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All content was reviewed and approved by members of the International Society of Auricular Reconstruction Congress, which held full responsibility for the abstract selections.

O-01 Placement of Osseointegrated Implants at the Time of Ear Elevation; Lessons Learned

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Aims:

To review patient outcomes following placement of osseointegrated hearing prostheses at the time of costal cartilage microtia reconstruction.

Background:

Osseointegrated implants are an effective treatment for conductive hearing loss. Patients with microtia are a target population for this type of prosthesis, as most have intact sensorineural hearing but atypical or absent ear canals, middle ears, and ossicles. No prior evidence has demonstrated the safety of implantation at the time of microtia repair.

Methods:

Single-institution (Stanford Children’s Hospital) review of patient outcomes following placement of osseointegrated hearing implants from 2020–2023. All patients with microtia underwent a Firmin-technique two-stage repair, with placement of the Cochlear OSIA or Med-El Bonebridge implant performed at the time of the second stage procedure or with a revision procedure following completion of initial microtia reconstruction. The incision for OSIA implants was performed using a modified technique incorporating the prior postauricular incision, which varies from manufacturer recommendations.

Results:

Thirty-six patients with microtia reconstruction received osseointegrated implants. Twenty patients underwent placement of a Cochlear OSIA implant at time of second-stage ear elevation; in this group there were no documented major complications. Sixteen patients had placement of the OSIA or Med-El Bonebridge implant at the time of a revision procedure after two-stage reconstruction; 2 patients had complications requiring operative intervention for explantation. Several minor complications were managed conservatively with serial exams.

Conclusions:

Placement of osseointegrated implants concurrently with ear elevation or during a secondary microtia revision is safe and efficient in most patients. We found fewer complications when the implant was placed at the time of ear elevation (second stage) compared to implantation performed as separate standalone surgery. Care on placement of the implant away from the junction of the posterior skin graft incision line,

and away from the neck muscles inserting onto the occiput, may decrease risk of post operative pain, hematoma, and risk of implant exposure.

O-02 Feasibility of a Novel Computer-Assisted Approach to Planning Atresiaplasty in Poor/Borderline Candidates

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Aims:

To show that computer tomography (CT) image segmentation and computer-assisted drill trajectory planning could help define anatomic relationships in congenital aural atresia (CAA) patients with challenging anatomy.

Background:

Surgical repair of CAA is challenging. High resolution CT imaging has improved preoperative assessment of highly variable and abnormal patient anatomy. However, the use of scans for surgical planning and image-guided surgery has not fully been explored.

Methods:

CT scans from CAA patients seen at a quaternary care center in the past ten years were extracted from the medical record. Surgical candidacy was assessed using the Jahrsdoerfer grading scale. Representative scans were selected to cover the range of surgical candidacy. Using image segmentation and trajectory planning software, simulated atresiaplasty canals of varying diameter (maximum 10mm) were generated. The facial nerve, middle ear volume, and malleus-incus complex were segmented, and distance from planned drill path to facial nerve was calculated.

Results:

Eight patients were included (mean age 6.9 ± 3.0 years). Three had “very good” to “excellent” J-scores with maximum canal diameter (MCD) of 10mm and average distance from facial nerve (DFN) of $1.61\text{mm} \pm 0.78$. Three “marginal” to “fair” candidates had a MCD of 10mm, average DFN of $1.64\text{mm} \pm 1.34$. One “poor” candidate was unable to accommodate a canal without facial nerve violation. A second “poor” candidate had an average DFN of 5.21mm, and could accommodate only a 3mm diameter canal. For borderline surgical candidates, finding an optimal drill path was significantly dependent on start/end points and optimal angulation, with less tolerance for error when compared to planning for “good” to “excellent” candidates.

Conclusion:

Pre-operative trajectory planning appears feasible for use in evaluating CAA patients, and may be particularly useful in surgical planning for borderline atresiaplasty

candidates. This technique may hold promise in developing future image-guided surgical techniques with improved safety, efficiency, and outcomes.

O-03 Recent 50 cases of Primary Autogenous Total Auricular Construction

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Purpose:

Recent 50 cases of primary autogenous total auricular construction was analyzed.

Patients and methods:

Nagata-type skin approach was used for all cases. 6 types of templates developed by senior author was used for all patients. 6-9th ipsilateral rib cartilage were harvested without perichondrium. Rib cartilage donor site was reconstructed by making perichondrium pocket, and grafting diced rib cartilage into the pocket in all cases. Second stage is designed to elevate the auricular construct for glasses for vision and reading, and mask for infection prevention. TPF was used for elevation in 49 cases(98%) , and post auricular fascia flap was used in 1 case (2 %). To cover the fascia flap, Scalp STSG was used in 30 cases(60 %), chest skin was used in. 20 cases(40%).

Results:

Satisfactory results were achieved in vast majority of cases with excellent anterior surface sensation. Chest deformity was clinically not seen in this series. Complications: Pneumothorax 1 case that was intra-operatively repaired(2%). Partial anterior lobule flap necrosis required surgical repair: 1case(2%), Helix deformity required revision at second stage:1case(2%), wire extrusion:2 cases(4%), failure of ear elevation required revision:1 case(2%).

Conclusion:

Nagata skin approach, four flaps approach for lobule and small concha type, V-shape incision for concha for concha type, Nagata-type 3D framework, rib cartilage donor site reconstruction, combined with author's auricular templates, give us satisfactory results in vast majority of cases with minimum complications. The shape of posterior W-flap is almost always asymmetry to achieve 15-20 degree posterior inclination of the ear construct. W- flap allows to create stable and deep concha bowl in all cases. We do not encounter rib cartilage donor site depression. With the use of ear splint after second stage, maintenance of ear elevation becomes stable.

O-04 Using the external auditory canal skin graft of the healthy side to treat unilateral congenital aural atresia: a randomized clinical trial

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Aims:

To determine whether the healthy external auditory canal (EAC) skin graft can maintain the ear canal health after atresioplasty in unilateral congenital aural atresia (CAA) cases.

Background:

After atresioplasty in CAA cases, there were three major clinical problems: restenosis, infection and tympanic membrane lateralization. These problems make it difficult to maintain the health of EAC. The existence of EAC skin is the core to keep EAC healthy after atresioplasty.

Methods:

A Zelen design randomized controlled study was used to collect unilateral CAA patients for atresioplasty prospectively (clinical trial registration number: ChiCTR2000032103). The patients were randomly divided into the control group and case group. Case group: transplant part of the healthy lateral EAC skin to repair the atresia side for unilateral CAA patients. Control group: all used scalp blade thick skin. We observed the EAC health and hearing results of two groups after atresioplasty.

Results:

A total of 34 cases were enrolled from July 2020 to September 2023. There were 20 patients in case group and 14 patients in control group, with an average age of 19 years (12-36 years). The average follow-up time was 19 months (1-36 months). The average preoperative Air-Bone Gap (ABG) is 44.7dB and postoperative ABG is 28.3dB. The complications include lateralization of tympanic membrane, re-atresia or stenosis, there were 2 re-atresia and 5 stenosis patients in this study. The incidence of complications related to atresioplasty was lower than previous studies.

Conclusions:

By optimizing the atresioplasty technology, the health of the reconstructed EAC is improved compared with the previous study. After active intervention and treatment, there was no scarring stenosis or local bone hyperplasia on the contralateral side EAC.

O-05 Optimizing Vascular Supply in Temporoparietal Fascia Harvest through Intra-Operative Endoscopic Angiography

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Aims:

Described herein is a safe and reproducible endoscopic visualization technique which provides assistance in harvesting a well vascularized temporoparietal fascia flap.

Background:

Adequate coverage of a porous polyethylene framework with a Temporoparietal Fascia Flap is key to a safe alloplastic auricular reconstruction. Incorporating both the posterior and anterior branches of the superficial temporal artery can be difficult due to limited vessel visibility, especially when using minimally invasive incisions. Intra-operative Indocyanine Green Angiography (ICG) has been successfully used across multiple surgical specialties and can be applied in pediatric microtia reconstruction.

Methods:

This is a retrospective cohort study of consecutive patients undergoing total auricular reconstruction with a porous polyethylene framework between September 2020 and October 2023. Data on patient demographics, complications, and surgical technique including use of an endoscope with and without intra-operative angiography was collected. After surgeons acquired equipment they began use of intra-operative angiography. The impact of ICG use on the rate of framework exposure was the primary outcome.

Results:

Sixty-seven consecutive ears were included for this analysis, 15 (22.4%) of which were reconstructed with the assistance of ICG angiography. Median patient age was 8 years (range 4-19 years) and 47 (70%) were male. The ears reconstructed with the use of intra-operative ICG had significantly lower rate of framework exposure (1 (6.6%) vs 9 (17.3) , $p < 0.01$) compared to those reconstructed without ICG. Operative times were not impacted by ICG and patient complications related to its use were not observed.

Conclusions:

Intra-operative use of ICG can assist surgeons in securing adequate temporoparietal fascia flap vascularity, decrease rate of exposure, and provides excellent video visualization during microtia reconstruction.

