

Case Report**Minimally invasive anterior approach otoplasty for children with prominent ears: case report and scoping review****Trimartani Koento, Eva Tami Handari**

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ABSTRACT

Background: Prominent ears are one of the most common facial deformities in children. Although primarily a cosmetic issue, this condition can have significant social and psychological impacts on children, leading to the need for otoplasty at an early age. Otoplasty, a corrective surgical procedure, has undergone various innovations aimed at achieving satisfactory aesthetic outcomes, while minimizing complications. **Purpose:** To convey surgical techniques used in otoplasty for children with prominent ears. **Case report:** A 5-year-old patient presented with complaints of absent external auditory canals and prominent ears. The patient was diagnosed with bilateral auricular atresia, and prominent ears. The parents also reported speech delay in their child. Otoplasty was performed using the latest technique, with adjustments to the antihelical fold and reduction of conchal projection. **Result:** Following otoplasty using the newly introduced *setback otoplasty technique* described by Raunig, the patient demonstrated significant improvement in the aesthetic appearance of the ears with a more harmonious projection. Postoperative complications were minimal, with no signs of infection or residual deformity. The patient also continued postoperative speech therapy to address the speech delay. **Conclusion:** Advances in otoplasty with the *New Concept* Rauning technique had proven effective in correcting prominent ear deformities in children, yielding favorable aesthetic outcomes, with minimal complications. Early otoplasty can correct ear shape abnormalities and improve the child's quality of life, both cosmetically and psychosocially.

Keywords: otoplasty, prominent ears, auricular atresia, minimal invasive anterior approach (Raunig technique), Mustardé technique

ABSTRAK

Latar belakang: Prominent ears, atau telinga 'caplang', merupakan salah satu kelainan telinga yang paling umum terjadi pada anak-anak. Meski sifatnya lebih merupakan kelainan kosmetik daripada fungsional, masalah ini dapat memengaruhi aspek sosial dan psikologis anak, sehingga tindakan otoplasti sering kali diperlukan sejak usia dini. Otoplasti, sebagai prosedur bedah korektif, telah mengalami berbagai inovasi dengan tujuan memberikan hasil estetika yang memuaskan sekaligus mengurangi risiko komplikasi. **Tujuan:** Untuk memaparkan teknik operasi otoplasti yang dapat digunakan pada anak dengan 'caplang'. **Laporan kasus:** Pasien berusia 5 tahun datang dengan keluhan tidak adanya liang telinga, dan telinga 'caplang'. Pasien di diagnosis dengan atresia auricular bilateral dan 'caplang'. Orang tua pasien juga melaporkan keterlambatan bicara pada anak. Otoplasti dilakukan menggunakan teknik terbaru, dengan penyesuaian pada lipatan Antiheliks dan pengurangan proyeksi conical. **Hasil:** Setelah prosedur otoplasti, dengan menggunakan Teknik terbaru yang diperkenalkan oleh Raunig yaitu teknik "minimally invasive anterior approach", pasien menunjukkan perbaikan signifikan dalam tampilan telinga dengan proyeksi yang lebih harmonis hanya dengan insisi kecil dibagian anterior. Komplikasi pasca operasi minimal, tanpa tanda-tanda infeksi, atau deformitas residual. Pasien juga melanjutkan terapi wicara pasca operasi untuk mengatasi keterlambatan bicara. **Kesimpulan:** Perkembangan otoplasti dengan teknik terbaru menurut Mustardé terbukti efektif dalam memperbaiki deformitas 'caplang' pada anak, dengan hasil estetika yang baik, dan komplikasi minimal. Otoplasti dini dapat memperbaiki kelainan bentuk telinga dan meningkatkan kualitas hidup anak, baik dari aspek kosmetik maupun psikososial.

Kata kunci: otoplasti, telinga menonjol'caplang', atresia aurikular, teknik Rauning, teknik Mustardé

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INTRODUCTION

In children, one of the most common congenital craniofacial abnormalities seen is bulging or prominent ears. These deformities, while primarily cosmetic, can have significant psychosocial implications, often prompting parents to pursue corrective interventions to overcome potential emotional distress and social stigma.¹

There are no definitive epidemiological figures, but the prevalence has been reported to reach as high as 22.5%.² Other studies estimated the incidence of prominent ears to be approximately 5%.³

The diagnosis of this condition is typically subjective. Most authors agree that normal auricular protrusion is defined as less than 21 mm from the mastoid surface.¹ Most authors agree that normal auricular protrusion is defined stated as less than 21 mm from the mastoid surface.¹ Prominent ear is defined when the helicon-mastoid distance is more than 25 mm.¹¹

The management of prominent ears has evolved over time to include various surgical approaches, such as the *New Concept* technique of Mustardé, Furnas, and Stenström methods. These approaches have been periodically refined to improve cosmetic outcomes while minimizing the need for additional corrective procedures. Given that the primary goal of otoplasty is cosmetic, substantial efforts are directed toward achieving reliable, stable, and aesthetically pleasing results through modern reconstructive techniques. Otoplasty is a commonly performed pediatric otorhinolaryngological procedure. While its indications are primarily cosmetic, functional issues may occasionally arise. Corrective

surgery is conducted in both private and public healthcare settings for adolescent and adult patients.³

In this case report, we present a 5-year-old female patient with complaints of billateral prominent ears, ear tags and without the presence of ear canal on both ears.

