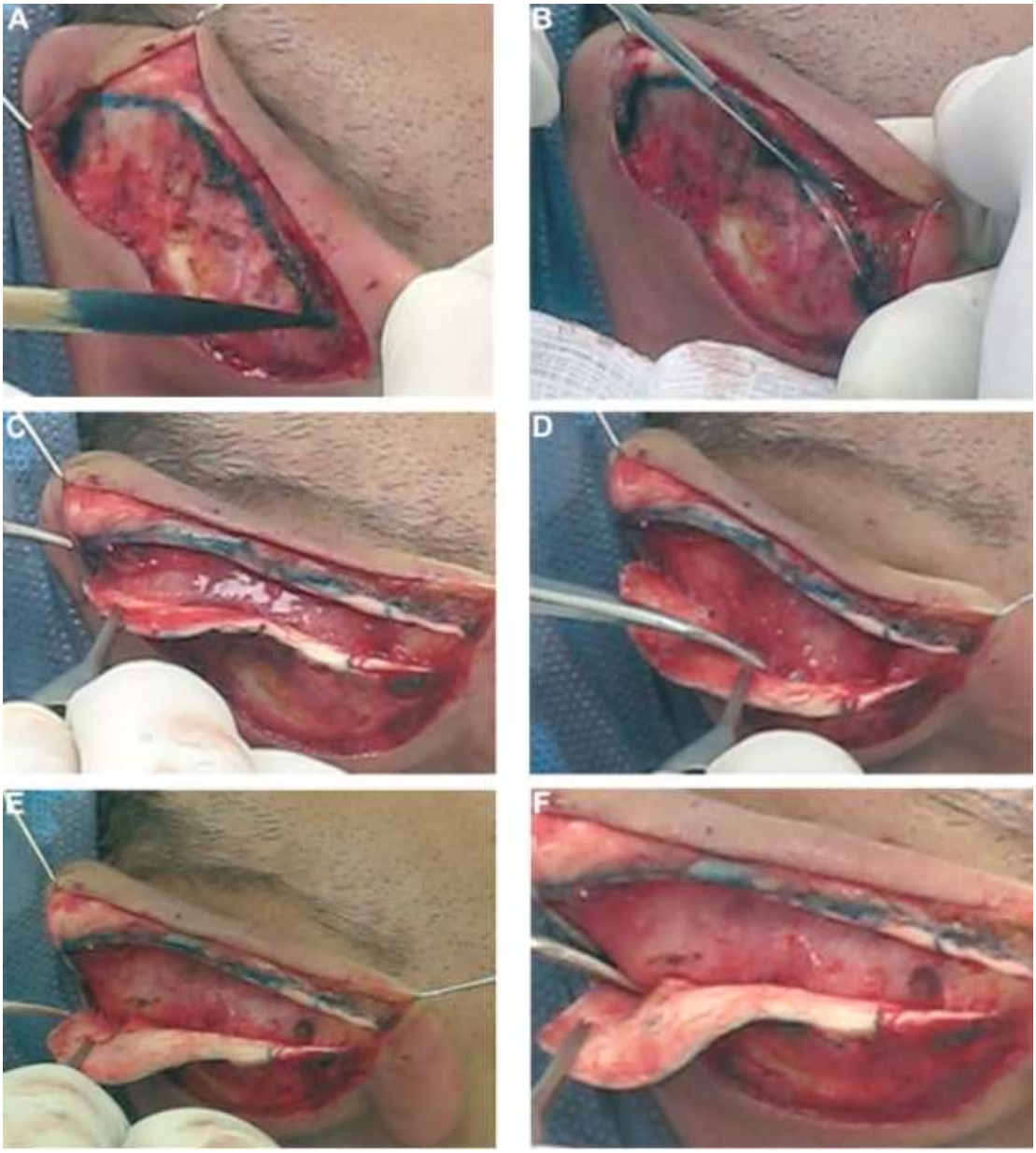


Fig. (4): (A) Cartilage marked with methylene blue ink. (B) Incision. (C, D) Undermining the antihelix with Stevens scissors. (E, F) Dissecting the triangular fossa to completely expose the antihelix.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