O-06 Microtia: Post-Operation & Complications Management

Lessons from 1012 Ear Reconstruction Operations

Dr Xia Chen¹

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Aims:

Ear reconstructive surgery has seen further improvements and become more mature. We adopt a more comprehensive approach based on our own experience which is safe, stable and mature, and relatively easy for young doctors to learn and implement.

Background:

Ear reconstruction presents challenges for surgeons, not only during the pre-operation and in-operation stages, but also post-operation. The post-operation stage and the treatment of complications are critical to the overall success of ear reconstruction surgery.

Methods:

We setting out details and precautions for each step of the ear reconstruction process for microtia patients, covers post-operative care: negative pressure drainage, bandaging and fixing, nursing, treatment of complications and satisfaction survey.

Results:

Over the period Jan 2015-July 2021, our surgical team treated 77 complications in 1012 microtia ear reconstructions. We present the key learnings from this high volume of operations. All complications were treated promptly and the shape of the auricle was preserved as much as possible. Patients were surveyed after the operation and expressed satisfaction with the shape of the reconstructed external auricle. Three typical cases involving different types of complications will be described.

Conclusions:

We deal in detail with the post-operation stage. We share our cumulative surgical experience gained over 20 years, especially the latest practical lessons gleaned over the last seven years.

O-07 The Correlation between Microtia Classification, Hearing Loss Levels, Types, and Meatus Acusticus Externus Morphology in Indonesia Microtia Center Universitas Airlangga Academic Hospital

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Aims:

The aim of this study was to evaluate the correlation between microtia classification, hearing loss levels, types, and meatus acusticus externus morphology in patients from Indonesia Microtia Center Universitas Airlangga Academic Hospital.

Background:

Microtia, a congenital malformation of the external ear, is characterized by incomplete development or abnormal formation of the auricle and external auditory canal, often resulting in hearing loss.

Methods:

A retrospective cohort analysis was conducted using outpatient data from 2018 to 2021. Microtia was classified into four grades according to the Marx (1988) categorization method. Hearing loss levels were assessed using ABR (Auditory Brainstem Response) testing or puretone audiometry. Hearing loss types were classified as normal hearing, conduction hearing loss, sensory hearing loss, and mixed hearing loss. Meatus acusticus externus morphology was classified as normal, stenosis, and atresia. The Spearman correlation test was used to analyze the data.

Results

Sixty-five patients were included in the study (51 men and 14 females; mean age: 16.8 years). There was a significant correlation between the degree of microtia and the levels of hearing loss for both the right ($p=0.0005$) and left ears ($p=0.0001$). There was also a significant correlation between the degree of microtia and the type of hearing loss (right $p = 0.0002$; left $p = 0.0007$). Additionally, there was a significant correlation between the degree of microtia and the morphology of the meatus acusticus externus (right $p=0.0006$; left $p=0.0002$).

Conclusions

The degree of microtia is positively correlated with the levels and type of hearing loss, and the morphological shape of the meatus acusticus externus.

O-08 Second Stage Costal Cartilage Reconstruction Revisited: Avoiding Sulcus Retraction

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Aim:

The aim of this presentation is to present a technique that avoids sulcus retraction in the second stage auricular reconstruction.

Background:

The author experienced many techniques for sulcus creation, that involved neck dissection and advancement, and placement of split and full thickness grafts. The high incidence of sulcus retraction with traditional techniques forced the author to look for alternative ways to avoid this complication.

Methods:

Combining techniques for scalp reconstruction, a rotation advancement flap is created, changing the vector of skin advancement, and adding a flap behind the ear with no tension. Reconstruction is completed with full thickness contralateral retroauricular graft and ultradelicate scalp graft.

Results:

With this technique, sulcus retraction has been avoided, proving to be superior than previous techniques.

Conclusions:

A new technique for sulcus creation is presented, that avoids the usual complication of traditional techniques.

O-09 Patient-specific factors in therapeutic decision-making regarding hearing rehabilitation in external ear anomalies

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Aims:

The aim of this study was to evaluate the decision making and timeframes between first entering the auricle consultation, where both THE EAR (auricle reconstruction) and THE HEARING (hearing rehabilitation) are discussed. Secondly it was investigated whether a BCD on softband was trialed (<4 years) and if this trial period might be of influence on decision-making regarding their choice in hearing rehabilitation.

Background:

Unilateral hearing loss (UHL) is of influence on speech and language development since the contralateral ear is not completely compensatory. Even though bone conduction devices (BCDs) are associated with good audiological outcomes, not all patients (and/or caretakers) choose to rehabilitate from an early age or rehabilitate at all, especially in unilateral microtia patients.

Methods:

A retrospective cohort study was performed, using data from a study done by Vijverberg et al. (1). In the current study patients were selected based on the etiology of the affected ear i.e., congenital microtia/atresia.

Results:

One hundred subjects were included: 36 female and 64 males. The time period between first consultation and a decision about hearing rehabilitation was shortest in the age group of 11-20 years. The unilaterally affected patients were on average older at time of bcd trial (12.0 years) compared to the bilateral affected (2.6 year). In the total study population, forty-seven (47%) patients choose to proceed implantation with a percutaneous BCD, whereas 43 (43%) choose to wait/do nothing.

Conclusions:

Proper guidance of patients (and caretakers) in emphasizing the role of binaural hearing during childhood and improving clinical standard regarding follow-up is important.

- (1) Vijverberg MA, Siemann I, Verhamme L, Eising H, Damen G, Hol MKS. Ten-year retrospective evaluation of therapeutic choices and related satisfaction in patients with auricular deformities. *J Craniomaxillofac Surg.* 2022;50(7):555-60.

O-10 Microtia Surgery: Second Stage Flap Design, From Face Lift to Ear Reconstruction

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Aims:

This study aims to report the incision and flap design in the second stage of Firmin's two-stage surgery technique, discuss complications, aesthetic outcomes, and satisfaction rate from our experience.

Background:

Ear reconstruction with autologous rib cartilage remains the gold standard for the treatment of congenital microtia. The emotional impact of the scars, even after reconstruction, is determinant in the quality of life of the patients. Therefore, the surgical technique has evolved through the years, trying to achieve an improved aesthetical outcome. The author has implemented a specific retro auricular flap design, following the hairline, for elevation during second stage of ear reconstruction.

Methods:

The ear reconstruction was performed in two stages. During first stage, the ear framework is sculpted and placed under the skin. For second stage, ear elevation was carried out using Firmin's technique and a modification of the skin flap to cover the retro auricular sulcus. The new skin flap design is inspired by the facelift incisions, with a triangular configuration, having its upper vertex in the middle third of the ear. After the final result, the patients rated their reconstructed ear from 1-10, surgeon's satisfaction was evaluated and complications were also reported.

Results:

The new flap design was performed in a total of 46 patients from 2018 to 2023. All of them with congenital microtia. According to the surgeon, 91% of the patients had a good result, the results were satisfactory in 6,5% and only 2,17% had unsatisfactory results. The average rate given by the patients was 8,6/10. Regarding ear elevation, 1,84% (n=4) of the patients had sulcus loss. No graft loss or wound dehiscence were reported.

Conclusion:

This new retro auricular flap design is a safe way to improve the aesthetic results and avoid complications as descended hairline, cicatricial alopecia and wound dehiscence. These little modifications to Firmin's technique improved the surgical results in our cohort with a low incidence of complications and a high rate of satisfaction among the patients and their parents.

O-11 One-Stage Autologous Microtia Reconstruction

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Aims:

The aim of this study is to present the surgical details of single-stage autologous microtia reconstruction, which can be an alternative to multi-stage techniques, and to evaluate the aesthetic, sensory and morphometric results of this technique.

Background:

Multi-stage autologous reconstruction is the most preferred technique in microtia reconstruction. However, negative factors such as prolonged treatment time, high treatment cost, recurrent surgeries in the same area and prolonged return to social life, are the difficulties of multi-stage techniques in clinical practice.

Methods:

23 patients who had single-stage operations between 2018 and 2022 due to unilateral microtia were included in the study.

Surgical technique: Ipsilateral three costal cartilages were taken. Cartilage frame was made of them. A piece of cartilage was placed under the frame to create the posterior sulcus. Then, the ear skin was elevated, and the superficial temporal fascia was elevated. The cartilage frame placed in the proper position was covered with this fascia. A skin graft obtained from the rudimentary ear was placed on it. A full-thickness skin graft taken from the arm was used for the posterior sulcus. Projection, length, width, postauricular sulcus depth, cephaloauricular angle, axis of the reconstructed and normal ear were measured with digital caliper. Protective sensation was evaluated with the Semmes-Weinstein monofilament test. Surgery and hospital stay times were recorded. All evaluations were performed at post-operative sixth months.

Results:

General appearance, aesthetic subunits of the ear, donor sites and Protective sensation conditions of the patients' results were acceptable in this technique. Post-auricular sulcus depth and axis angle difference between reconstructed and normal ear was similar in one stage technique patients.

Conclusions:

Successful results in terms of aesthetic, sensory and morphometric were obtained with described one-stage reconstruction by considering the basic microtia principles.