LITERATURE REVIEW

Anatomy of the external ear

The auricle (pinna), which projects from the side of the skull, and external acoustic meatus, which extends inside, are the two main parts of the external ear.⁴ The auricle is a structure on the side of the head, that is made up of cartilage and covered with skin. Its structure is structured in a pattern of depressions and elevations. The helix forms the prominent outer rim of the auricle and terminates inferiorly at the fleshy lobule, which is the only part of the auricle not supported by cartilage. The concha is the central hollow part of the auricle, from which the external acoustic meatus arises.⁴ Detailed anatomy is illustrated in Figure 1.

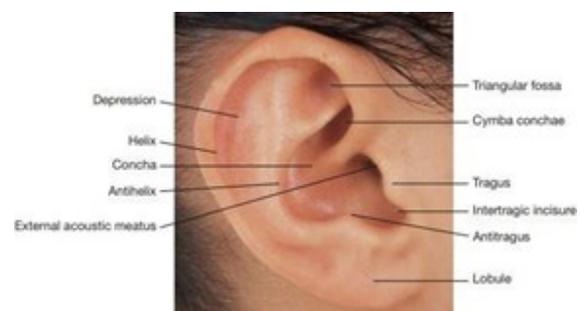


Figure 1. Anatomy of the outer ear⁴

The auricle is composed of key structures—helix, antihelix, concha, tragus, and lobule—whose shapes vary among individuals, along with accessory parts such as the antitragus, intertragal notch, and Darwin's tubercle. The average adult ear measures about 6 cm in height and 55% in width, with a conchal depth of 1.5 cm. Normally, the helix lies 2–5 mm lateral to the antihelix; absence of a clear antihelical fold causes the helix to droop forward, producing a prominent ear.⁶

An auriculocephalic angle of less than 25 degrees is formed when the auricle extends just over 2 cm from the mastoid process.¹ Typical distances between the ear's helix and mastoid bone are 10–12 mm in the top half, 16–18 mm in the middle half, and 20–22 mm in the bottom half.⁴ The helix-to-mastoid distance of the two ears are almost equal, the difference is only less than 3mm.¹

One helpful axis for finding the ear's spatial connection to the eyes, nose, and eyebrows is the Frankfort horizontal plane.⁶ Near the tragus apex, this plane connects with the inferior orbital rim. On top, the upper helix is in line with a horizontal plane that runs parallel to the Frankfort plane and starts at the lateral eyebrow. There is a horizontal line between the nasal tip and the earlobe. Along with its vertical axis, the auricle produces a 15–30° posterolateral divergence, giving it a slightly rotated appearance when viewed from the side.⁶

The auricle contains both intrinsic and extrinsic muscles. The intrinsic muscles of the auricle interconnect with various segments of the auricular cartilage, influencing the shape of the auricle. The external muscles, on the other hand, include the auricle muscles (anterior, superior, and posterior)—anchoring the auricle to the cranial structure, and might play a role in its position.⁴

Definition of prominent ear

One of the most prevalent auricular abnormalities seen in children is prominent ears. Parents often seek out surgery to address auricular abnormalities due to the emotional and cosmetic effects on their children. Early otoplasty is in high demand because of the significant social and psychological impact from craniofacial abnormalities existence.¹ Among congenital auricular anomalies, prominent ears are the most prevalent and often affect both ears. About 5% of people have ears that stick out in some way; this is more of an aesthetic issue than a medical one.⁷

Although some congenital or genetic illnesses, such as Fragile X syndrome, are linked to a small number of auricular malformations, the actual cause of these abnormalities is still unknown. Another factor that might cause auricular malformations is if the second branchial arch is not properly developed during pregnancy due to factors like radiation or hypoxia. However, these pathophysiological mechanisms remain conjecture and are not conclusively linked to ear deformities.⁸

Severity level of prominent ear:

- Grade I: Most of the auricular structures are identifiable, exhibiting only mild abnormalities. Extra skin or cartilage is usually not needed for reconstruction. Macrotia, prominent ears, cryptotia, no superior helix, very small tragal abnormalities, satyr ear, Darwin's tubercle, extra folds (Stahl's ear), colobomata, and lobular deformities (such as pixied lobule, macrolobule, no lobule, lobular colobomata, bifid lobule, and cup ear deformities) are among the deformities.
- Grade II: Certain normal auricular components are visible. More skin and cartilage may need to be used for partial

restoration. These deformities are also associated with grade II microtia and severe cup ear deformities with alterations in all dimensions, including mini ears.

