

# Posterior scoring pinnaplasty for correction of prominent ears

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## Aim of work

In this study, we present our experience with correction of prominent ears by posterior scoring only without elevation of the anterior perichondrium of the auricle.

## Rationale

By avoiding an anterior subperichondrial flap, we managed to reduce operative time, convalescence, and complications, with no effect on postoperative outcome.

## Keywords:

otoplasty, pinnaplasty, prominent ears

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## Introduction

Prominent ears are one of the most common congenital defects; they occur in 5% of the population [1]. The condition is autosomal dominant in inheritance and is described as a protrusion of the auricle greater than the normal auriculocephalic angle ( $>30\text{--}40^\circ$ ). The main abnormalities are the absence of the antihelical fold and a large, deep conchal bowl [2].

Although the physiological consequences of prominent ears are negligible, the esthetic and psychological impact can be considerable. This is especially poignant in children and adolescents who may develop behavioral problems because of the associated emotional trauma.

Studies [3,4] comparing data before and after corrective surgery for prominent ears reveal improved quality of life, an improvement in self esteem, decreased psychosocial anxiety, and decreased anxiety states, specifically in children.

As school-aged children are more likely to suffer the psychological consequences of peer ridicule, it is recommended that the ideal age for surgical correction, or pinnaplasty, is between the ages of 5 and 6 years. Further, at this age, children are about to start or have just started attending school and are able to participate in their own postoperative care.

The auriculocephalic angle is the angle between the auricle and the scalp, viewed from the posterior aspect. It is normally  $30\text{--}40^\circ$  in measurement. The distance between the helical rim and the scalp should be slightly less than 2 cm with this angle (Fig. 1).

A ear appears prominent or protruding if it projects more than 2 cm or more than  $40^\circ$  from the temporomastoid plane of the skull.

In the frontal view, the helical rim should be seen lateral to the lateral most exposure of the antihelix.

Da Silva Freitas *et al.* [5] compared the auriculocephalic angles of 15 patients with prominent ears with those of 15

persons in a control group. The average auriculocephalic angle was  $47.7^\circ$  in the study group and  $31.1^\circ$  in the control group.

Dieffenbach [6] first described a technique for surgical correction of prominent ears in 1845, and since its origin, several techniques have been developed but the goals of pinnaplasty, as described by McDowell [7] in 1968, remain the same: the protrusion in the upper third of the ear should be eliminated, the helix of both ears should be seen lateral to the antihelix from the frontal view, the helix should have a smooth and regular contour, the postauricular sulcus should not be markedly decreased or disturbed, the ear should not be placed too close to the head, and the contours and positions of the two ears should match closely but not be symmetrical.

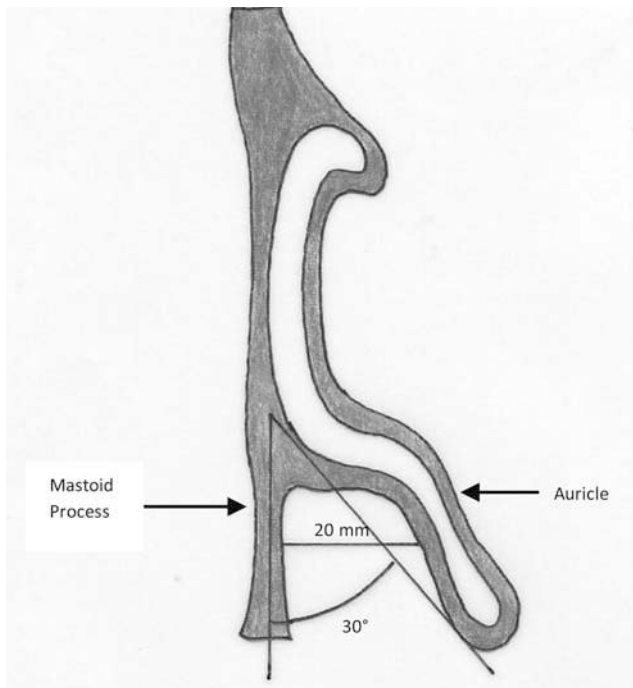
In 1963, Mustarde [8] first described a cartilage-manipulating technique that involved restoration of the antihelical fold using permanent conchoscaphal horizontal mattress sutures. In 1968, Furnas [9] described a conchal setback technique that involved the use of permanent conchomastoidal sutures.

In 1930, Pierce [10] described posterior scoring of the cartilage to weaken the crest of the antihelix, facilitating the formation of a fold.

Stenstrom [11] advocated anterior scoring of the antihelix to prevent anterior warping that he observed when posterior scoring alone was performed. He theorized that this occurred when the intrinsic mechanical properties of the cartilage were destroyed because of elastin disruption and perichondrial stripping during surgery.

The technique of incisionless otoplasty (ear pinning), developed by Fritsch [12] in the early 1990s, involves inserting a needle through the skin for anterior scoring, followed by suturing of the auricle to the scalp; however, according to the UK National Institute for Health and Clinical Excellence, the evidence for its efficacy and safety is inadequate both in quality and quantity.

Figure 1



Auriculocephalic angle.