O-12 Vascular Variation of Temporoparietal fascia in Microtia Associated with Hemifacial Microsomia

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Aims

This study aimed to analyze the vascular anatomy in patients with microtia associated with HFM.

Background:

In microtia associated with hemifacial microsomia (HFM), ear reconstruction poses challenges owing to anatomical and vascular variations. A comprehensive understanding of the vascular anatomy is essential to safely elevate the temporoparietal fascia (TPF) flap and provide framework coverage. This study analyzed vascular variations in microtia associated with HFM.

Methods:

A retrospective analysis was conducted on 47 patients with microtia and HFM, who underwent computed tomography angiography between November 2011 and May 2022. The vascular course and branching, supplying the TPF were analyzed. Craniometric measurements were conducted to determine the horizontal distance from the porion and fronto-zygomatic suture (F–Z suture) to the vessels.

Results:

On the affected side, the TPF were primarily supplied by either the superficial temporal artery (STA) or postauricular artery-originated STA (Po-STA). The Po-STA (n=29) was more prevalent than STA (n=18), and it mostly exhibited a single frontal branch (n=20). Craniometric analysis revealed that the Po-STA was closer to the porion, ear vestige, and F–Z suture than the STA on the non-affected side. Furthermore, a significant correlation was observed between the severity of mandibular hypoplasia and presence of Po-STA variation (Cramer's V=0.498, p=0.005).

Conclusions:

Microtia associated with HFM exhibits vascular variations in the TPF, particularly a unique Po-STA variation. The Po-STA is prone to injury during ear reconstruction because of its proximity to the external auditory canal and ear vestige. Surgeons should be cautious of these anatomical variations for safer ear reconstruction procedures and utilize preoperative imaging for meticulous planning.

O-13 Microtia: Pre-operation and In-operation Lessons from 1012 Ear Reconstruction Operations

Dr Xia Chen¹

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Aims:

Ear reconstructive surgery has seen further improvements and become more mature. We adopt a more comprehensive approach based on our own experience which is safe, stable and mature, and relatively easy for young doctors to learn and implement.

Background:

Organ reconstruction is one of the most challenging tasks in plastic and reconstructive surgery. This is particularly true of ear reconstruction, which requires enormous attention to detail.

Methods:

We set out details and precautions for each step of the pre-operation and intra-operation stages of the ear reconstruction process for microtia patients. We cover pre-operative screening and assessment of surgical conditions, the design of intra-operative incisions, flap separations, costal cartilage extraction, framework carving and cranial ear angle surgery.

Results:

Over the period Jan 2015-July 2021, our surgical team carried out 1012 microtia ear reconstructions, at the rate of 3-4 per week. This approach presents the key learnings from this high volume of operations. Two typical cases involving different types of microtia will be presented in order to illustrate the process of total ear reconstruction.

Conclusions:

We describe in detail the pre-operative and intra-operation stages of the ear reconstruction process. We share our cumulative surgical experience gained over 20 years, especially the latest practical lessons gleaned over the last seven years.

O-14 The Clinical Application of Using Mastoid Region Flap with Subcutaneous Pedicle for Ectopic Lobule- type Microtia Reconstruction

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Aims:

To investigate the outcomes after ear reconstruction by using the mastoid region flap with subcutaneous pedicle for ectopic lobule-type microtia; to prove the mastoid region flap with subcutaneous pedicle retaining sufficient blood supply; to provide a clinical option of ear reconstruction with full use of ectopic ear remnant.

Background:

Follow-up studies on auricular reconstruction procedures for ectopic lobule-type microtia have reported postoperative complications, some of which can only be reversed with revision surgery. This study aimed to investigate the outcomes after ear reconstruction by using the mastoid region flap with subcutaneous pedicle for ectopic lobule-type microtia; to prove the mastoid region flap with subcutaneous pedicle retaining sufficient blood supply; and to provide a clinical option of ear reconstruction with full use of ectopic ear remnant.

Methods:

This study includes 8 ectopic lobule-type microtia patients from August 2016 to present. Based on the first stage of Nagata's method of auricular reconstruction separate the ectopic earlobe as a mastoid region flap with subcutaneous pedicle. Transpose the flap based on subcutaneous pedicle to proper level and allow a larger skin surface area for covering reconstructed ear framework. Give real-time evaluation of blood supply in subcutaneous pedicle flap during and soon after the operation through Indocyanine Green Fluorescence Contrast Technology. Finally, satisfaction scores and eye-tracking devices were used to evaluate the efficacy of ear reconstruction.

Results:

In the cases of 8 ectopic lobule-type microtia patients, the mastoid region flap with subcutaneous pedicle transposition is used to correct the earlobe position and reconstruct earlobe and concha with natural appearance and good symmetry with the other side. The Indocyanine Green Fluorescence Contrast Technology shows a satisfying blood perfusion into the flap region. The follow-up study from 6 to 24 months shows viability and well blood supply of reconstructed ear, with natural appearance and good symmetry with the other side.

Conclusions:

Appropriate location correction for ectopic remnant earlobe promotes the success of ear reconstruction with symmetric appearance of ears. The preservation of the subcutaneous pedicle during auricular reconstruction leads to significantly sufficient perfusion of the skin flap and allows transposition to cover the reconstructed ear framework, coming with a more natural and vivid appearance.

O-15 New Strategies for Tragus and Antitragus - Complex Fabrication in Lobule-Type - Microtia Reconstruction

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Background:

The creation of a high-defining tragus and antitragus complex remains a demanding challenge during staged lobule-type microtia reconstruction. The success of the complex carving relies greatly on proper operation of the cartilage, which is commonly residual cartilage of various sizes. The authors discuss the relevant details for sculpting the tragus and antitragus complex based on cartilage remnants in various conditions.

Methods:

A series of 562 lobule-type microtia patients underwent autogenous costal cartilage auricular reconstruction between 2007 and 2016. Because of the various sizes and shapes of the remnant cartilage used for the tragus and antitragus complex reconstruction, the authors have described possible scenarios for fabrication and introduced relevant tactics for appropriate treatment.

Results:

Corresponding methods for various scenarios in tragus and antitragus complex fabrication have been shown to demonstrate a satisfactory appearance. The results demonstrate the achievement of a harmonious tragus and antitragus complex for the integrity of a constructed ear.

Conclusions:

Proper use of the residual cartilage for tragus and antitragus complex sculpture plays a vital role in acquiring a favorable contour of the auricle in microtia reconstruction. The introduced approach enhances the aesthetics and functionality of the complex for modern life.

O-16 A New Method of Correcting Cryptotia by Changing Mechanical Fulcrum After Constricted Cartilage Overturned

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Background:

Many techniques have been introduced to correct cryptotia. The previous methods are releasing the constricted cartilage and changing the mechanical fulcrum partly to the right position. However, some patients are still not satisfied with the treatment results, due to cryptotia recurrence and insufficient superior 1/3 width. This study aimed to develop a new method for completely changing the mechanical direction of constricted cartilage for correcting cryptotia.

Methods:

From 2007 to 2020, twenty-four cryptotia patients were treated. During surgical reconstruction, the retroauricular skin flap was elevated, the posterior aspect of the upper auricular cartilage was completely exposed, and the abnormal insertion of the auricular intrinsic muscles detached. The sharply curved antihelical cartilage was cut and overturned, and the scalp skin flap was undermined and advanced toward the postauricular sulcus. The edge of the retroauricular scalp flap is fixed on the mastoid periosteum. The incision was closed.

Results:

Eighteen patients had unilateral cryptotia, and six had bilateral cryptotia. Relatively favorable results were obtained in the follow-up period (range, 6–48 months). There were no cases of skin necrosis, complications, or revision surgery.

Conclusions:

The main advantages of this technique are the surgically reproducible results, and that it can be applied to most cases. The method described in this paper could potentially increase the width of the upper third of the auricle and reduce recurrence rate, while also leaving an inconspicuous scar and a satisfactory auricular contour. It is suggested that this technique could be an alternative method of cryptotia correction.

O-17 Two-Stage Combined Auricular with Atresiaplasty Reconstruction: Technique Description and Results

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Aims:

To present a two-stage approach for combined auricular reconstruction with atresiaplasty, describing the surgical technique, and reporting outcomes in cases operated on in 2023.

Background:

Congenital microtia and aural atresia present challenges in reconstructive surgery, affecting aesthetics and hearing function. This abstract outline a comprehensive solution for these conditions.

Methods:

Three patients (aged 9 to 14) with congenital microtia and aural atresia underwent a two-stage reconstruction. The first stage involved auricular framework creation using costal cartilage grafts and external ear formation. The second stage focused on atresiaplasty for ear canal reconstruction and auditory function restoration.

Results:

All three cases achieved favorable outcomes. After atresiaplasty, patients regained functional hearing with good auditory results. Aesthetic outcomes were highly satisfactory, providing a natural appearance to the reconstructed ear. The patients and their families reported a substantial improvement in their quality of life.