- Grade III: The characteristic auricle lacks identifiable structures. Comprehensive reconstruction requires significant amounts of skin and cartilage. Typical findings include congenital aural atresia. These malformations may present unilaterally, bilaterally, or in cases of anotia.⁸

Diagnosis

In congenital aural atresia or anotia, the auricle often lacks clear structures, requiring reconstruction with skin and cartilage. Evaluation focuses on ear size, position, projection, rotation, shape, and symmetry, to guide surgical planning. Auricular dimensions are measured by height, width, and projection, often using calipers to assess the distance between the helical rim, lobule, mastoid process, and facial landmarks. Normal values include a conchal depth under 1.5 cm and an auriculocranial angle below 25°. Cartilage thickness and stiffness are also evaluated, though variations show little impact on surgical outcomes.^{1,10}

Management

Achieving a natural look with smooth and aesthetically attractive curves is the objective of correcting prominent ears. Auricular setback should be harmonious, ensuring that the ears appear perfectly positioned to the other auricular components. McDowell⁹ conducted research providing more precise otoplasty targets.⁹ After the top third of the ear had been properly corrected, it was fine to correct the middle or lower thirds, but not the other way around. From the front, you should be able to see that both ears' helixes go beyond the antihelix, reaching up to the mid-auricle

level, at the very least. Surgeons should aim to achieve an “unoperated” appearance of the ear, with smooth and natural curves. All the way down its length, the auricular helix should be perfectly smooth. It is important to avoid extreme narrowing or deformity of the postauricular sulcus, and to keep the ear away from the skull, particularly in men. In the top third, the measurement should be 10-12 mm, in the middle third, 16-18 mm, and in the bottom third, 20-22 mm, of the posterior distance from the helical rim to the mastoid skin. Both ears should always be positioned symmetrically within 3 mm of each other, measured from the side border to the top of the head.

When it comes to surgical procedures, there are few options for dealing with prominent ears. When treating the top part of the ear, one option is to utilize antihelical fold manipulation. The many methods that have been recorded may be categorized according to the methods used to manipulate the cartilage: scoring, moulding, and fracture treatments. Suture fixation is essential for cartilage moulding and suturing treatments, since it secures the scaffold in its new place. When it comes to restoring the antihelix, the Mustardé method stands out.¹¹(Figure2).

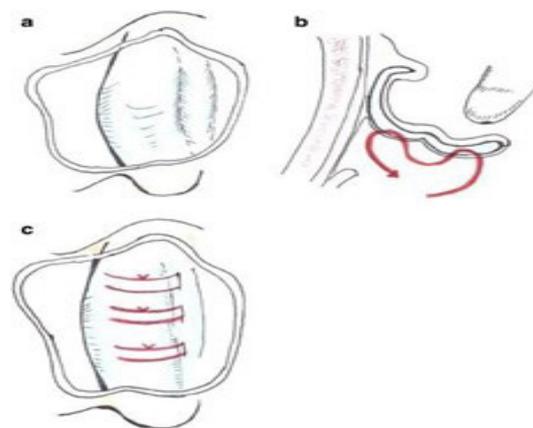


Figure 2. Mustardé technique for antihelical flap¹¹

To keep the perichondrium linked to the auricular cartilage, scissors are used to incise the posterior skin across the helix, antihelix, and concha. In order to reconstruct the antihelical fold, non-absorbable conchoscaphal mattress sutures are placed on the posterior cartilage. For conchoscaphal mattress sutures on the anterior cartilage, there is some evidence that an anterior approach is preferable. This method is supposedly less invasive, requires less skin flap dissection, and reduces the likelihood of postoperative discomfort and haematomas.¹¹

Another method involves cartilage fracture techniques. This procedure involves cutting full-thickness incisions in the cartilage in a parallel fashion to the desired antihelical fold, ensuring that the anterior perichondrium remains unaffected. Cartilage between incisions is reshaped into a tube, sutured, and thinned, such that the antihelical form remains intact. Another option is to use an anterior scoring method that is based on Gibson's assumption. In this method, the desired concavity or convexity is achieved by bending the cartilage towards the unscored surface. The extent of scoring affects the degree of cartilage curvature. These strategies can be employed individually or in combination, each with distinct advantages and limitations.¹²

Suturing, excising, and scoring are some of the methods utilized to treat conchal abnormalities.¹³ Reducing prominence and superfluous conchal cartilage in the top two-thirds of the ear is possible, with the use of conchomastoid sutures.⁵ Detailed techniques are illustrated in Figure 3.

