

# Identification of Auricularis Posterior Muscle As A Landmark in Otoplasty

ABDEL RAHMAN AWADEEN, M.D.

The Department of Plastic & Reconstructive Surgery, Faculty of Medicine, Al-Azhar University

## ABSTRACT

**Background:** Otoplasty is a common surgical procedure in plastic surgery practice, several techniques described to correct auricular prominence, creation of antihelix or correction of ear lobule prominence. There is no definite landmark guiding the surgeon for proper sites of concho-mastoid sutures to adjust auriculo-cephalic distance. In this study auricularis posterior muscle used as a fixed anatomical landmark for proper correction of auricular prominence.

**Patient and Methods:** The study was done at Alazhar university hospitals from April 2010 to November 2011 including 30 cases with prominent auricle and age group 4-12 years with follow-up period 10 month. Group (A) 18 case with absent antihelix, superior crus and flat anterior surface of the auricle and auricular prominence, group (B) 6 cases with ill defined antihelix and auricular prominence, group (C) 6 cases with normal auricular architecture and auricular prominence as the only complaint.

**Technique:** With cartilage breaking and scoring 3 sutures used to correct auricular prominence, the first suture at the level of superior belly of auricularis posterior muscle 5mm anterior to its insertion. The second suture at the level of inferior belly of the muscle 2-3mm anterior to its insertion 3<sup>rd</sup> suture site differs according to the degree of prominence of the upper third and varying according to the case and requires surgeon experience.

**Result:** All cases show good healing and satisfactory aesthetic outcome as expressed by parent and child except one case showed residual prominence of the upper third. Another case complained of palpability of a knot under the skin.

**Conclusion:** Auricularis posterior muscle is a good landmark for placement of concho-mastoid suture and repositioning of the auricle.

## INTRODUCTION

Prominent auricle one of the common congenital anomalies in children. Significant malformations of the ear are prevalent in today's society and affects more than 5% of white population [1]. It is a source of embarrassments of the child starting in preschool age. Different methods and variable techniques of otoplasty are used e.g. Cartilage breaking, cartilage scoring, rasping, plication suture (Mustarde suture) and open otoplasty [2]. Placement of concho-

mastoid sutures for repositioning of the auricle in normal relation to the skull is the key point of success and achievement of proper technique. Adjustment of auriculo-cephalic angle at the level of helix, concha and lower third giving natural slanting prominence of the auricle is paramount. Auricularis posterior muscle can be used as a good landmark for placement of repositioning sutures.

### *Relevant anatomy of auricularis posterior muscle:*

Auricular muscles are very poorly developed in most humans and have no function. The remnants of the human auricular musculature are a classical example of rudimentary organs.

### *Auricularis posterior muscle:*

Origin: Mastoid tip as 2-3 fascicles.

Insertion: Cranial surface of convexity of conchae.

Innervation: Posterior branch of facial nerve.

In absence of definite landmarks guiding the surgeon to the sites of sutures used for auricular repositioning, auricularis posterior muscle can be used as a good landmark for sites of these sutures with limited variability according to the patient age which requires surgeon experience [3].

### *Topography of the auricle:*

Awareness of the following general observations of normal ears is important in determining the presence of a deformity:

- A- The long axis of the ear normally lies 20 degrees posterior from the vertical (coronal) plane.
- B- The long axis of the ear normally lies 15 degrees more upright than the dorsum of the nose. It is not parallel to the nose.
- C- The normal distance from helix to mastoid skin is as follows:
  - 10-12mm at the superior ear.
  - 16-18mm at the middle ear.
  - 20-22mm at the lower ear.

- D- The ear projects 23 degrees away from the temporal scalp.
- E- The top of the ear is at the level of the brow. The bottom of the ear is at the level of the base of the nasal columella.
- F- The ear sits at a distance of one ear's length posterior to the lateral orbital rim [4].