Conclusions:

The two-stage combined approach for auricular reconstruction with atresiaplasty proves to be an effective method for addressing congenital microtia and aural atresia. The technique applied in three cases during 2023 resulted in functional auditory improvement and aesthetically pleasing outcomes. This approach enhances overall well-being and self-esteem, making it a valuable addition to the field of auricular reconstruction procedures and emphasizing the importance of addressing both form and function.

O-18 Our experience in ear reconstruction in Uzbekistan

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Our experience is based on operations to reconstruct the auricle from auto-cartilage over the past 10 years. During this period, we performed 39 operations, and we would like to share this experience.

We can divide the total number of patients into two parts, in the first part there are 23 patients, we used a tissue expander for them. We carried out the second group, 16 children, without using this expander.

All operations have in several stages. The first stage is the formation of the auricle from costal cartilages as framework and its installation in the stock;

The second stage (after 6 months) – earlobe correction;

The third stage (6 months after the second stage) is the detachment of the auricle and the formation of a behind-the-ear pocket.

Based on the work done, we can state the following conclusions for the first group.

Positive sides:

- the expander allows for more free use of the skin;
- sufficient amount of hairless skin.

Negative sides:

- when using an expander, skin necrosis is very high;
- additional costs for the expander and additional preparation time are required.

For the second group we have the following positive conclusion:

- reduced operation time;
- the possibility of simultaneous surgery for atresia of the auditory canal.

And the negative side:

- insufficient skin without hair

O-19 Using Materials Science and 3D Printing Technology to Teach and Plan Ear Reconstruction

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Aims:

The aim of this study was to review the range of models used for teaching auricular framework carving and validate a carvable 3D printed costal cartilage simulation tool for teaching and planning auricular reconstruction.

Background:

Owing to the complexity and variability of autologous auricular reconstruction, there is a need for reliable simulation to facilitate the planning, teaching and training of this procedure. There are a range of materials reported to enhance learning, from fruit to rubber, yet few provide a realistic simulation of the texture and geometry of costochondral cartilage.

Methods:

A systematic review using PRISMA guidance was conducted to identify simulation models for ear framework carving from MEDLINE, Embase and Cochrane databases. A novel foam impregnated silicone material was designed and compared to costochondral cartilage for mechanical properties. Auricular frameworks and costal cartilages 6 to 9 were printed using an Ultimaker3 3D Printer and reproduced using the silicone for carving.

The models were validated by 12 plastic surgery trainees, who each attempted auricular reconstruction using the carvable models. Pre- and post-training Likert questionnaires were completed to assess confidence, comprehension and educational value of the models.

Results:

354 articles were identified and 13 met inclusion criteria. Vegetables, animal tissue, synthetic materials and 3D printed moulds were identified. 3D printing and silicone-based impressions were deemed consistently superior for framework planning. Using our novel silicone-sponge composite with 3D printing yielded statistically significant improvements in understanding the different components of an auricular framework ($p < 0.0001$), the location of subunits ($p = 0.006$) and confidence in carving and handling cartilage ($p < 0.0001$). 100% felt the 3D printed teaching aids directly enhanced their learning.

O-20 Fifteen Lessons Learned from 2,237 Primary Ear Reconstruction

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Aims:

Through September 2023, we have performed 2,337 implant ear reconstructions. We will present the lessons learned from this large series to help surgeons improve outcomes, minimize complications, and reduce the patient's burden of care.

Background:

There are two surgical methods of ear reconstruction for microtia. One uses rib cartilage and the second a porous polyethylene (PPE) implant. The senior author helped developed the PPE method of ear reconstruction in 1990 and has gradually modified the procedure to minimize complications and improve microtia outcomes over the last 34 years.

Methods:

We reviewed all patients having ear reconstruction surgery for microtia from 1991 through September 2023. We chronicled important modifications of the operative technique, postoperative care, and ancillary procedures for symmetry and hearing.

Results:

We performed a total of 2,327 ear reconstructions using a porous polyethylene framework.

Of the total cases, 654 were done with a simultaneous atresia repair, 305 were performed following a previously completed atresia repair, and 224 were done along with the placement of an implantable bone conduction hearing device. During this period, we made changes in the preferred patient age, implant design, surgical technique, ancillary procedures, and postoperative care to reduce complications and improve outcomes. Many of these insights are applicable to all microtia patients, regardless of the method of ear reconstruction.

Conclusions:

Performing ear reconstructions for over three decades has given the senior author insights that have improved the aesthetic and functional treatment of microtia. These changes have made the procedure significantly more efficient and less arduous for the patient.

O-21 Anatomical Variant of The Superficial Temporal Artery in Temporoparietal Fascia Flap in Single Stage Endoscopic Assisted Microtia Reconstruction

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Aims:

Understanding the anatomical variant of the superficial temporal artery branch, its branching in the flap, its relationship with the frontal branch of the facial nerve in microtia reconstruction.

Background:

Single-stage microtia auricular reconstruction is becoming more relevant. The determining factor is a temporoparietal fascia flap (TPF) with both branches of the superficial temporal artery (STA). There are not many studies regarding vascular branching and their relation with the frontal branch of the facial nerve, hence our study.

Methods:

Anatomical study on TPF flap harvested during single-stage endoscopic assisted microtia auricular reconstruction from May 2018 to July 2021. Flaps were observed under microscope. Variables (vascular size, number of frontal/parietal branches, distance from branching location to estimated external ear canal, distance from frontal artery to projected course of facial nerve's frontal branch etc.) and demographic information were obtained.

Result:

Fifty-five flaps from 54 patients were included into the study. 50/55 (90,9%) had parietal branch and 55/55 (100%) had frontal branch with mean diameter of 0.98 and 0.91 mm respectively. Regarding frontal branch, 1.8%, 25.5%, 50.9%, 16.35, 5.45% had 0-4 traverse frontal branch(es), respectively. The mean distance from the frontal artery to the estimated course of the facial nerve's frontal branch was 10.56 mm. 5/16 flaps that missing or small parietal/frontal branch (<0.5mm) had small necrosis while only 2/39 remaining flaps do, which is statically significant ($p=0.018$). All said necrosis were successfully repair with local flap, and no framework was removed. One case had nerve damage during flap harvest.

Conclusions:

Detail anatomical description of the STA allow arterial-based flap designing and harvest, which in turn tremendously improve surgical success rate by diminishing flap necrosis and nerve damages.

O-22 Experience of 62 cases with simultaneous bilateral total auricular reconstruction

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Aims:

To summarize the experience of simultaneous bilateral total auricular reconstruction surgery (two stage autologous costal cartilage technique) and optimize the technical process.

Background:

Simultaneous bilateral auricle reconstruction is an effective way to shorten the treatment period for bilateral microtia patients. However, the long duration of the operation and the high risk of post-operative nursing make it difficult to do.

Methods:

From October 2020 to October 2023, a total of 62 patients with bilateral 2 -3 ° microtia were treated in our department. The surgical technique was similar with two stage ear reconstruction (Nagata technique). The surgery was completed with the cooperation of three experienced ear reconstruction doctors. The surgical time exceeds 6 hours. After surgery, posture nursing is carried out to prevent torticollis, pressure ulcers, skin care, wound care, etc.

Results:

Through close cooperation between doctors, nurses, and anesthetist during the surgery, and continuous optimization of perioperative nursing, most patients had good three-dimensional morphology of their bilateral ears after surgery, the complications such as cartilage absorption, flap necrosis, or infection was low. The patients had minimal postoperative pain and no occurrence of torticollis or pressure ulcers.

Conclusions:

Simultaneous bilateral total auricular reconstruction can effectively shorten the treatment period of bilateral microtia patients. The biggest challenge were the long surgical time and the difficulty of postoperative care. Through perioperative medical cooperation, posture care, pain care, skin care, and wound care were carried out. Most patients achieved satisfactory results, and the relevant experience can be promoted in teams with mature ear reconstruction technology.

O-23 Total Rebuilding of the Ear after Unsatisfactory Initial Microtia Reconstruction: 30 Years-Experience Using Autogenous Costal Cartilage Framework

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Background: This study recounts the author's experience through a long-term follow-up analysis of secondary procedures in patients dissatisfied with their initial microtia reconstruction.

Methods: We reviewed a total of 134 patients who underwent a secondary operation between 1992 and 2021 by examining their medical records and photographic data. Out of these, 110 patients, followed for a period ranging from 6 months to 26 years (average 33.2 months), were included to evaluate aesthetic outcomes.

Results: The primary reconstruction was performed using costal cartilage in 113 patients, porous polyethylene implant in seven patients, silicone implant in six patients, and other methods in eight patients. By the time of the secondary reconstruction, the major external features observed were: lump in 91 cases, deficient convolution in 19 cases, and an absent framework with scarred mastoid skin in 22 cases. All secondary reconstructions utilized an autogenous costal cartilage framework. This framework was covered with the temporoparietal fascia flap technique in 118 patients, mastoid skin coverage technique in 12 patients, and other techniques in four patients. We recorded one major complication (exposure of the cartilage framework due to partial necrosis of the fascial flap) and three minor complications (loss of moderate-sized full-thickness skin grafted onto the fascia). The average aesthetic outcome score, rated on a four-point Likert scale (i.e., 1 = poor, 2 = fair, 3 = good, and 4 = excellent), was 3.17 with a median of 3.00. Forty-two percent of the patients received an "excellent" rating, and 36 percent were rated as "good". In this presentation, we will discuss and showcase the preoperative and postoperative appearances of patients, categorized as excellent, good, fair, and poor.