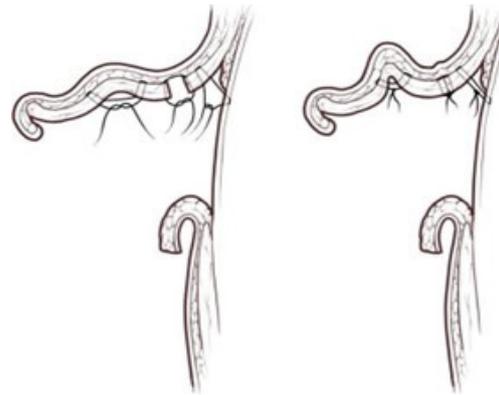


Figure 3. Conchomastoid Sutures¹¹

During suturing, non-absorbable sutures are inserted into the periosteum, mastoid fascia, and conchal cartilage.⁵ The conchal bowl and middle ear are moved posteriorly during this surgery. Sewn too far forward on the mastoid or too far back on the concha may cause the conchal cup to rotate too much, which can block the external auditory canal. In such a case, it may be necessary to undergo conchal excision, or make adjustment to the sutures.¹³

In cases of excessive conchal depth, conchal excision is indicated. This procedure, which may be approached from the front or the back, is carried out at the point where the back wall meets the base of the conchal bowl.¹⁴ The anterior approach is commonly used for skin and cartilage excision, while the posterior approach is typically reserved for cartilage-only excision. No documented advantage exists for either technique. Furthermore, conchal deformities can be corrected by scoring the cartilage using Gibson's approach, at the point when scoring the concha's front surface pulls the wall of the concha backwards. Because of this, the conchal wall becomes a scaphal surface.¹²

Methods that focus on the lobule itself either fail to take lobular location into account, or perhaps make it more prominent. Verify that the lobule and helical rim are perpendicular to one another. By establishing a reference point close to the retrolobular sulcus, the Gosain method may relocate the lobule with little disruption to surrounding tissue. On the inside of the lobule, between the control point and the incision created after the auricle, a perpendicular cut is performed, followed by removal of two triangular skin flaps on either side of the control point. Sutures are passed through the control point, fastened to the mastoid fascia and pulled taut to provide adequate lobular regulation.¹⁴ Minimally invasive techniques such as incisionless otoplasty or endoscopic approaches may also be considered.¹

Minimally invasive approach techniques, such as small incision otoplasty or endoscopic approaches, may also be considered.¹ Minimally invasive otoplasty / anterior approach (MIO) is a technique used to correct protruding ears by manipulating the biomechanical forces of the ear cartilage and stabilization of the new contour, using sutures applied through tiny incisions, through small skin incision, small visible exposure of the cartilage as possible. Precision using rasp and combined with cartilage filing; suturing, like Mustardé technique, only not from the posterior but from anterior incision under the helical incision.¹⁵ Sketch of minimal invasive approach. (Figure 4).

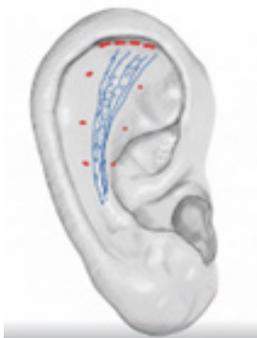


Figure 4. Minimal invasive approach, small horizontal incision under superior helix

CASE REPORT

A 5-year-old female patient came with bilateral prominent ears, ear tags, and ear canal atresia. The patient's parents reported that the ear prominence had been noticeable since birth. There were no complaints of ear pain, discharge, or itching. The parents mentioned that she had not been able to speak fluently, and was only able to articulate one to two words. The child's developmental history revealed that she started walking at 21 months, and speaking at 3 years of age. However, the patient was able to respond when her name is being called, and understood when spoken to. The patient was currently undergoing speech therapy. There was no family history of similar complaints, and no other congenital abnormalities, or comorbid conditions.



Figure 5. Ear tags and bilateral prominent ear with atresia

On physical examination, the patient was fully conscious, with stable hemodynamic status. Examination of the right ear revealed a prominent ear with an absence of the external auditory canal, accompanied by a large ear tag that resembled an auricular accessory. Examination of the left ear similarly showed a prominent ear with no identifiable external auditory canal And accompanied by a small preauricular ear tag. Nasal examination and other physical findings were within normal limits.

The patient was diagnosed with bilateral prominent ears, bilateral atresia, and ear tags. (Figure 5).