*Key topographical landmarks include:*

- Helix.
- Antihelix.
- Scapha.
- Superior and inferior crus.
- Triangular fossa.
- Tragus.
- Antitragus.
- Concha (cyma and cavum).
- Lobule [4].

Abnormalities causing prominent ears include: Under defined antihelical fold, conchal hypertrophy, increased concho-mastoid angle, and anterior projection of the lobule [5].

## PATIENTS AND METHODS

This study was done at Alazhar university hospitals from April 2010 to November 2011 including 30 cases with prominent auricle, age group 4-12 years and follow-up period 10 months. All cases were complaining from bilateral prominent auricle with variable degrees.

Group (A): 18 case with absent antihelix and superior crus and flat anterior surface of the auricle with auricular prominence.

Group (B): 6 cases with ill defined antihelix with auricular prominence.

Group (C): 6 cases with normal auricular architecture and auricular prominence is the only complaint.

In all cases preoperative marking of new antihelix after digital contouring by 2 points at 3 levels demonstrating the area of cartilage scoring for antihelix width and another 2 point for creation of superior crus. Under general anesthesia posterior approach was used, excision of skin ellipse to facilitate muscle exposure and posterior repositioning of the auricle, the skin excision is fashioned to close the wound and place the scar in the posterior auricular crease.

Identification of auricularis posterior muscle done by manual traction of the auricle anteriorly stretching the bellies followed by blunt dissection using scissor down to mastoid fascia above and below the muscle, after dissection and identification of the muscle bellies, cartilage breaking and scoring done for creation of antihelix by tracing the preoperative marking to create appropriate width and contour in group (A).

In group (B), cartilage breaking with subperichondrial dissection without scoring.

In group (C) no need of cartilage breaking or scoring.

The corner stone step in all cases is placement of three sutures between the concha and mastoid fascia.

The first suture at the level of superior muscle belly at the convexity of the concha 5mm anterior to the its insertion in the concha to be sutured to the origin of the muscle or just behind it.

The second suture at the level of inferior belly of the muscle 2-3mm anterior to its insertion and tied to its origin, just plication of the muscle may be enough in some cases.

The third suture site differs according to the degree of upper third prominence and requires surgeon experience to keep natural auriculo-cephalic angle (it is the last suture to be done after placement of first and second suture and better to be located 8mm above superior muscle belly and tied to concha just inferior to fossa triangularis).

The 3<sup>rd</sup> suture was required in 11 case only 8 cases from group (A) and 3 cases from group (B), 10 cases of them ranged between 8-12 years old and one aged 5 year. The 3 repositioning suture were done by PDS 3/0 with round needle.

6 cases required fishtail excision of the skin behind the ear lobule to correct its prominence.

The skin closure in two layers: Inverted lambert S.C suture by PDS 4/0 with round needle and simple interrupted skin suture by proline 5/0 cutting needle.

Postoperative dressing done using vaseline gauze in the helical groove and fossa triangularis to help in cartilage molding with soft post auricular pad and also application of soft pad over the auricle followed by gentle application of crepe bandage including all the auricle and surround the occipute and forehead for 10 days.

### RESULTS

All cases showed good healing and satisfactory aesthetic outcome as expressed by parent and child except one case from group (C) required second procedure to correct the prominence of the upper third. Another case complaint of palpability of a knot under the skin with stinging sensation which required short procedure to burry this knot. Three cases from group (A) developed dusky discoloration of the skin which resolved one week later.



Fig. (1): Auricularis posterior muscle.

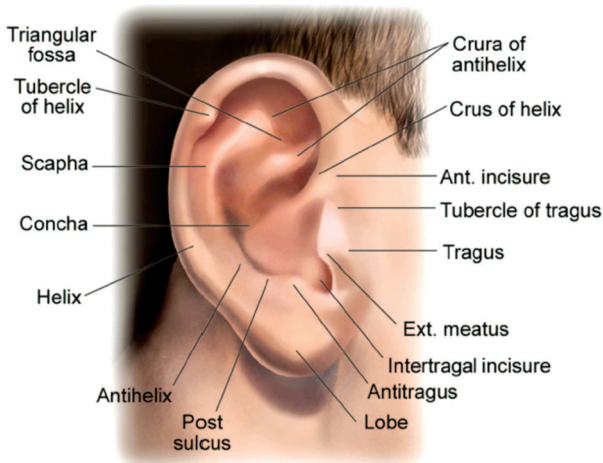


Fig. (2): Topography of the auricle.