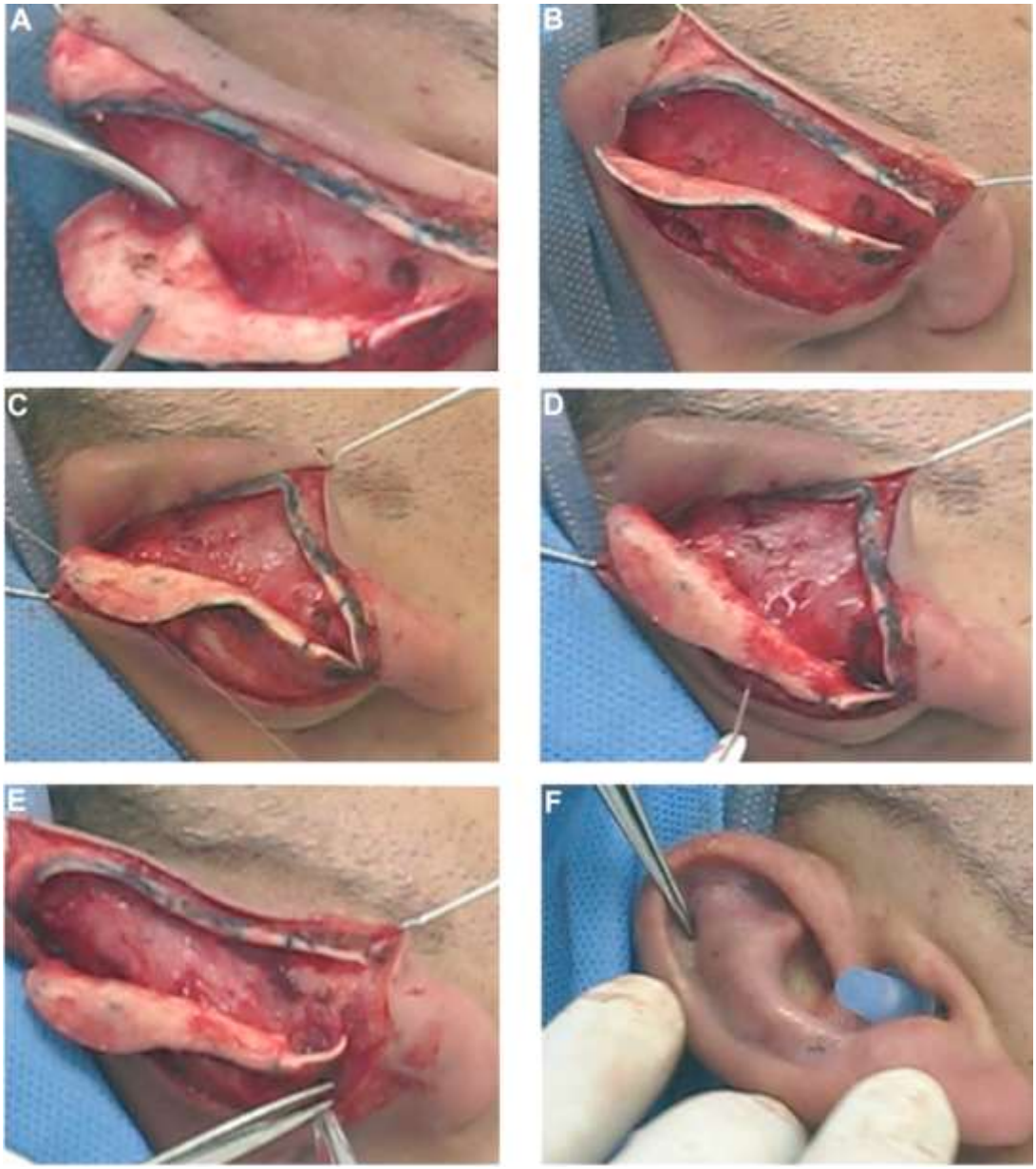


Fig. (5): (A) Complete undermining of the antihelix to the triangular fossa and anterior crus. (B) The helix is totally free and disconnected from the antihelix. (C) The first mattress suture, (D) the second suture, and (E) the third suture. (F) Intraoperative testing of the new shape to evaluate the partial results.