Auricle evaluation revealed helix mastoid distance (HMD) was more than 20mm, stiff auricular cartilage, and there was a missing antehelix fold bilaterally. (Figure 6).



Figure 6 . Prominent ears posterior view

We decided to remove all ear tags and perform otoplasty through a small incision, minimal invasive anterior approach (Raunig technique).

Prophylactic antibiotic therapy with Cefazolin 500 mg once daily was administered preoperatively.

The patient was prepared for surgery under general anesthesia, and positioned supine on the operating table. Aseptic and antiseptic preparation of the surgical area was performed. Markings were made on the preauricular ear tag areas. Physiological saline mixed with epinephrine at a ratio of 1:200,000 was injected into the tissues.



Figure 7. Marking for future antihelix curve

The ear tag was excised, and the base flap was stitched using 4-0 Vicryl sutures to reconstruct a new tragus, ensuring a natural postoperative auricular appearance. The shape of both ears was then treated with incisions and reposition. To improve the auricular contour, extra cartilage from the front was removed.

Following the removal of the ear tags, otoplasty was performed. Markings were made to shape the future antihelical fold. (Figure 7). Raunig's technique was employed, utilizing a small horizontal incision along the helical rim, extending to the inferior crus. The skin was elevated over the antihelical fold at the subperichondrial level anteriorly, and the subcutaneous plane posteriorly, using sharp instrument to score/rasp the ear cartilage creating the future antehelix fold.

The superior helix crus incisions were then folded, and secured with 4-0 Prolene sutures in a figure-of-eight pattern, providing structural stability and symmetry to the auricles. The inferior helixes were fixated with gauze using a through-and-through suture. (Figure 8). The patient demonstrated good postoperative recovery with minimal scarring and pain, as observed in Figure 9.

Six months postoperatively, the scars were not visible, and the patient reported satisfaction, with further hearing assessment scheduled.

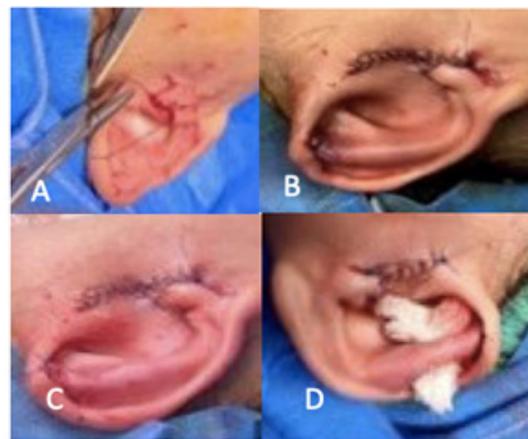


Figure 8. A. Sutured using 4-0 Prolene in a figure-of-eight pattern, B and C. Suturing and creating antihelix, D. inferior helix was fixated with gauze through-and-through suture

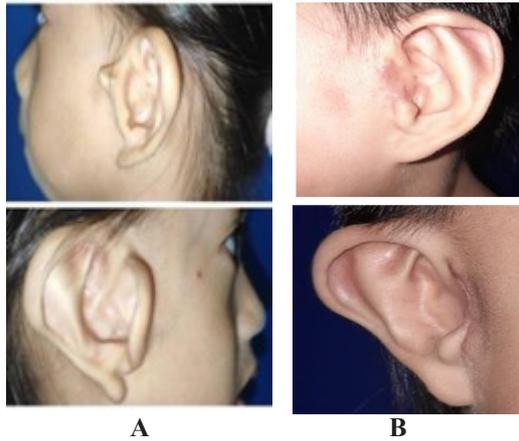


Figure 9. A. Before and B. Six month after surgery

CLINICAL QUESTION

Based on the above case report, the clinical question can be formulated as: “How was prominent ear be managed using otoplasty surgery?”

Patients: Pediatric patient with prominent ears.

Intervention: Otoplasty surgery for prominent ears.

Comparison: Furnas, Mustarde, Raunig surgical techniques (minimal invasive anterior approach).

Outcome: Patient/family satisfaction. No complication.

METHOD

The literature search was conducted using three online databases: Cochrane, PubMed, and ScienceDirect.

The eligibility criteria for the literature search were as follows:

1. Inclusion criteria:
 - a. Studies involving pediatric patients under the age of 18.
 - b. Study designs including systematic reviews, meta-analyses, randomized controlled trials (RCTs), cohort research, including case reports,

case control studies, cross-sectional studies, and other types of studies. included in this scoping review.

- c. Studies involving patients with prominent ear undergoing otoplasty.
 - d. Recent studies published within the last five years.
2. Exclusion Criteria:
 - a. Literature reviews, editorials, and commentaries.
 - b. Articles in languages other than English and Indonesian.
 - c. Studies without full-text availability.

