

Incisionless Otoplasty

Abstract

Importance

This study evaluates the postoperative outcomes achieved with incisionless otoplasty for the correction of prominauris.

Objective

To determine whether incisionless otoplasty is a reliable and replicable technique in correcting prominauris.

Design, Setting, and Participants

This study consisted of a retrospective electronic medical record review for 72 patients undergoing incisionless otoplasty for the correction of prominauris by a single surgeon from November 2006 to April 2013. Follow-up ranged from 1 to 87 months. The patients were operated on at both St Joseph's Health Centre (a community hospital) and The Cumberland Clinic (private practice) in Toronto, Ontario, Canada. All patients undergoing an incisionless otoplasty for the correction of prominauris were eligible. Participants' ages ranged from 3 to 55 years, with the majority being adults. Seventy patients were followed up for outcomes.

Interventions

Incisionless otoplasty.

Main Outcomes and Measures

Number and type of sutures used, perioperative complications, and postoperative follow-up including complications and revisions. Complications included infection, hematoma, bleeding, perichondritis, suture granuloma, suture exposure, and suture failure.

Results

A mean (SD) 2.5 (0.8) sutures were used in the left ear, 2.48 (0.75) in the right ear, and 4.69 (1.75) in total. The number of sutures used in the left vs right ear was not significantly different ($P = .60$). All patients had horizontal mattress

sutures placed for correction of prominauris. There were no serious perioperative complications such as infection, bleeding, hematoma, perichondritis, or cartilage necrosis. Follow-up data were extracted and analyzed in 70 patients, with a mean follow-up time of 31 months. Complications were seen in 10 patients (14%): 4 were due to suture failure, 3 were due to suture exposure, 2 were due to granuloma formation, and 1 was due to a Polysporin (bacitracin zinc/polymyxin B sulfate) reaction. Nine patients (13%) needed a revision to achieve a desirable result.

Conclusions and Relevance

The technique of incisionless otoplasty used in this study was well tolerated and effective in both pediatric and adult patients, producing favorable outcomes with minimal complications. This procedure is less invasive than its open counterpart and seems at least equally effective in longevity.

Level of Evidence

4.

Prominent ears are one of the most common congenital deformities, with an incidence of 5% in whites.¹ Typically, the protrusion is rooted in an obtuse concha-scapha angle, conchal hypertrophy, or a combination of the two.² The most common presentation involves a lack of development of the antihelical fold creating confusion between the concha and the scapha, giving an unappealing aesthetic appearance.¹ Because of this unfavorable cosmesis, both children and adults can experience psychosocial distress.³⁻⁵ As a result, otoplasty is of paramount importance in patients affected by prominauris and can drastically improve outcomes.

According to Adamson and Strecker,¹ otoplasty refers to any surgical procedure with the goal of restoring the normal relationship of the auricle with the head. The earliest references of otoplasty came in the 10th century in India and the 16th century in Bologna in its most crude form. The first report of otoplasty as a surgical correction of prominent ears was in 1845 by Dieffenbach, who used a skin excision to move the pinna back.¹ Over time, surgeons have modified these techniques to improve the procedure and its outcomes. In the late 1800s and early 1900s, all techniques were primarily based on skin excisions and cartilage incisions at different points in the ear aimed at correcting the absent antihelical fold and mitigating conchal hypertrophy. Although each improved on their predecessor, surgeons encountered problems such as a high rate of recurrence, scarring, wound complications, and sharp antihelical borders that were unappealing.^{1,6,7} In 1949, Becker combined prior cartilage incision techniques with suturing in order to preserve anatomical changes for a lower recurrence rate.^{1,6} Soon after, Mustarde (1963) and Furnas (1968) pioneered the use of conchoscaphal and conchomastoid sutures with little to no cartilage incision; this is the foundation of incisionless otoplasty.^{6,8,9}

Fritsch¹⁰⁻¹² described the beginnings of true incisionless otoplasty in 1992, a procedure that came about in order to use a more favorable minimally invasive technique that minimizes the complications and reduces the recovery time of its open counterpart. Incisionless techniques avoid cartilage irregularities commonly found postoperatively in open, cartilage cutting, or carving otoplasty and also give the surgeon more control over manipulation of the ear in real time as the sutures are being placed.¹ Since 1992, Fritsch^{11,12} has modified the procedure to make it faster by reducing the number of steps and to create a more aesthetically pleasing result. Incisionless otoplasty fulfills the goals of otoplasty as outlined by McDowell: correction of the protrusion, creation of a smooth antihelical fold, avoiding disturbance of the postauricular sulcus, and preventing a plastered-down postoperative appearance with a sharp looking antihelical fold.^{1,8} Although incisionless otoplasty can be used in young children, it should be noted that nonsurgical means have been shown to be successful in correcting prominauris in infants.^{10,13}

Currently, there are no published studies that include adults in an incisionless otoplasty series. This article presents a large series of incisionless otoplasty patients and aims to show that this technique is a well-tolerated and reliable outpatient procedure with good outcomes in both pediatric and adult patients.