O-24 Functional Outcomes in Reconstructive Microtia Surgery: Phase 1 of an International Multiphase Study Protocol in Developing a Patient Reported Outcome Measure

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Aims:

Postoperative review following reconstructive microtia surgery often concludes by early adolescence prior to reaching adulthood. While Patient Reported Outcome Measures (PROM) such as EAR-Q are effective in the immediate postoperative duration, this study aims to capture patient outcomes in an older patient population to improve clinical understanding of auricular subunits that contribute most significantly to the functional needs of this cohort as they transition into working life.

Methods:

This study was conducted at two tertiary institutions in two countries over two years. Microtia patients over 1 year post reconstruction were invited to participate. Semi-structured qualitative cognitive interviews were conducted at plastic surgery units by a single interviewer. A Child Psychologist was present during interviews involving patients younger than 18. Interviews were audio-recorded, transcribed and coded using the constant comparative method. Data from each round of interviews was iteratively processed and reviewed by an expert panel at each institution in the development of a PROM.

Results:

Four patients at each institution were recruited for a total of 8 interviews. Mean age at interview was 16.5 and 19.8 years at each institution respectively. PROM categories include Hearing, Aesthetic Outcome, Anatomical Forces, Fit and Function, and Affect on Life and Work.

While most patients rated aesthetic outcome highly, past or ongoing hearing loss affected life, school and work for 62.5% of patients. Seven of eight patients interviewed have had to make custom adjustments to fit helmets, safety glasses, masks or headphones, with 50% interviewed identifying at least one anatomical subunit of the ear that gave them great discomfort or pain as a result.

Conclusions:

Early results demonstrate the extent of functional adjustments necessary for post-reconstruction microtia patients. This team would ideally like to complete another round of interviews with another adult cohort from a different country prior to progression to field testing in Phase 2.

O-25 Application of porous polyethylene ear framework in auricular reconstruction of microtia: An 18-year experience of Shanghai

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Aims:

To observe and evaluate the clinical effect of and experience in total auricular reconstruction with polymer polyethylene artificial ear framework implantation (Medpor or Su-Por).

Background:

Congenital microtia are clinically prevalent, and reconstruction with artificial ear framework implantation is both a challenge and a hope.

Methods:

A total of 2057 patients (2063 ears) with microtia accepted auricular reconstruction from May 2003 to June 2022 in our department were included (13 patients with 3D patient-specific custom-made artificial ear framework). The surgical methods and success rate, scores of symmetries and fine structures of the auricle, patient satisfaction, surgical complications together with hearing improvement were evaluated.

Results:

All patients had been followed up for 6 months to 16 years postoperatively, successful reconstruction of all the 2063 ears was achieved, and the auricle shape recovered well gradually. Scores of seven auricle symmetrical indexes were all more than 5. The proportion of the score of 14 fine structures in the auricle more than 10 was 88.90% (1834 /2063) . The overall satisfaction rate of patients was 92.00% (1898 /2063) . Patients undergoing simultaneous hearing reconstruction obtained varying degrees of hearing improvement.

Conclusions:

Porous polyethylene artificial ear framework implantation is clinically safe and feasible for the treatment of the congenital microtia, which can be used as one method of auricular reconstruction. Besides, simultaneous hearing reconstruction can be performed, which not only makes the reconstructed auricle more realistic, but improves the patient's satisfaction rate.

O-26 Longitudinal Pediatric Outcomes of Bonebridge (BCI602) and Osia (OSI200) Implants

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Aim:

To describe the longitudinal audiometric and surgical outcomes of Bonebridge™ (BCI 602) or the Cochlear Osia®2 system in children and adolescents with conductive or mixed hearing loss or single-sided deafness.

Methods:

A four-year retrospective review (October 2018-January 2023) of 52 children (59 implants) who underwent implantation with the Osia®2 (37 patients, 43 implants) or BCI 602 (14 patients, 16 implants) at a tertiary pediatric hospital. Inclusion criteria were < 19 years and completed preoperative unaided and postoperative aided audiometry. Pure-tone average air conduction (PTA AC) and bone conduction (PTA BC), aided thresholds, air-bone gap (ABG), functional gain (FG), effective gain (EG), speech reception threshold (SRT), and word recognition score (WRS) in quiet, were measured at 3 months and > 1 year postoperatively were calculated between groups.

Results:

Median age at implantation was 11.9 years. Mean preoperative, unaided PTA AC and BC were 71.4 dB and 13.7. Average aided thresholds at 3 months for 52 patients (59 implants) and >1 year for 14 patients (15 implants) postoperatively were 23.1 dB vs 18.3 dB, mean FG was 46.8 dB vs 51.2, and mean EG was -10.9 dB vs -8.8 dB. Average 3-month aided thresholds for the Osia®2 vs the BCI 602 were 21.4 dB vs 28.8 dB ($P < .01$) but mean 3-month FGs and EGs were non-significant ($P = .51$, $P = .77$). Mean follow-up time was 14.6 months.

Conclusions:

In our study, children aged 5-18 years with various types of hearing loss received significant, comparable audiologic gain with the BCI 602 and the Osia®2 implants. Audiometric endpoints at >12 months after surgery were comparable to those at 3 months postoperatively. This is the largest pediatric cohort in the United States to have undergone active transcutaneous bone conduction implantation. Study strengths include prospective collection of patients. Limitations include overall retrospective design.

O-27 Effect of Functional Ear Reconstruction on Quality of Life of Patients with Bilateral Microtia: A Prospective Control Study

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Miss Yaoyao Fu¹

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Aims:

To evaluate the effect of ear reconstruction and functional ear reconstruction on the psychology and quality of life of the microtia patients.

Background:

The physical and mental health status of patients with bilateral microtia is consistently observed to be inferior to that of other microtia patients. In light of this, our study aims to examine and contrast the effects of bilateral functional ear reconstruction on quality of life and benefits, in comparison to solely undergoing bilateral ear reconstruction.

Methods:

Patients were divided into a functional ear reconstruction (FER) group and a control group according to the willingness and actual situation of the patient. All patients received two-stage surgeries to finish the autologous cartilage microtia reconstruction, while the FER group received unilateral Bonebridge implantation at the second stage surgery, simultaneously. Socio-demographic and clinical information was collected at the beginning of the study, while the ear questionnaire (EAR-Q) and Glasgow Children's Benefit Inventory were obtained six months post each operation.

Results:

The study included a total of 108 patients, with 54 patients allocated to the functional ear reconstruction (FER) group and 54 patients allocated to the control group. After six months of the second stage surgery, there was a significant increase in the levels of quality of life and benefit in both groups. However, the FER group exhibited a significantly improvement in quality of life and benefit compared to the control group ($p < 0.05$).

Conclusion:

Functional ear reconstruction holds promise as an effective approach for enhancing the quality of life and providing greater benefit to patients with bilateral microtia. Nevertheless, further research with a larger sample size is necessary to validate these findings.

O-28 Single-stage bone-anchored hearing implant surgery in children: prospective comparative research

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Aims:

To compare the clinical outcomes of single-stage BAHl surgery with two-stage surgery in children up to nine years and to ascertain the safety of one-stage surgery in this population.

Background:

After the introduction of the wide-diameter implant at the beginning of this century, implant loss decreased, also in children. Based on these and long-term single-stage results in adults, some centres have already implemented single-stage surgery in their paediatric population.

The studies that described single-stage surgery in children up to nine years of age are only of small scale and were not comparative in design. In addition, these studies are also not comparable with previous two-stage studies due to heterogeneity in design, population, and reporting of complications.

Methods:

A test group of 15 children (22 implants) implanted with a wide diameter implant in single-stage surgery using the linear incision technique was compared with a historical control group of 50 children (62 implants) implanted in two stages. The primary outcome measure was implant survival during 1-year follow-up. Secondary outcomes included causes of implant loss, implant stability, soft tissue reaction, surgical- and loading time.

Results:

No implants were lost in the test group vs. three implants (4.8%) in the control group. Single-stage surgical- and loading times were significantly shorter than the two-stage surgery times.

Conclusions:

The preliminary data of this first prospective, controlled trial between single- and two-stage BAHl surgery in children from 4-9 years show non-inferior outcomes regarding implant survival. Based on this study, we cautiously propose single-stage surgery with a wide diameter implant as the standard approach in all children from four years requiring a BAHl.