The literature search using the specified keywords in the three online databases yielded a total of 289 titles. After screening, 274 studies were excluded as they did not meet the inclusion criteria and/or fell within the exclusion criteria. Four studies underwent full-text review, and one study was excluded for not performing otoplasty techniques on pediatric patients. A total of three studies were case-control studies, cross-sectional studies, and case reports.

The study by Teaima et al.¹⁵ was a case series involving 32 prominent ears treated with incisionless otoplasty, a minimally invasive technique. This procedure could be performed under general or local anesthesia, depending on the patient’s level of cooperation. Auricular surface labelling with a blue marker pen indicated the anchor suture positions. The antihelix was reshaped, and the conchal protrusion was reduced in each auricle, by using of three anchor sutures.

The first step involved placing the first suture in the anterior helix area to create the superior antihelical root. Located at the very top of the primary antihelical stem was the second suture, while the third, just above the lobule and antitragus, was at the very bottom of the expected antihelix. Once the suture locations were determined, local injection of 1:100,000 adrenaline in saline solution was

administered to both auricular surfaces. Then, using a small scalpel, a 1mm incision was made at four marked points, particularly at Point A, which was extended to insert the suture. The skin was separated from the perichondrium using small scissors inserted through these points.

Non-absorbable 4-0 sutures were then introduced, drawn from one end of the ear to the other end, via the auricular cartilage without passing to the other side. Under the skin, the suture was directed from Point B to Point C. Then, by tracing the cartilage, it was guided from Point C to Point D, and finally back to Point A beneath the skin. This process ensured the entire suture pathway remained concealed and invisible externally. The sutures were tied multiple times to ensure stable tension, with slight overcorrection recommended, since suture tension might decrease within the first three postoperative months.¹⁵

The second study, a retrospective cohort study by Sert et al.¹⁶, described the modified fish-tail technique performed on 21 prominent ears, under general or local anaesthesia. The excess skin on the back of the ear was surgically removed using an elliptical incision for the repair.

The Furnas sutures will narrow the concha-mastoid angle, by suturing the concha to the mastoid periosteum, primarily correcting excessive conchal prominence or a deep conchal bowl. While Mustardé sutures create or enhance the antihelical fold by placing permanent mattress sutures between the conchal fossa and the scapha. These two techniques are often combined to address the different anatomical causes of prominent ears: a deep conchal bowl and underdeveloped antihelical fold.¹⁶

Once the basic ear correction was completed, focus shifted to the lobule. The modified fish-tail technique began by marking the excision boundaries vertically on the posterior lobule, beginning at the lower end of the elliptical excision that had been done earlier. This excision was carefully performed

to keep the horizontal width of the excision boundaries limited, preventing a lobule that appeared too narrow or pinched when viewed laterally. It was of the utmost importance to make certain that the incision was terminated at a minimum of 0.5 centimetres above the lowest edge of the lobule, to guarantee that the scar would not be visible.

Once the fish-tail excision was finished, the skin on the outside of the incision was dragged inside to find the best spots to stitch to fix the lobules. Point 1 was sutured to Point 1' and Point 2 was sutured to Point 2'; the suture locations were highlighted with methylene blue. Correct lobule form repair was achieved by applying asymmetric oblique sutures across the suture gaps. It was possible to immediately remove the triangular area at the base of the incision, to fix a dog ear deformity, or to suture the inferior lobule to relocate it superoposteriorly.

These sutures are designed to provide adjustable vertical alignment and adequate correction through asymmetric oblique sutures, all with minimal skin excision. Once all steps are completed, the entire incision is closed using a continuous mattress suture technique with 3-0 monocryl (Ethicon, USA). The outcomes of this procedure showed no wound dehiscence, infection, recurrence, hematoma, or hypertrophic/keloid scarring, making it an effective and safe technique for correcting prominent lobules with a very low risk of complications.¹⁶

The third study, a retrospective study by Raunig,¹⁷ described New Concept technique performed on 398 patients with protruding lobules. The procedure began by outlining the helical tail as an initial guide. Next, an oval skin excision was performed in the fold area between the antihelix and lobule, marking the medial edge of the helical tail with a black marker.

In order to mobilise the anterior skin, the subsequent step entailed performing sub-tunneling via the space between the medial edge and the conchal cartilage, providing

better surgical access. Several small incisions were then made on the medial edge (marked with black ink) to carefully separate the tissues while preserving the lateral edge's integrity. To correct the weakened lobule, a subcutaneous incision was made on the lateral side, while a penetrating incision was made through the conchal cartilage on the medial side.