The third suture was placed more inferiorly in the region between the antitragus and the conchal cartilage to maintain the curve of the antihelix. In those cases where the cartilage was very thick, it was necessary to make a parallel 10-mm incision to weaken the spring and facilitate the fold by suturing. It was not necessary for the surgeon to observe the ear anteriorly while all three sutures were being tied. The antihelix could be constructed through a posterior approach to the ear, in the shape desired by the surgeon. This different tie and the position of the second and third mattress suture were needed to avoid a tube-

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

like final appearance. The fourth suture was placed in the tail of the helix to rotate this structure forward, suturing it to the posterior side of the concha **(4).**

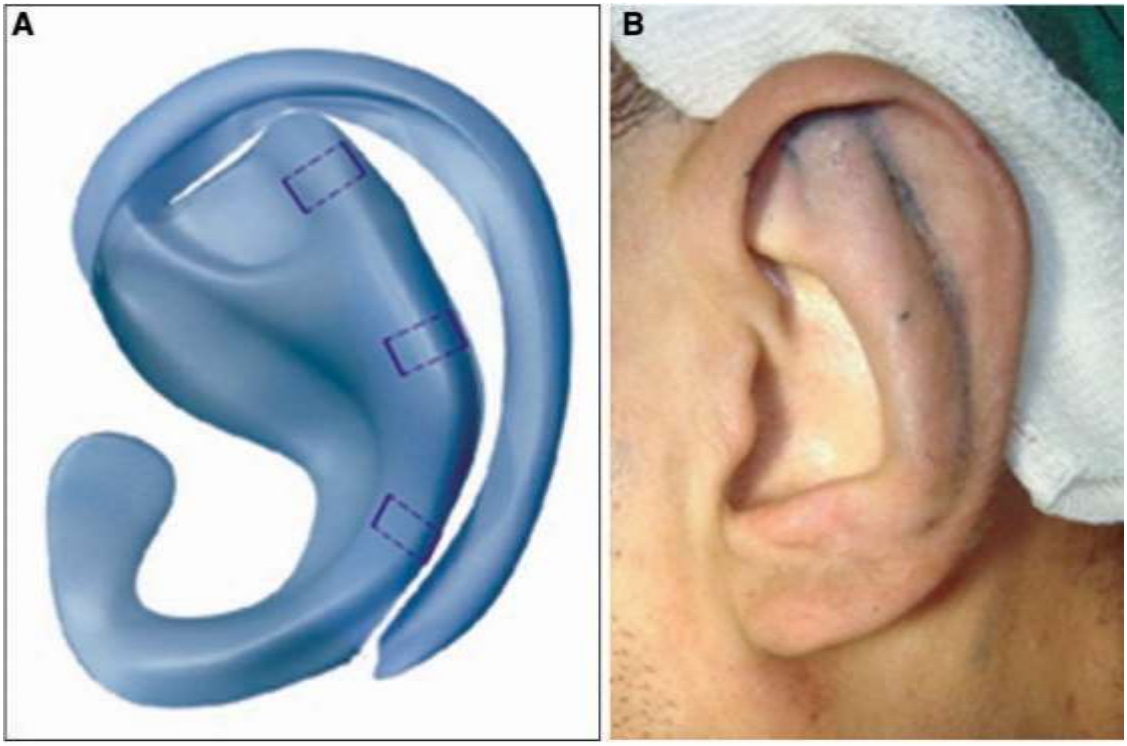


Fig. (6): (A) The antihelix is reshaped through disconnection and sutures. (B) Result immediately after surgery.