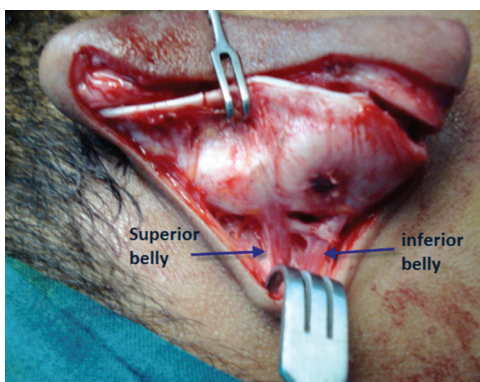


Fig. (3): Identification of auricularis posterior muscle bellies.



Fig. (4): Preoperative marking after digital remodeling of the auricle.



Fig. (5): Cartilage scoring.

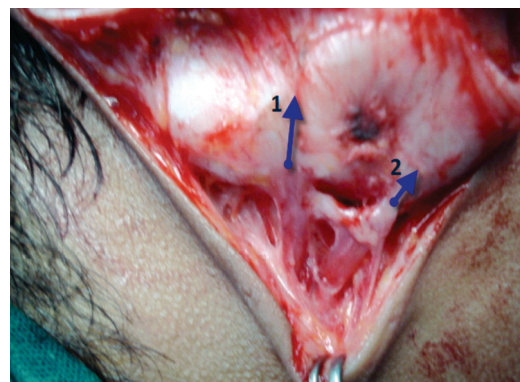


Fig. (6): Sites of first and second suture.  
 (1) The first suture at the level of superior muscle belly 5mm anterior to its insertion.  
 (2) The second suture at the level of inferior belly of the muscle 2-3mm anterior to its insertion.



Fig. (7): The first suture at the level of superior belly of auricularis posterior muscle.



Fig. (8): The second suture at the level of inferior belly of auricularis posterior muscle.

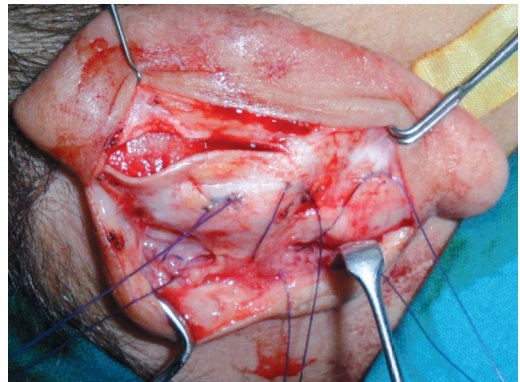


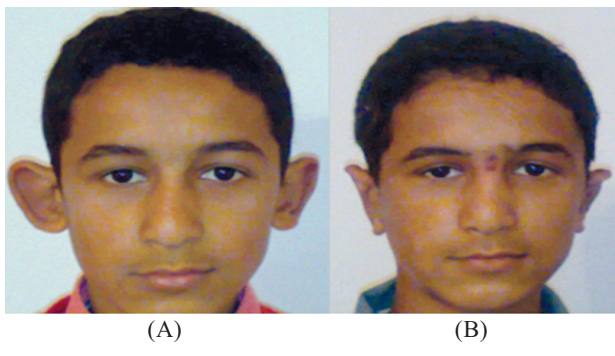
Fig. (9): The three suture before repositioning of the auricle.



Fig. (10): The third suture site differs according to the degree of prominence.