The outcomes of this procedure for 398 patients were followed up for periods ranging from 1 month to 8 years. The technique demonstrated very low complication rates. While one instance needed unilateral surgery, three cases necessitated bilateral revision of the ear, including the lobule. Typically, problems involving the projecting lobules were a result of both hypoplastic antihelix, and hypertrophic conchal cavity.¹⁷

Table 2. Study characteristics

Study ID	Study design	Sample size	Mean age	Surgical technique	Study findings
Teaima et al., 2020	Case series	32 ears	15.31±6.3	Incisionless otoplasty (Minimally invasive technique) <ul style="list-style-type: none"> • Performed under general or local anesthesia. • Three retention sutures were used for each ear, tied through four points behind the ear to form the antihelix and reduce the conchal bowl. • The sutures were placed subcutaneously, making them invisible externally. • The procedure required no postoperative dressing or inpatient care. 	<ul style="list-style-type: none"> • Efficacy demonstrated an 88% satisfaction rate across all cases. • Minimal complications observed, including mild ear protrusion in 2 ears and suture extrusion in 3 ears, which were re-sutured under local anesthesia. • No perichondritis or hematoma was reported. • Six-month follow-up revealed corrected ear protrusion without evident surgical scars.
Sert et al., 2024	Retrospective cohort	21 patients	14(5 – 17)	<ul style="list-style-type: none"> • Modified fish-tail technique The procedure began with elliptical excision of excess skin from the posterior ear. • Excess conchal cartilage was measured, trimmed as required, and sutured. • In order to reduce the height of the conchomastoid angle, furnas sutures were used, followed by lobule correction through a vertically oriented fish-tail skin excision. • Oblique asymmetric sutures were employed to unite the excision edges, with predefined suture points marked using methylene blue. 	<ul style="list-style-type: none"> • All patients underwent bilateral lobule correction using the modified fish-tail technique. • No cases of wound dehiscence, infection, prominent lobule recurrence, or hematoma were observed during the follow-up period. • No patient was found to have hypertrophic or keloid scarring, according to the findings. • The follow-up time was 15 months on average, with a range of 12 to 24 months. • The study concluded that this technique effectively adjusted vertical l o b u l e height with minimal skin excision, minimizing the risk of hypertrophic or keloid scarring.

Raunig et al., 2020	Retrospective	398	4-18	New concept	<p>Follow-up periods for the duration of follow-up periods for 398 patients varied anywhere from one month to eight years. The described technique demonstrated a very low complication rate. Three cases required bilateral revision of the ear and lobule, while one case necessary change at the unilateral level. It was discovered that the majority of patients had substantial lobular malformations, which were a mix of hypoplastic antihelix and hypertrophic conchal cavity abnormalities.</p>
<ul style="list-style-type: none"> • The procedure commenced by outlining the helical tail as a preliminary guide. An oval skin excision was performed in the crease between the antihelix and lobule, marking the medial edge of the helical tail with black ink. • A sub-tunneling procedure was performed between the medial edge and the conchal cartilage in order to mobilise the anterior skin and provide improved access for surgical procedures. • Multiple small incisions were made along the marked medial edge to carefully separate tissues while preserving the lateral edge intact. To address lobular weakness, lateral incisions were made subcutaneously, while medial incisions penetrated the conchal cartilage. 					

DISCUSSION

On our case subject, the patient was found to have prominent ears on both sides of his head. In accordance with the Weerda classification system, our patient was diagnosed with a grade I ear deformity, which was classified as a minor malformation with majority of the auricular structure intact.¹⁰ A prominent ear is an uncommon congenital auricular deformity which has an incidence rate of 1 in 10,000 to 20,000 live births. Males are more likely to be affected by this condition than females. In majority, auricular abnormalities and middle ear malformations are unilateral, with the right ear more often being affected.

However, inner ear abnormalities are less occurred. In addition to conductive hearing loss that lasts from childhood into adulthood, atresia of the external auditory canal could be present in majority of people with this disorder. Prominent ear can manifest with a physically

and functionally normal middle ear, or might be associated with abnormalities. Additionally, some patients may exhibit this deformity as part of syndromic conditions, such as Treacher-Collins syndrome, Goldenhar syndrome, and Crouzon syndrome.¹⁸ In our patient, no systemic abnormalities were found. However, a delay in verbal development was noted, as the patient was only able to speak one or two words, and began speaking at the age of 3 years. This raised the possibility of underlying syndromes, necessitating further evaluation to rule out associated conditions.