Graham and Gault [13] described a technique for minimally invasive endoscopic-assisted otoplasty. They approached the posterior aspect of the auricular cartilage through a port in the temporal scalp and placed sutures by means of postauricular stab incisions. By moving a large scar into the scalp, a ear keloid or hypertrophic scar may be avoided. Preliminary results were promising but long-term follow-up and reproducible results are needed before it can be recommended as a procedure of choice. Possible drawbacks are technical difficulty and prolonged operative time.

Ear molding in neonates using special splints is popular in Japan but must be done while maternal estrogens are still circulating in the infant's blood stream to allow change in the shape of the auricular cartilage.

The multitude of different approaches indicates that there is not one clearly definitive technique with which to correct these problems.

### Patients and methods

This study included 30 patients operated upon during the past 2 years, with a total of 59 operated ears as one patient was unilateral because of traumatic avulsion of the auricle at a young age. The patient's ages ranged from 4 to 28 years, with an average age of 12 years. Patients were followed up for a minimum of 6 months and a maximum of 2 years.

Patients with an auriculocephalic angle greater than 40° were included in the study.

Esthetic evaluation of the ear for preoperative planning was carried out by standard preoperative photography.

Figure 2



Posterior scoring through a postauricular flap.

This included photographs taken in the frontal, posterior, right and left lateral, and right and left oblique views.

### Surgical procedure

- (1) Surgery was performed under general anesthesia with the patient in the supine position and the ear to be operated upon facing upward.
- (2) The skin was infiltrated with a solution of 1% xylocaine with epinephrine 1 : 200 000.
- (3) An ellipse of skin from the posterior aspect of the auricle was removed.
- (4) The skin was dissected off the posterior aspect through the incision.
- (5) Posterior scoring of the perichondrium and cartilage was performed using a no. 15 blade. Scoring was performed in a grid-like manner (Fig. 2).
- (6) The auricle was bent backwards and stabilized with three permanent prolene Mustarde sutures, creating a new antihelical fold.
- (7) The auricular perichondrium was then sutured to the mastoid periosteum using prolene Furnas sutures.
- (8) The postauricular incision was closed using interrupted Vicryl 3-0 sutures.
- (9) The ears were dressed with antibiotic covered tulle and an elastic crepe bandage.
- (10) Total operative time was ~1.5 h for both ears.

### Postoperative care

- (1) Patients were administered Azithromycin postoperatively for 3 days along with analgesics.
- (2) They were discharged on the same day as the surgery.
- (3) The dressing was removed after 7 to 10 days.

### Discussion

Pinnaplasty is a technically challenging procedure because of the complex anatomy and position of the auricle.

Figure 3



Preoperative and postoperative photographs of a patient with protruding ears.

The ultimate goal of pinnaplasty for prominent ears is to make the ears less prominent, while maintaining a normal appearance and symmetry. Adequate auriculomastoid separation ( $>10$  mm) is essential to avoid the glued-on ear appearance. It is also important that the scars are invisible and the results are lasting.

Elliott [14] divided complications of otoplasty into early and late sequelae. Early complications include hematoma, infection, chondritis, pain, bleeding, pruritus, and necrosis. Late sequelae include unsightly scarring, patient dissatisfaction, suture problems, and dysesthesias.

In a retrospective comparison of Mustardé's posterior suturing technique with Stenstrom's anterior scoring technique, Tan [15] found that although patient satisfaction with the esthetic results were the same between the two approaches, ears treated using Mustardé's method required more than twice as many reoperations (24.4 vs. 9.9%). Further, Tan confirmed the presence of complications such as sinus formation and wound infections caused by the presence of sutures (15% incidence).

In our series, we did not encounter any sinus formation, and only very mild superficial wound infections were seen in two ears, which were easily managed.

Calder and Naasan [16] reviewed their experience with 562 Stenstrom otoplasties and found a 16.6% overall complication rate with an 8% incidence of residual deformity.

Adamson *et al.* [17] found that patients who had undergone cartilage-cutting procedures tended to have higher rates of revision and persistent postoperative stigmata compared with those who had undergone cartilage-sparing procedures.

Our procedure is cartilage sparing, and we agree with the findings of Adamson and colleagues as regards the postoperative results and revision rates.

Careful scoring of the posterior aspect of the antihelix and concha in a grid-like manner breaks the elastic recoil of the cartilage, making it more malleable and easier to reshape. We did not notice any anterior warping as observed by Stenstrom.

In this technique, as only the posterior auricular skin is dissected, we noted the following benefits when compared with anterior and combined approaches: reduced operative time, fewer complications, especially

hematoma and scar formation, earlier discharge from hospital, and quicker recovery with less postoperative pain.

Early complications of pinnaplasty include hematoma, infection, chondritis, pain, bleeding, pruritus, and necrosis. Late sequelae include scarring, patient dissatisfaction, suture problems, and dysesthesias.

The only complication that we encountered was a superficial infection at the suture line in two ears, which was easily controlled with further antibiotic treatment and local wound dressing. We did not encounter any instances of hematomas, skin necrosis, suture extrusion, hypertrophic scars, or keloids.

The majority of patients are satisfied with their postoperative appearance (Fig. 3). Only one patient is scheduled for revision surgery because of slight asymmetry between both sides.

This simple technique is suitable for use in the vast majority of patients with prominent ears. However, one must always be flexible and tailor the procedure to the abnormalities unique to each patient.

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## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

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