O-29 Collaborators in Care - The Role of the Advanced Practice Provider in a Microtia Practice

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Aims:

Discuss the incorporation and utilization of Advanced Practice Providers in a Microtia Practice

Background:

Integration of Nurse Practitioners (NPs) and Physician Assistants (PAs), which may be collectively known as Advanced Practice Providers (APPs), in a surgical subspecialty can improve cost effective, quality patient care and be a valuable contributor in medical residency training, particularly in auricular reconstruction. We describe the role of the APP in microtia care at Stanford Medicine Children's Health in an academic medicine setting. In the operating room, an APP can function as a first assist, assisting the primary surgeon as well as completing certain tasks of the surgery. The APP can then provide support caring for the patient in the hospital, when there is a rib cartilage harvest requiring admission. They can be an integral role in preoperative education and teaching wound care, as well as in post operative wound surveillance. Although there is variable education and preparation of the NP and PA, the broad knowledge of the APP allows these clinical experts to specialize in the specialized care delivery of patients with complex conditions throughout the perioperative continuum. Investment in the training and retention of an APP in the surgical subspecialty role may allow for variably broad utilization in the outpatient, inpatient, or operative settings dependent upon the needs of the surgical team. APPs with optimal clinical preparation and experience may additionally participate in clinical research, quality improvement, leadership, and management in auricular reconstruction programs while providing clinical continuity in an academic setting.

Conclusions:

APPs working in an academic setting can be a positive core collaborator of the perioperative care team for patients with complex condition.

O-30 The struggles of establishing a microtia center in Indonesia, a developing Southeast Asian country

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Aims:

To illustrate the difficulties of making microtia centers in developing countries

Background:

Microtia is generally less popular than other craniofacial congenital defects, especially those located in the central part of the face. Long hair or head coverings can also hide its clinical appearance. Surgeries are often considered aesthetic-only procedures and felt to be less important than the need for hearing devices. Its extremely difficult and long-hour surgery results in a lack of available experts, leading to numerous unsatisfactory results that can traumatize and devastate patients and persuade those who haven't had surgery to abandon their plans to undergo it.

Methods:

We managed the first microtia center in Indonesia with a multidisciplinary approach. Initially, only three fields were involved, including plastic surgery, ENT, and psychiatry, which were based on the key problems in microtia: aesthetics, hearing function, and psychology. Coincidentally, all three experts are women, so a motherly approach is predominantly adopted in treating patients. The center shifted to become a microtia and craniofacial center as the number of other congenital craniofacial deformity patients increased, resulting in an increase in other disciplines involved in the center.

Results:

It is currently the biggest microtia center in Indonesia, with one to two surgical cases every week and high post-op satisfactory results. The parents are presently thinking about ear reconstruction while their child is still young. The rise in the number of surgeries implies that patients desire for reconstructive surgery is increasing.

Conclusions:

Starting a microtia center in a developing country is not easy. It takes determination and dedication to become the best in the country. Multidisciplinary treatment is unquestionably superior than just one related scientific discipline. Do remember: When there is a will, there is a way.

O-31 'How about your ear?' Analyses of the EAR-Q

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Aims:

This study aimed to assess the quality of life (QoL) in pediatric patients with microtia through the utilization of the EAR-Q questionnaire, collected at the Microtia Expert Teams from the Radboudumc and the University Medical Centre Groningen, between July '22 and July '23. Specifically, we sought to understand the impact of these conditions on the physical, emotional, and social well-being of children and adolescents, as reported by patients or their parents.

Background:

Patient-reported outcome measures (PROMs) refer to questionnaires that measure outcomes of care related to the patient's health and that are reported by the patient. These PROMs provide a better understanding of treatment efficacy, and their implementation is effective in terms of in-hospital complications.

The EAR-Q is a set of questionnaires which can be used to collect and compare evidence-based outcomes data from patients with any kind of ear condition. The EAR-Q measures three overarching domains: appearance, health related quality of life and adverse effects.

Methods:

A study was conducted with a cohort of 48 pediatric patients, or their parents on behalf of younger children. Participants were asked to complete the EAR-Q questionnaire. The questionnaires included items related to physical symptoms, psychosocial impact, and overall satisfaction with their ear condition.

Results:

Results revealed that patients and their parents report a considerable impact of ear-related conditions on quality of life. Psychosocial challenges, including self-esteem issues and communication issues were observed, affecting the emotional and social domains. Overall, the results suggest that ear-related conditions can have substantial impact on the quality of life of these patients.

Conclusions:

The EAR-Q provide valuable insights into the quality of life of patients with microtia of atresia. In addition, this questionnaire can make an important contribution to quality registration.

O-32 Our Experience of Combining Hearing Implants with Autologous Auricular Reconstruction

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Aim:

To describe how we combine hearing with autologous auricular reconstruction in children with Congenital Aural Atresia. To explain the clinical, audiological and radiological work-up and technical aspects of the procedure. To report the audiological and surgical outcomes

Materials and Methods:

Demographics, indication, operative details, surgical and audiological outcomes including processor datalogging and Children's Home Inventory for Listening Difficulties (CHILD) questionnaire were collected on all children undergoing hearing implantation with / or as part of a planned autologous auricular reconstruction.

Results:

9 Bonebridges, 7 Vibrant Soundbridges, 4 Osia, 4 BAHA Connect and 13 BAHA Attracts were implanted in children aged 5 – 15 (average 6) between December 2014 and March 2023. Implantation performed before autologous reconstruction in 21, with first stage auricular reconstruction in 2 and with final stage in 7. One patient required conversion of BAHA Connect to Osia due to abutment site infections. One patient developed pressure necrosis of temporo-parietal flap following application of audio processor and conductor link damage at revision surgery. They were successfully converted to Attract. No drop in bone conduction hearing occurred following implantation. Datalogged use in bilateral microtia patients was 12 hours / day minimum. Datalogged usage in unilateral microtia patients was 1.1 to 12 hours / day. In unilateral patients average CHILD (in noise) improvement from 4.79 to 6.89 (child scoring).

Conclusions:

Combined implantation with the first stage of reconstruction abandoned as the Temporo-parietal vascular flap required to cover the newly constructed ear meant inadequate cover of the implant. Now implant either before auricular reconstruction (sited with plastic surgical input to avoid the eventual site of ear and damage to its potential blood supply) or with the final stage. We have demonstrated no significant deterioration in the inner ear function and improved hearing with the CHILD questionnaire. Objective measurement of device use with datalogging shows variable use in unilateral patients. Numbers too small to demonstrate benefit of one implant over another.

O-33 “Scalp Securing” Ear Molding Technique for correction of Congenital Ear Abnormalities

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Aim:

Repair of congenital ear abnormalities through ear molding entered medical literature during the early 1980's. Literature supports success when initiated early, ideally within the first two weeks of life. Traditional ear molding techniques have resulted in varying success, depending on the severity and type of auricular deformity. Ear Molding systems, such as the EarWell™ and EarBuddies™, can have limitations due to cost, provider training, or availability of supplies.

Objectives:

To evaluate the success of an advanced, “scalp-secured” newborn ear molding technique that utilizes readily available medical supplies found in an otolaryngology clinic.

Methods:

A retrospective chart review of newborns ages 1-8 weeks who underwent ear molding in clinic was performed. Molding supplies include: 3 sizes of Steri strips™, Mastisol® liquid adhesive, DERMABOND® topical skin adhesive, silicone IV tubing, silicone putty and scissors. While holding the ear in correct anatomical position, the silicone tubing and putty are fixed into place using liquid adhesives and application of Steri strips™ in a “fan” design secured to the scalp. Infants returned to clinic every 7-10 days for removal and reapplication of the ear mold for a total of 3-4 sessions.

Results:

65 infants were molded; 34 males, 31 females, with an average age 3-1/2 weeks at initiation of ear molding. Most common deformity was prominauris (n=20), followed by cartilage adhesion (n=12), other helical rim abnormalities (n=9), Stahl deformity (n=10), lop/cup (n=8), mixed deformities (n=2) and conchal bowl abnormalities (n=2). Conchal bowl abnormalities proved to be the most challenging. Infants were re-molded every 7-10 days with average treatment time of 4 weeks. Parents were surveyed for level of satisfaction post molding. There were no patients with skin injury, skin ulcers, or pressure injury from this technique.

Conclusions:

Advancements in conventional ear molding techniques with inexpensive and readily available supplies can lead to successful correction of mild and severe congenital ear abnormalities. Early initiation of molding, remolding every 7-10 days, and the “scalp secured fan” technique of taping resulted in excellent outcomes with no skin injury.

O-34 Total Ear Reconstruction with Autogenous Costal Cartilage in Challenging Cases: Use of Silicone-Induced Vascularized Capsule Technique

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Aim:

Total ear reconstruction poses significant challenges when compromised mastoid skin conditions preclude the successful embedding of an autogenous costal cartilage framework.

Methods:

In instances where diminished skin elasticity and volume made the insertion of the framework into the mastoid skin pocket problematic, we utilized a silicone block. This block was strategically positioned within the framework's deep recesses to enhance skin-framework contact, fostering the creation of a vascularized capsule around the silicone. From 2019 to 2023, eight patients benefited from this technique. Patients were pre-operatively categorized into three groups:

Group I: Four patients with congenital dystopic lobule-remnant microtia and anotia displaying a low hairline. For this group, silicone was placed in the concha.

Group II: Three patients with lobule-remnant congenital microtia requiring reoperation. Here, the silicone was inserted into the concha.