For our patient, we employed Setback Otoplasty surgery (Raunig technique). An initial incision was made at the designated site, followed by an undermining procedure, which carefully separated the skin from the underlying tissue while preserving the inferior portion as the base flap. The base flap was then sutured to create a new tragus, ensuring

a more natural ear appearance postoperatively. Subsequently, incisions and repositioning were performed on the anterior and posterior aspects of the ear. Excess cartilage on the anterior side was removed and sculpted, to refine the ear shape. The superior scapha incision was then curved and sutured through the hyaline cartilage in a figure-eight pattern, providing a strong and symmetrical auricular structure. This approach, referred to as the *New Concept* technique, is primarily used to treat underdeveloped antihelical folds.¹ This novel suturing technique corrects prominent ear deformities by forming and binding the antihelical fold with figure-eight stitches.¹⁸ The outcomes achieved a highly natural appearance, with straight helices and smooth, rounded antihelical contours free of irregularities or sharp edges. The scapho-antihelical angle measured approximately 90 degrees, and the concha-antihelical angle appeared smooth and natural. During the formation of the new antihelix, it is anticipated that the cartilage may attempt to revert to its original position, emphasizing the importance of precisely delineating the cartilage edges. Raunig et al.¹⁷ reported from 398 patients' follow-ups, which lasted from one month to eight years, that this method had a very low complication rate. The result from Messner et al. study of 1-year postoperative follow-up, noting a surgical revision rate of 3% and a cartilage recurrence rate estimated at 10% to 15%; and Deleito et al. using a combined Mustardé and Furnas method, reported that 77% of patients achieved good outcomes, 18% were satisfied, and the remainder required revision surgery. With a revision rate of about 13.6%, the Mustardé technique has complication rates ranging from 0.4% to 24%.^{2,9,10} Infections, haematomas, pruritus, persistent protrusion/asymmetry, and problems with the palpability, visibility, and extrusion of sutures were among the documented consequences in the literatures. Suture extrusion rates, suture line granuloma development, and recurring abnormalities owing to suture deterioration had all been linked to the Mustardé method in the past, ranging from 0% to 22.2%.^{19,20}

There was little need for revision surgery after a Mustardé otoplasty, and both the patients and surgeons reported great pleasure with the results. Between 24 and 476 weeks of follow-up, Boroditsky et al.²⁰ documented 119 Mustardé otoplasties in 68 individuals. The median follow-up was 72 weeks. Out of this group, 51 of them had both ears operated on. The duration of the operation ranged from 31 to 133 minutes, with an average of 95 minutes. Small issues such as suture extrusion (n=20), haematoma (n=1), and suture abscess (n=1) were among the 24 minor complications recorded in 17 patients. The revision rate was 1.7% due to major difficulties, which included reoperations (n=2). Overall, 97% of patients and surgeons reported satisfaction with the aesthetic outcomes.²⁰ A study combining the Mustardé and Furnas techniques, found no hematoma, no infected surgical sites, nor too large scars. One ear developed chondritis, and five patients (8.3%) had obvious scarring or foreign body granulomas on the posterior ear.⁵

Bilateral residual deformities were noted in three patients in one year postoperative. There was one case of total recurrence (1.7%), and one patient declined further correction.²¹ Raunig et al.¹⁷ reported on follow-ups in 398 patients, with very low complication rates. Bilateral lobular deformity revisions were necessary in three cases, and unilateral revisions in one case. Prominent lobular deformities typically resulted from hypoplastic antihelix and hypertrophic conchal cavity abnormalities.

Several studies compared the Mustardé technique with others. One study involving 20 patients with prominent ears (15 males and 5 females) divided them into two groups. The comparison showed high patient satisfaction in both groups. None of the patients in either group experienced bleeding, hematoma, keloid formation, suture extrusion, skin or cartilage infection, skin necrosis, or recurrence. Antihelical irregularities were not observed in group A (Mustardé method) but were identified in one patient (5%) in group B (Stenström technique). As a result, the Mustardé procedure

was preferred for correcting prominent ears in young children with soft or thin cartilage, whereas the Stenström technique was recommended for adults with firm cartilage.²¹

Correlating the concha with antihelix reconstruction involved removing conchal cartilage along the remaining mastoid cartilage sutures, preventing narrowing or collapse of the external auditory canal. Conchal cartilage disruption could obscure the transition to the antihelix. Combined with Mustardé sutures, this technique provided a natural and aesthetically pleasing ear appearance. Loss of conchal cartilage could reduce antihelical projection.²¹ The implementation of the *New Concept* procedure,¹⁷ brought satisfying outcomes in this patient.

In conclusion, advanced techniques in otoplasty, such as the *New Concept* procedure had been proven effective in correcting prominent ear deformities in children. These approaches resulted in significant aesthetic improvements with minimal complications.

Early otoplasty not only provides physical correction of the ear shape, but also plays a vital role in enhancing the quality of life in children, both cosmetically and psychosocially. Therefore, surgical intervention is highly recommended for children with prominent ears, to achieve optimal outcomes and mitigate potential psychological impacts.

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