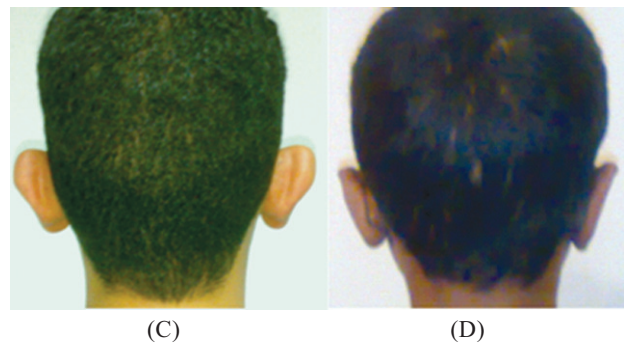


Fig. (11): Fishtail excision to correct prominence ear lobe.



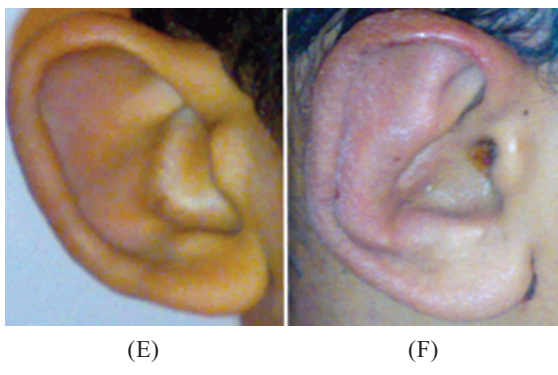
(A)

(B)



(C)

(D)



(E)

(F)

Fig. (12): Twelve years old child pre and post: (A,B) Pre and post anterior view, (C,D) Pre and post posterior view, (E,F) Pre and post close up lateral view.

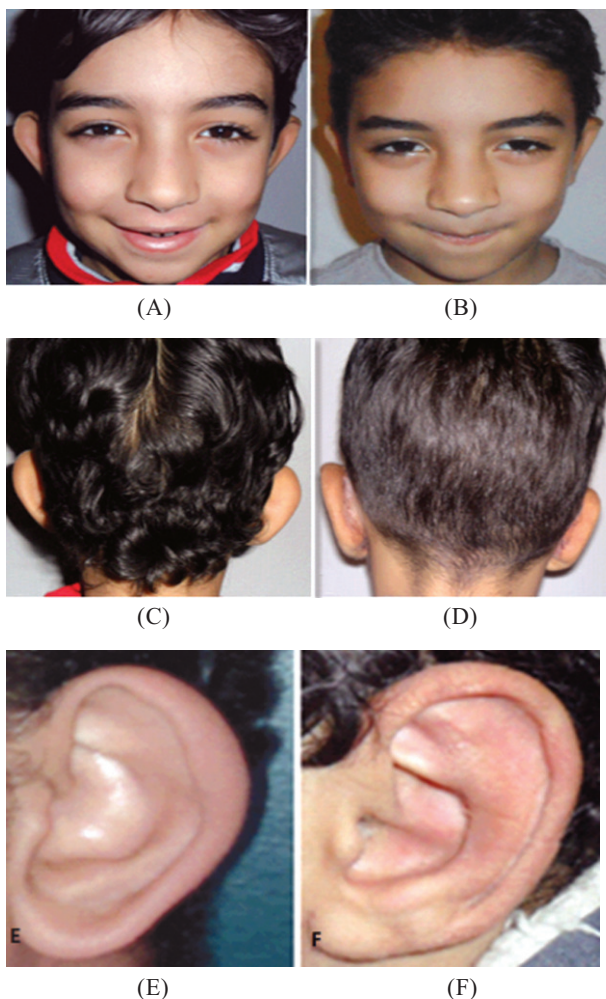


Fig. (13): Five years old child pre and post: (A,B) Pre and post anterior view, (C,D) Pre and post posterior view, (E,F) Pre and post close up lateral view.