This maneuver adjusted the position of the earlobe appropriately. Finally, as a refinement, a small strip of the cartilage was excised from the superior part of the lateral border of the newly shaped antihelical fold, close to the scaphoid fossa, to avoid any unexpected posterior projection of the cartilage at the back edge of the ear. This excision worked to simulate the natural shape of the antihelix. The conchal cartilage should be operated upon only if a high degree of hypertrophy is present. In the author's view, the best way to do that is to set back with a mastoid fixation 21 or an elliptical resection in the midportion of the concha. The posterior skin was sutured with a 5-0 continuous nylon suture. Because of the extensive undermining of the flaps, there was little tension, and the skin could be placed in a new position easily. The ear dressing consisted first of wet cotton that was carefully molded into the concavities of the new ear's fold; a larger, dried portion of cotton was applied with a band- age placed around the head, which was kept in place for four days.

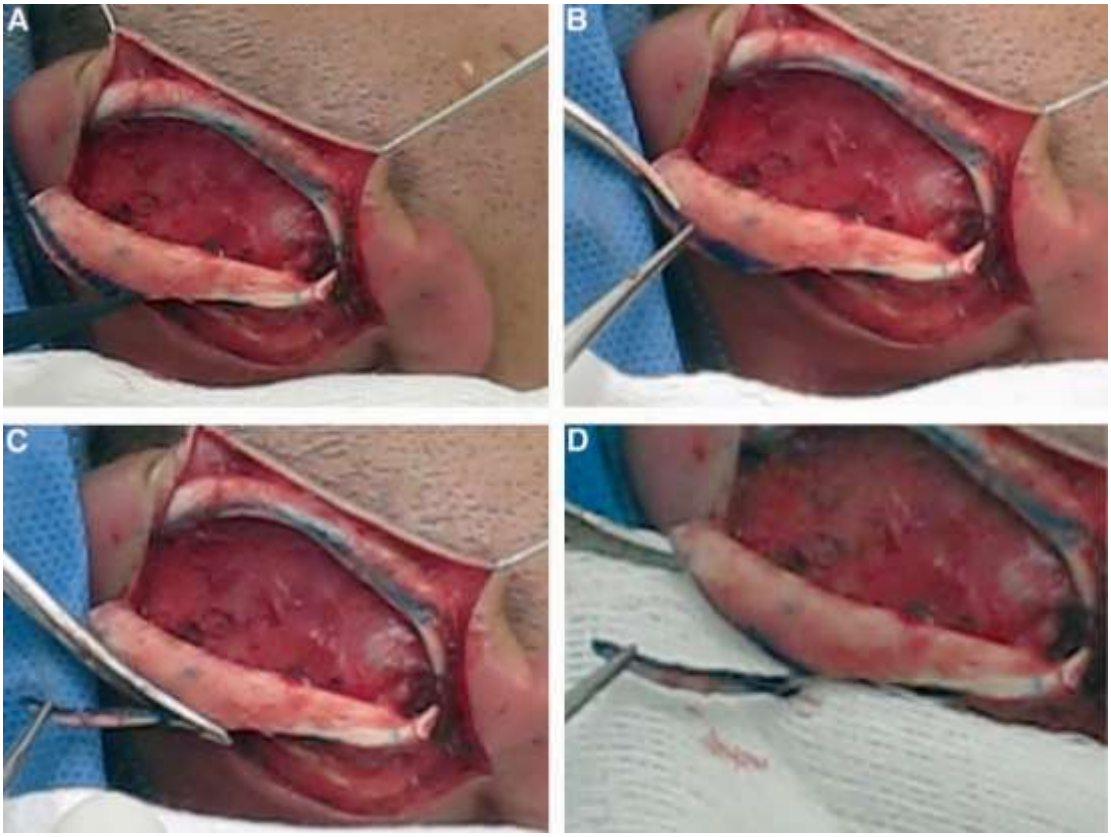


Fig. (7): (A-D) A small strip of cartilage is cut off in the superior part of lateral border of the antihelix.