Methods

Medical Record Review

Institutional review board approval was obtained from St Joseph's Health Centre. A retrospective electronic medical record review was conducted for 72 patients undergoing incisionless otoplasty for the correction of prominent ears by a single surgeon (A.G.) from November 2006 to April 2013 at St Joseph's Health Centre and The Cumberland Clinic in Toronto, Ontario, Canada. Variables of interest included patient age at time of otoplasty, preoperative diagnosis and ear deformity type, unilateral or bilateral procedure, anesthetic used (local vs general), number and type of sutures used, perioperative complications, and postoperative follow-up including revisions and complications. Included in the definition of complications were infection, hematoma, bleeding, perichondritis, suture granuloma, suture exposure, and suture failure. Undercorrection or persistent deformity were considered unsatisfactory results. Statistical analysis was performed using Microsoft Excel 2010 version 14.0 (Microsoft Corp).

Surgical Technique

Patients are prepared and draped using a head drape, body sheet, and 2 adhesive ear drapes (Steri-Drape 1020; 3M Company). The pinnae are injected with lidocaine hydrochloride, 1%, with epinephrine, 1:200 000, obtaining proper blanching and distribution of the solution on the anterior and posterior aspects of the pinna and avoiding overinjection. A 22-G hypodermic needle is

then used to percutaneously score the cartilage at the level of where the antihelical fold is to be recreated. Anywhere from 2 to 4 sutures (4-0 Ti-Cron [Covidien] or 3-0 Mersilene [Ethicon]) using a free curved needle (Regular Surgeons ½ Circle 1834-7D; Anchor Products Company) are then placed percutaneously following a Mustarde type of horizontal mattress suture to recreate the antihelical fold and reduce some of the conchal prominence ([Figure 1](#) and [Video](#)). The first 32 patients in this series were operated on using Fritsch's original technique, where 2 different sized needles are used and the suture breaches both the posterior and anterior surfaces of the pinna.¹⁰ The technique was then simplified to use only the larger of the 2 needles and avoid breaching the anterior surface of the ear. This simplified the technique significantly and made it quicker. A similar technique was later published by and nicely illustrated by Fritsch.¹¹ When a conchomastoid suture is required or a protruding ear lobe needs correction, we use the percutaneous technique described by Fritsch¹² in 2009. When the procedure is completed, the ears are cleansed with sterile saline solution and dabbed with antibiotic ointment. In young children we place a light cotton wool and glycerine otoplasty dressing that is kept on for approximately 24 hours. Older children and adults have an athletic headband put on or no dressing at all. All patients are asked to use an athletic headband at night for 2 weeks and told they can wear it during the day if desired. Patients are followed up in the office in 1 week.

Figure 1. Suture Placement in Incisionless Otoplasty and Transcutaneous Placement

Suture placement in incisionless otoplasty (A and B) and transcutaneous placement of the sutures (C).

^aPlacement of antihelical fold sutures.

^bPlacement of conchomastoid suture.

^cPlacement of cauda helicis suture.

Results

A total of 72 patients were included in the study. Ages ranged from 3 to 55 years, with a mean (SD) age of 13.6 (10.3) years. Sixty patients were 18 years or younger (pediatric population), and the other 12 patients were older than 18 years (adult population).

In terms of preoperative diagnosis and ear deformity, 65 patients (90%) presented with absent antihelical folds as either the exclusive deformity or as part of a more complicated pattern. The other 7 patients (10%) presented with conchal bowl hypertrophy or a more severe lop ear deformity. Sixty-six patients were operated on for the correction of bilateral prominauris, and the remaining 6 for unilateral prominauris. All patients younger than 13 years

were given general anesthetic, whereas 11 patients (15%) 13 years or older were given general anesthetic, with the remainder receiving local.

In terms of sutures used, a mean (SD) of 2.5 (0.8) were used in the left ear, 2.48 (0.75) in the right ear, and 4.69 (1.75) in total. The number of sutures used in the left ear vs the right ear was not significantly different ($P = .60$). All pediatric patients younger than 13 years were corrected with the use of 4-0 Ti-Cron sutures. The remaining patients 13 years or older were operated on using 4-0 Ti-Cron sutures and/or 3-0 Mersilene sutures as required. We found that some adults and older teenagers required the thicker suture to obtain and maintain proper correction. All patients had horizontal mattress sutures placed for the correction of their deformity. Five patients had bilateral percutaneous conchomastoid sutures in addition, and 3 patients had cauda helicis sutures for the correction of prominent ear lobes ([Figure 1](#)). No serious perioperative complications such as infection, bleeding, hematoma, perichondritis, or cartilage necrosis were experienced by any patients in the data series with the exception of 1 minor reaction to Polysporin ointment (bacitracin zinc/polymyxin B sulfate; Johnson & Johnson).