## DISCUSSION

Otoplasty is one of the most common plastic surgical procedure among other ear deformities [6]. Many authors advocate that the prominent auricle deformity must be analyzed according to three major components include, wide auriculocephalic angle, ill defined antihelix and deep concha [7,8].

Several techniques have been described to correct this deformity with variation in approach, cartilage remodeling, scoring with or without skin excision. Over than two hundred techniques have been published in management of prominent auricle with various modification but with lack of knowledge about fixed identified points for placement of sutures to reposition of the auricle [9,10]. Cartilage sparing technique using plicating mattress (mustarde) to correct antihelical fold and also to reposition the auricle with or without skin excision still

used by some plastic surgeon with high recurrence rate due to cartilage recoil and need of secondary correction [11].

Cartilage cutting techniques with scoring to create antihelix in addition to single concho-mastoid suture to reposition the auricle with or without skin excision also used by several authors and advocated by resultant natural appearing auricle but there is incidence of development of telephone pole deformity due to subsequent forward protrusion of the upper and lower third (ear lobule) [12].

In this study the second suture which lie 2–3mm anterior to the insertion of inferior belly of auricularis posterior muscle help in production of natural protrusion of the ear lobule and can be supplemented by fish tail excision of the skin to gain natural appearance, also the third suture which determined in the study by 8mm above the superior belly of the muscle is helpful to correct auriculocephalic angle and require surgeon experience to produce natural projection of the auricle. Skin excision is helpful to easy exposure of the muscle and for location aesthetically pleasing scar in post auricular crease.

Outcome of this study show that, overall patient satisfaction is excellent, with a recurrence rate generally less than 4 percent (one case only from group (C)).

## Conclusion:

Auricularis posterior muscle is a good landmark for placement of concho-mastoid suture and repositioning of the auricle. It can be used as fixed point in most of cases by its superior and inferior muscle bellies for first and second suture placement but the third suture depends on the surgeon experience and requirement of each case.

## REFERENCES

- 1- Cole P. and Stal S.: Prominent ear deformity. Plastic Surgery Clinical Problem Solving. McGraw-Hill Professional, 18: 110-114, 2009.
- 2- Limandjaja G., Breugem C., Mink van der Molen B. and Kon M.: Complications of otoplasty: A literature review. J. Plast. Reconstr. Aesthet. Surg., 62: 19–27, 2009.
- 3- McMinn R.: Ear. Last's Anatomy Regional and Applied. 9<sup>th</sup> ed. Churchill livingstone. London, 6: 526-534, 2009.
- 4- Huang C. and Lorenz H.: Aesthetic Otoplasty, Handbook of Plastic Surgery. INFRMA-HC, 112: 1011-1015, 2006.
- 5- Ellis D.A. and Keohane J.D.: A simplified approach to otoplasty. Otolaryngol., 21: 66-69.0, 1992.
- 6- Hackney L.: Plastic surgery of the ear. Select Read Plast. Surg., 16: 1-31, 2001.

- 7- Schwentner I., Schmutzhard J., Deibl M., et al.: Health-related quality of life outcome of adult patients after otoplasty. *J. Craniofac. Surg.*, 17: 629-635, 2006.
- 8- Becker D.G., Lai S.S., Wise J.B., et al.: Analysis in otoplasty. *Facial Plast. Surg. Clin. North Am.*, 14: 63-71, 2006.
- 9- Adamson P.A. and Litner J.A.: Otoplasty technique Re-published in: *Otolaryngol. Clin. North Am.*, 40: 305-318, 2007.
- 10- Furnas D.W.: Correction of prominent ears by concha-mastoid sutures. *Plast. Reconstr. Surg.*, 42: 189, 1968.
- 11- Mustardé J.C.: The correction of prominent ears using simple mattress sutures. *Br. J. Plast. Surg.*, 16: 170, 1963.
- 12- Lentz A.K., Plikaitis C.M. and Bauer B.S.: Understanding the unfavorable result after otoplasty: An integrated approach to correction. *Plast. Reconstr. Surg.*, 128: 536-544, 2011.