Mustardé Technique

Over 200 different otoplasty techniques have been described **(5; 6)**. In general, these are grouped into cartilage cutting and cartilage-sparing (suturing) techniques. The Mustarde technique is one of the most common cartilage sparing techniques. Mustarde sutures correct the prominent ear deformity by creating and securing an antihelical fold with 2–4 horizontal mattress fixation sutures **(7).**

The complication rate for cartilage-sparing techniques is in the range of 0.4%–24%, with a revision rate of approximately 13.6%.2,9,10 Common complications reported in the literature include infection, bleeding/hematoma, pruritus, residual protrusion/asymmetry, and a number

of complications associated with suture material (eg, palpability, visibility, and extrusion). Classically, the Mustarde technique has been associated with variable rates of suture extrusion, suture line granuloma formation, and relapsing deformity secondary to suture fatigue (0%–22.2%) **(5)**.

Surgical Technique

All patients had surgery performed under general anesthesia, with perioperative antibiotic prophylaxis and local anesthesia with epinephrine administered. Patients were prepared

and draped to maintain bilateral ear exposure. An elliptical skin excision was made on the posterior surface of the ear to access the underlying cartilage. The retroauricular elliptical incision was made for 2 reasons. First, to allow adequate dissection and exposure of the underlying perichondrium and access to the conchal bowl if a reduction was needed. Specifically, the incision extended superiorly to allow sufficient cartilage exposure in the upper helix and triangular fossa. This allowed for precise conchoscaphal and/or concho-fossa triangularis suture guide point placement for antihelical fold correction. Second, we prefer a mid-auricle ellipse to avoid potential synechiae at the sulcus. The skin excision does little to shape the ear; however, because of the reduction of prominence, there often is skin redundancy and thus it is reduced. The posterior surface was skeletonized, exposing the underlying perichondrium . Prominent posterior auricular muscles were divided with electrocautery at the depth of the sulcus. Conchal bowl reduction was performed at this stage in the operation for indicated ears **(8)**.

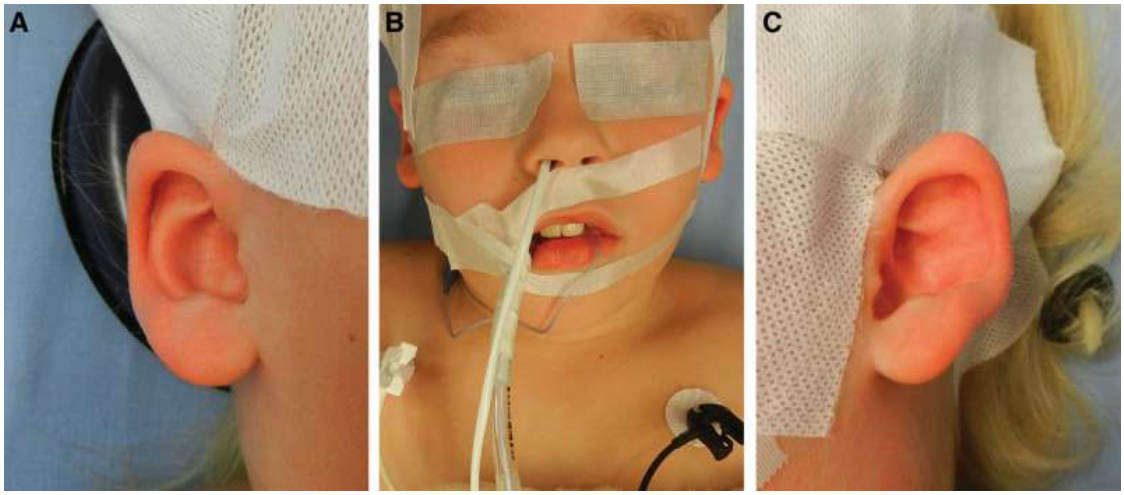
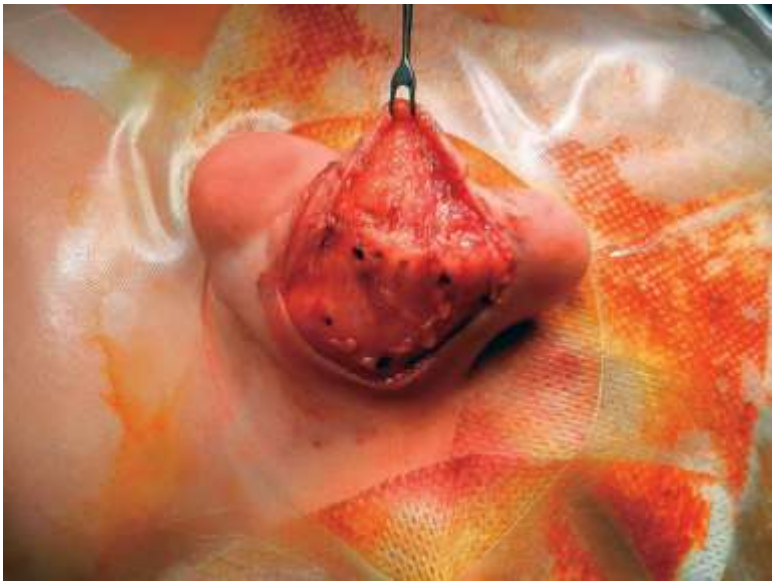