Group III: A single patient with post-traumatic anotia exhibited a low hairline coupled with multiple mastoid scars. For this individual, the silicone was situated in the scapha.

Following the operation, the silicone was extracted between 8-24 months, after which skin grafting was performed on the vascularized capsules.

Results:

Out of the eight patients, seven exhibited stable silicone post-surgery, with vascularized capsules enveloping the nearby cartilage. One patient had silicone exposure via a suture scar, resulting in a partial loss of the capsule. However, a significant portion remained unaffected. Full-thickness skin grafts on these silicone capsules were successfully integrated in all instances, yielding stable and precisely defined auricular reconstructions.

Conclusion:

The presented technique provides a reliable solution for total ear reconstruction in challenging scenarios.

O-35 Abdominal Muscles Infiltration Analgesia for Donor-site Pain in Autologous Ear Reconstruction: A Retrospective Study

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Aims:

The objective of this study was to introduce rectus abdominis and external oblique muscle infiltration analgesia in autologous ear reconstruction and to evaluate its efficacy and safety.

Background:

Donor-site pain is a troubling side-effect in autologous ear reconstruction. A well-planned pain management protocol is thus essential.

Methods:

A total of 72 patients were recruited into two cohorts: the intermittent rectus abdominis and external oblique muscle infiltration analgesia combined with intravenous patient-controlled anesthesia and intravenous patient-controlled analgesia alone. The primary outcome was the numerical rating score of pain recorded during 48 h postoperatively. Secondary outcomes included the Barthel Index and rescue analgesic consumption. Additionally, sensory-blocked areas were tested using a cold stimulus.

Results:

The numerical rating score was significantly lower in infiltration analgesia combined with intravenous patient-controlled anesthesia than in intravenous patient-controlled anesthesia alone at 28 ($P < 0.01$), 32 ($P < 0.01$), 36 ($P < 0.01$), 44 ($P < 0.001$), and 48 h ($P < 0.01$) postoperatively. Conversely, the number of patients who received rescue analgesics ($P < 0.01$) and consumption ($P < 0.01$) were significantly larger in intravenous patient-controlled anesthesia alone. Rectus abdominis muscle and external oblique muscle infiltration analgesia improved the total Barthel Index scores at 24 h postoperatively ($P < 0.001$), especially in mobility ($P < 0.001$), and using stairs ($P < 0.001$) and the toilet ($P < 0.001$).

Conclusions:

Rectus abdominis and external oblique muscle infiltration analgesia effectively and safely prevents costal cartilage donor site pain in children undergoing autologous ear reconstruction.

O-36 Experience with 127 Osia Placements

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Aims:

The purpose of this study is to examine our large experience with placement of the Osia 2 bone conduction hearing implant in microtia patients with aural atresia.

Background:

Because aural atresia usually is seen with a normal cochlea and vestibulocochlear (CN VIII) nerve, bone conduction hearing devices can provide excellent hearing for these patients. The Osia 2 has several advantages over most other available bone conduction devices. These include a lighter external processor with a lower profile, attachment with a smaller magnet, lack of annoying sound feedback when touched or worn under a hat, and the ability to use when swimming. Since the vibrator portion of the device sits internally under the scalp, hearing fidelity is improved since the vibrations do not pass through soft tissue to reach the bone.

Methods:

We review all patients having placement of the Osia 2 implant from March 2020 through September 2023. Demographic data and complications were noted.

Results:

We inserted 129 Osia implants during the study period. Most devices (113 of 129) were placed at the time of ear reconstruction using the same incision used to harvest the temporoparietal fascia. One device was placed in an adult under local anaesthesia. Patients ranges in age from 3 years to 41 years with a median age of 6.5 years. A prior CT scan was not obtained to assess skull thickness. Four implants were removed because of infections (3 from magnet skin pressure injuries and one from an infected abutment removed at the time of Osia insertion). We removed two implants because of exposures. Two patients had bleeding from the dura that required temporary bone removal and replacement to obtain haemostasis with no postoperative issues. Four patients had placement of alloderm to improve scalp thickness over the implant.

Conclusions:

Placement of the Osia implant during implant ear reconstruction allows a single surgery without a secondary scalp incision. Attention to magnet strength, better soft tissue coverage of the implant, and the use of alloderm in young patients with very thin scalps has eliminated postoperative skin injury and infections.

O-37 Validating a New Surgical Gouge for Autogenous Ear Reconstruction During Simulated Microtia Workshops

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Aims:

This paper assesses the effectiveness and user satisfaction of a novel surgical handle and gouge designed for complex cartilage carving during autologous ear reconstruction. The study is focused on gathering subjective feedback from participants, by comparing their experience to standard instrumentation.

Background:

Autologous ear reconstruction remains a gold-standard surgical technique for treating external ear deformities. This technical procedure requires experience, understanding of aesthetic principles, and techniques that can consistently produce optimal results. The tools used to achieve the three-dimensional ear framework are critical to the carving technique. Here we present the results of a novel surgical instrument designed for complex cartilage carving.

Methods:

The senior author regularly holds microtia workshops to train individuals and during two such workshops held in 2022, participants were given access to both commercially available surgical gouges as well as the novel surgical gouges developed by the authors. Participants then recorded their subjective feedback for both tools using a Likert-scale survey.

Results:

27 participants completed the post-workshop survey. Cumulative results revealed significantly higher ratings for the custom gouge compared to its counterpart in terms of weight (4.4 vs 2.9, $p < .001$), carving speed (4.2 vs 3.1, $p = .002$), hand strain (4.3 vs 3.4, $p = .005$), sharpness (4.1 vs 3.2, $p = .011$), the likelihood of future use (4.1 vs 3.2, $p = .023$), opinion on surgical use (4.1 vs 3.2, $p = .024$), and colleague recommendations (4.1 vs 2.9, $p = .001$).

Conclusions:

The custom gouge designed by the senior author demonstrated higher subjective ratings when compared to what is currently available on the market. This serves as a primary validation study that demonstrates the feasibility of further assessment in a true operative setting.

O-38 Ear reconstruction treatment decisions and long-term psychosocial outcomes among adults with microtia and their parents - findings from two retrospective, interview-based studies

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Aims:

These studies aim to examine long-term psychosocial outcomes and explore decisional processes related to ear reconstruction for people with microtia.

Background:

Long-term outcomes related to microtia, and ear reconstruction are ill-defined, particularly psychosocial outcomes. How people with microtia and their families navigate decisions about ear reconstruction, and how they perceive these decisions retrospectively is also poorly understood. A better understanding of the long-term psychosocial outcomes and the perception of treatment decisions related to ear reconstruction experienced by people with microtia would help inform treatment decisions for future patients and manage patient and parent expectations.

Methods:

Adults born with microtia and parents who were previously involved in ear reconstruction treatment decisions were interviewed. Purposeful samples of participants who made different ear reconstruction treatment choices (no treatment, autogenous, and prosthetic) were recruited at the Institute for Reconstructive Sciences in Medicine in Edmonton, Canada. Semi-structured interviews and questionnaires were completed by adults (N=16 to date) and parents/caregivers (N=9 to date), retrospectively exploring experiences related to making ear reconstruction treatment decisions and examining the longitudinal psychosocial implications of the decisions that were made. Interviews were analyzed using a thematic analysis approach.

Results:

Preliminary results demonstrate tremendous variability in participant experiences and how individuals and families appraised both decisions and outcomes. Psychosocial adaptation appears to be dynamic and ongoing, irrespective of which treatment option was pursued.

Conclusions:

These studies provide diverse, longitudinal perspectives for individuals and families navigating similar decisions regarding ear reconstruction, and the clinicians involved

in their care. Findings demonstrate that decisions regarding ear reconstruction and the resulting psychosocial outcomes are as variable as they are important.

O-39 3D Bioprinting auricular cartilages with a nanocellulose-hyaluronic acid bioink

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Aims:

The aim of this project was to develop a novel bioink for 3D bioprinting auricular cartilages and elucidate its printability, biocompatibility and chondrogenicity.

Background:

3D bioprinting could circumvent complications associated with autologous auricular reconstruction, but has been limited by ossification, immunogenicity and degradation owing to unsuitable biomaterial selection. Our preliminary work has shown Nanocellulose (NC) bioinks have promising biological and mechanical properties for 3D bioprinting, which we sought to enhance further using hyaluronic acid (HA) as a native cartilaginous extracellular matrix component.

Methods:

Nanocellulose blend (NCB), crystal (NCC) and fibril (NCF) formulations were compared for printability and chondrogenicity profiles and blended with a HA hydrogel. NC and HA were blended to make composite NCHA bioinks ranging from 100% HA to 20% HA, with NC-alginate as a control. Human nasoseptal chondrocytes from 3 separate patients were cultured in the biomaterial for 21 days. Chondrogenicity was determined with PCR, quantitative protein assays and histology. Printability was assessed using rheology and a CELLINK bioprinter. Biocompatibility was demonstrated with Live-Dead, lactate dehydrogenase and AlamarBlue assays.