Follow-up data were extracted and analyzed in 70 of the 72 patients. The range of follow-up was 1 to 87 months, with a mean (SD) follow-up time of 31.0 (29.5) months. Complications were seen in 10 of the 70 patients (14%): 4 were due to suture failure, 3 were due to suture exposure, 2 were due to small localized granuloma formation, and 1 was due to an allergic Polysporin reaction (resolved uneventfully in 1 week). No patients had overcorrection or infection. Nine patients (13%) needed a revision to achieve the desired result. Of these, 7 were unilateral procedures and 2 required both ears corrected. Of the 9 revisions, 5 were performed with the use of local anesthesia. Only 4 patients had an incisionless otoplasty revision because of suture failure following an operation by the primary surgeon (A.G.); the rest were performed because of unfavorable results in terms of undercorrection. Of the 9 revisions, 1 required an open otoplasty to correct a fairly severe lop ear deformity that did not improve enough with the incisionless technique. Most of these revisions required only a single suture to improve the result. Two patients underwent incisionless otoplasty to revise a prior open procedure that was performed elsewhere. One patient underwent incisionless otoplasty to revise an incisionless operation performed in Germany. No patients needed more than 1 revision. Pretreatment and posttreatment photographs are shown for an adult patient ([Figure 2](#)), a pediatric patient ([Figure 3](#)), and a teenaged patient ([Figure 4](#)).



Figure 2. Adult Patient

Pretreatment (top row) and posttreatment (bottom row) views.



Figure 3. Pediatric Patient

Pretreatment (top row) and posttreatment (bottom row) views.



Figure 4. Teenaged Patient

Pretreatment (top row) and posttreatment (bottom row) views.

Discussion

This is the largest series to date that presents the results of incisionless otoplasty. It is also the first to include adult patients. This is an important difference in previous studies because, albeit less of a clinical issue, prominent ears are still undesirable for many adults. Incisionless otoplasty gives adult patients a chance to correct the ear deformities that were not managed at a younger age. Outcomes were favorable in the adult population, with only 1 patient needing a revision.

This study agrees with others in terms of pediatric outcomes after incisionless otoplasty. Strychowsky et al¹⁴ found few complications in their study of 19 pediatric patients, with none having signs of significant infection, hematoma, wound dehiscence, or skin necrosis. Revision rates were similar (10.5% vs 12.9%).¹⁴ Similarly, Fritsch¹¹ has proven the efficacy of the operation with over 10 years of follow-up in his data series.

Incisionless otoplasty by this technique has proven to be effective in correcting prominauris caused by an absent antihelical fold, conchal hypertrophy, or both. The minimally invasive nature, easy recovery with no need for long-term dressings, and outpatient advantage of incisionless otoplasty makes it a more ideal option vs open otoplasty in cases where it is indicated. In teenagers, local anesthetic is typically used, and the patient can return home right after the procedure. In children, general anesthesia is more common, but outcomes are favorable and the postoperative course is rather uncomplicated. Open otoplasty features higher rates of early complications such as hematoma, perichondritis, postoperative pain and bleeding, skin necrosis, and wound infections, as well as later complications such as hypertrophic and keloid scars, ear deformities, hypoesthesia or paresthesia,

recurrence of the deformity, and fistula formation in severe cases.^{1,15-17} None of these complications, except for recurrence of the deformity, were seen in this series. The only other complications were limited to suture exposure, topical dermatitis, and granuloma formation; the latter was found to have an 8% incidence in a study done by Adamson et al¹ with the use of Mersilene sutures.

All patients in this series were treated with the use of Mustarde-type horizontal mattress sutures that allowed us to correct the principal deformity in our patients. The senior author (A.G.) has found that all mild and most moderate conchal hypertrophies can be addressed with properly placed sutures along the middle to lower aspects of the antihelical fold. The use of incisionless conchomastoid sutures has been reserved for extremely prominent conchal bowl hypertrophy. A number of different techniques to address ear lobe protrusion have been used by the senior author over the years, including skin excision, cartilage reshaping, and suture techniques. The senior author's experience with the cauda helicis suture and percutaneous cartilage release described by Fritsch¹¹ is limited but encouraging.

The concept of revision in the present series of incisionless otoplasty warrants discussion. Nine patients underwent a revision to achieve their desired result. The ease of revision is an important factor, affecting the rate of follow-up procedures: 5 of the 9 patients were able to have this procedure under local anesthetic, and most required just a single suture. Patients are motivated to undergo a revision procedure because it can be done in a short period as an outpatient (often in an office setting) with minimal postoperative recovery, which is not the case when this procedure is done using cartilage cutting and scoring technique or when revising with an open Mustarde and Furnas technique. As a result, many patients who are slightly displeased by a perceived lack of symmetry, amount of correction, or recurrence of the deformity may find it easier to request and undergo another procedure. Another important motivating factor that increases the revision rate in our practice is that otoplasty is a fully insured service up to the age of 18 years in most of Canada.

Conclusions

Overall, the technique of incisionless otoplasty used in this study was well-tolerated and efficacious in both pediatric and adult patients, leading to favorable outcomes and minimal complications. It is an extremely versatile technique that can be applied for the correction of the majority of these types of ear deformities, with replicable and consistent results that are very natural looking and pleasing to both patients and surgeons. The senior author has found absolutely no difference in the longevity of the results when compared with his own open approach otoplasty patients. It is speculated that the cartilage scoring and ensuing inflammatory reaction and scar formation caused by the operation and suture placement help maintain the results in the