Fig. (8): Left unilateral prominent ear deformity, note effaced antihelical fold; for left otoplasty. A Right ear. B, Full face view. C, Left ear.



ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 07, 2021

Fig. (9): Photograph showing an elliptical skin incision of the ear followed by skeletonization, exposing the perichondrium.

Next, Mustardé sutures were placed. Suture guide points were marked in the nadir of the scapha or fossa triangularis and opposite nadir of the conchal cartilage with a 25-gauge needle to guide recreation of the antihelical fold. Two to three 4-0 clear nylon conchoscaphal and/or concho-fossa triangularis horizontal mattress sutures were placed and secured under appropriate tension to replicate a symmetric degree of natural ear protrusion and antihelical fold correction. Skin was closed with 4-0 Polyglactin 910 running sutures. The head was wrapped for the first week and a protective headband was worn for 2 months postoperatively, with a graduated return to sports and avoidance of trauma during this interval were instructed **(8)**.

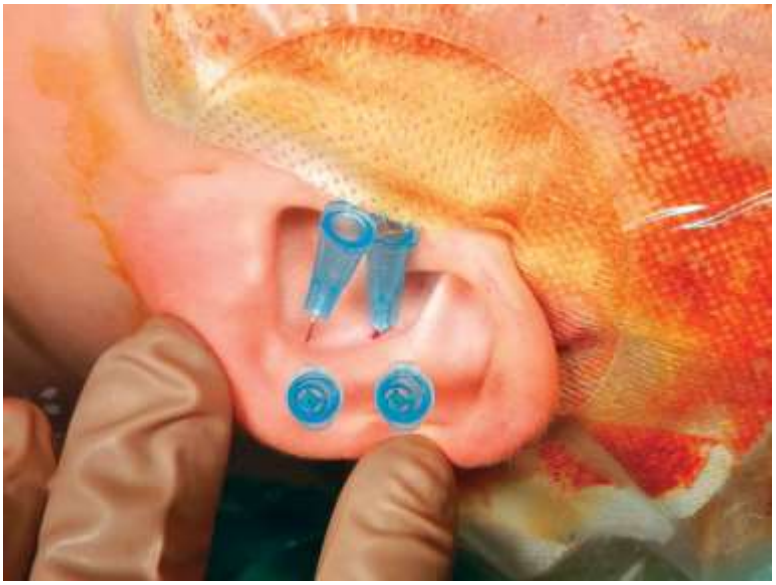


Fig. (10): Image displaying suture guide points marking nadir of scapha and conchal cartilage.

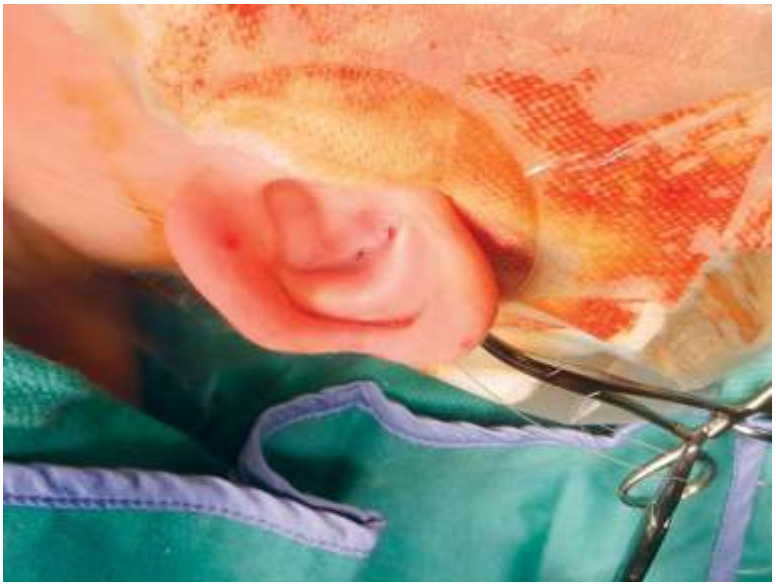


Fig. (11): Image showing the reconstruction of an antihelical fold using 4-0 clear nylon chonchoscaphal Mustardé mattress sutures.

The Mustardé otoplasty demonstrated a high overall efficacy in the correction of prominent ear deformity in the pediatric and adolescent population. Specifically, the procedure had low reoperation and complication rates compared with the literature, and positive overall aesthetic outcomes. The procedure demonstrated negligible early complications, such as hematoma or infection. Long-term complications, specifically related to suture extrusion, were easily managed at >1-year postoperatively. The Mustardé otoplasty technique remains a leader amongst otoplasty procedures described in the literature in regard to efficacy/safety profiles, postoperative complications, satisfaction scores, and overall resource utilization, with brief operative times, a "knife and fork" supply chain, and minimal overall case costs, indeed proving to be a good, fast, and cheap option for treatment of the prominent ear **(8)**.

A significant advantage offered by this technique is that it spares the auricular cartilage, especially since there are no sharp, aesthetically undesirable edges at the anterior side of the antihelix. In addition, the risk of a postoperative haematoma formation is low for perichondriumsparing methods. Despite its advantages, Mustardé's technique is primarily suitable for soft and thin cartilage, which is generally present in children up to the age of 10 years. However, if the cartilage is firmer, there is an increased risk that it may show a tendency to return to its original shape with the associated possibility of mattress sutures tear-out **(9).**

References.

1. **Chongchet, V. (1963).** A method of antihelix reconstruction. British journal of plastic surgery, 16, 268-272.

2. **Crikelair GF, Cosman B (1964).** Another solution for the problem of the prominent ear. Ann Surg; 160:314-324.

3. **Caouette-Laberge L, Guay N, Bortoluzzi P, Belleville C. (2000).** Otoplasty: anterior scoring technique and results in 500 cases. Plast Reconstr Surg; 105:504-515.

4. **Valente, A. S. C. (2013).** Separating the Helix from the Antihelix: A New Concept. Advanced Cosmetic Otoplasty: Art, Science, and New Clinical Techniques, 437.

5. **Limandjaja, G. C., Breugem, C. C., van der Molen, A. M., & Kon, M. (2009).** Complications of otoplasty: a literature review. Journal of Plastic, Reconstructive & Aesthetic Surgery, 62(1), 19-27.

6. **Janis, J. E., Rohrich, R. J., & Gutowski, K. A. (2005).** Otoplasty. Plastic and reconstructive surgery, 115(4), 60e-72e.

7. **Basat, S. O., Ceran, F., Askeroglu, U., Aksan, T., Orman, C., Yazar, M., ... & Bozkurt, M. (2016).** Preventing suture extrusion and recurrence in mustarde and furnas otoplasties by using laterally based postauricular dermal flap, long-term results. Journal of Craniofacial Surgery, 27(6), 1476-1480.

8. **Boroditsky ML, Van Slyke AC, Arneja JS. (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): e3103.

9. **Naumann, A. (2007).** Otoplasty–techniques, characteristics and risks. GMS current topics in otorhinolaryngology, head and neck surgery, 6.