Results:

All NC materials demonstrated printability, with NCC and NCB offering superior biological properties. Crosslinking of NCHA was achievable with no detriment to cell survival. NCHA was noted to be up to 10-fold more chondrogenic ($p < 0.0001$) than NC-Alginate and HA alone ($p < 0.0001$). Histologically, NCHA stained more intensely for extracellular matrix than NC-Alginate and HA. Of the NCHA mixtures, 40%HA -60%NC ($p = 0.0001$) was the most chondrogenic blend. All nanocellulose hydrogels demonstrated appropriate mechanical properties for 3D printing and retained their shape as auricular cartilages with sustained cell viability (>90%) and proliferation over 21 days.

Conclusions

NCHA bioinks demonstrate superior chondrogenicity, favourable mechanical properties and excellent biocompatibility. These inks hold promise for in vivo testing and eventually clinical translation.

O-40 Addressing Soft Palate Dysfunction in Patients with Microtia: A Proposed Screening Tool for Standardized Speech and Resonance Evaluation

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Aims:

Proposal for standardized speech and resonance evaluation in microtia patients.

Background:

Microtia and atresia patients can experience altered speech attributed to conductive hearing loss. Soft palate dysfunction, particularly velopharyngeal insufficiency (VPI), can further affect resonance and intelligibility. VPI evaluation is not routine among these patients, yet implementation of standardized screening could enable early identification and therapy to facilitate speech and language development, leading to enhanced intelligibility and confidence during critical stages of children's lives. We propose a screening tool for standardized speech and resonance evaluation for microtia patients.

Methods:

A certified bilingual speech-language pathologist (SLP) specialized in resonance disorders screens English- and Spanish-speaking patients using the Cleft Audit Protocol for Speech-Augmented-Americleft Modification (CAPS-A-AM). When indicated, nasopharyngoscopy and/or videofluoroscopy are performed, to visualize and quantify soft palate dysfunction. Intelligibility in Context Scale (ICS) and Velopharyngeal Insufficiency Effect on Life Outcomes (VELO) questionnaires additionally assess perception of speech and emotional impact on patients and caregivers.

Results:

Our proposed approach allows for standardized screening and VPI detection in patients with microtia. Microtia patients at our center (n=37) included bilingual/English (n=24; 65%) or Spanish-only speakers (n=13; 35%). Assessment by a bilingual SLP expands screening to larger populations without inter-examiner variability. Our algorithm provides a comprehensive tool for VPI identification by assessing resonance, intelligibility, and oropharynx structure and function. A stepwise approach facilitates screening patients with consideration for language-specific evaluation and appraisal of emotional impacts of VPI.

Conclusions:

VPI leads to hypernasal speech that can be difficult to understand and may not resolve with speech therapy alone, especially if undetected. The proposed algorithm is necessary in microtia patients to increase VPI detection, facilitate holistic care, and optimize language development to achieve these children's full potential.

O-41 Three new innovations for reconstructing more sophisticated ear for microtia

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In Japan, approximately 200 cases of microtia are born each year. We used to treat 80 microtia patients, which was one-third of the total cases per year. After Dr Nagata passed away last year, the situation has changed. We now treat more than half of these patients, about 120 cases. We have developed a reconstructive technique that results in a more natural, symmetrical, and desirable ear shape. Our technique has now become the standard in other institutions in Japan (Yotsuyanagi T et al. PRS 133:111-20, 2014. PRS Glob Open 2: e208, 2014. PRS Glob Open 7: e2337, 2019). In recent years, we have also introduced new innovations to achieve further aesthetic enhancements while improving functionality and reducing complications, and we present here these advances.

First, we have discontinued the use of stainless steel wires to connect cartilage pieces and replaced them with 5-0 nylon sutures. Wire-related problems have been frequently reported, and in some cases wire exposure and infection have necessitated the removal of the damaged cartilage, resulting in ear deformity. However, the use of nylon sutures has reduced the incidence of these problems. The strength of the cartilage framework following the switch to nylon sutures remains similar to that achieved with wires.

Second, we have developed a hybrid cartilage framework that combines remnant ear cartilage with costal cartilage (Yotsuyanagi T et al. PRS Glob Open 9: e3058, 2021). In the cartilage framework, the tragus and antitragus are created using remnant cartilage, while the other parts are constructed using costal cartilage. This modification has resulted in a more seamless and stable fit for devices such as earphones and hearing aids.

Third, even if a sufficient depth of helical rim cannot be achieved after the initial stage of costal cartilage grafting, it can be improved during the stage of ear elevation. The three-dimensional shape of the ear may not always be as desirable as expected, especially in young patients whose cartilage is flexible and prone to deformation due to skin tension. Since our base frame consisted of two pieces of cartilage with some parts overlapping in the helical crus, a three-dimensional shape of the helical crus can be emphasized by separating two pieces of cartilage and inserting the other piece of cartilage in the space created.

In addition to these three innovations, various improvements in operative techniques have enabled us to achieve results closer to the ideal.

O-42 Application of 3D patient-specific custom-made artificial material ear scaffolds in one-stage ear reconstruction for microtia

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Aims:

To evaluate the clinical results and advantages of 3D patient-specific custom-made artificial material ear scaffolds in one-stage ear reconstruction for microtia.

Background:

Congenital microtia will cause deformities in the auricle and ear canal, and it is often accompanied by hearing loss. This not only gives patients a cosmetic defect but also comes with hearing impairment and psychological barriers. The advancement in ear reconstruction technology offers an effective treatment for such patients. However, ear reconstruction surgery is technically challenging, involving multiple steps such as the preparation of skin and fascia flaps, the harvesting of rib cartilage, carving of the ear scaffold, and skin grafting.

Methods:

From June 2021 to March 2022, patients with unilateral microtia from the Ninth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine were selected, then randomly divided into two groups. Patients in experimental group (n=12) underwent one-stage ear reconstruction using 3D patient-specific custom-made artificial material auricular scaffolds, while the control group (n=12) used off-the-shelf two-piece artificial material auricular scaffolds which requires assembling during the surgery, with or without simultaneous hearing reconstruction. Operation duration, operation success rate, scores of symmetries of the auricle and fine structure of the auricle, patient satisfaction together with surgical complications were recorded respectively.

Results:

All reconstructive operations were successful, with no report of adverse event or complications. The mean speech recognition threshold was improved by 43.46 dB HL and all maximum speech recognition scores reached 100%. The experimental group shows better outcomes than the control group regarding to symmetry and fineness ($p<0.05$). The experimental group required fewer operation hours than the control group ($p<0.01$). The final mean score on each item from patient satisfaction questionnaire of the experimental group (9.7 points) was higher than the control group (8.9 points).

Conclusions:

One-stage ear reconstruction for microtia using 3D patient-specific custom-made artificial material ear scaffolds proves to be safe and effective, which also available for simultaneous hearing reconstruction. in one-stage ear reconstruction for microtia which can be used as one of the methods of auricular reconstruction. Clinical utility suggests 3D patient-specific custom-made artificial material ear scaffolds to be an excellent choice for auricular reconstruction.

O-43 Microtia surgery: Quality of Life after ear reconstruction

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¹Institute Of Plastic Surgery And Cosmetology, Moscow, Russia, Moscow, Russian Federation

Aims:

This study aims to discuss the quality of life of patients following ear reconstructive surgery.

Background:

Patients with ear defects frequently suffer of stigmatization and negative self-perception. Ear reconstruction with autologous rib cartilage is essentially an aesthetic intervention that aims to improve the appearance and reverse the negative psychosocial distress of the disease.

Methods:

Data were collected from an adaptation of the questionnaire proposed by UK Care Standards for the Management of Patients with Microtia and Atresia, including demographics, complications, aesthetic outcomes, and quality of life. The survey was sent to 130 patients who underwent ear reconstruction with autologous rib cartilage in two stages, performed by the main author, since January of 2015 until January 2023.

Results:

74 patients completed the questionnaire. The average score for ear-QOL before the surgery was significantly lower than after the reconstruction ($p = 2.39470e-12$). From the 73 patients that answered the survey, 63 (86%) agreed that they would do the surgery again and only 10 (14%) patients said that they wouldn't do the surgery if they could. The average score for the reconstructed ear given by the patient was 8,6/10.

Conclusion:

The quality of life improves significantly after the ear reconstruction; however, the patient should be involved in the decision about performing the surgery or not, regardless their age. The impact of the surgery in the quality of life is significant when performed under the right situations and motivated by the right reasons.

O-44 CAD-CAM workflow for the fabrication of Bioscaffolds and Porous Auricular Constructs with Polycaprolactone

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²Department of Hand-, Plastic- and Aesthetic Surgery, LMU Hospital , Munich, Germany

Aims:

In this study, we applied a more publicly accessible 3D printer, Ultimaker 2+ with biodegradable polymer-polycaprolactone (PCL) to fabricate both three-dimensional bioscaffolds and auricular constructs (both solid and porous) prepared to fill the gap as potential solutions for both cartilage defects and microtia respectively by managing of the CAD-CAM workflow.

Background:

In recent years, the application of three-dimensional fabrication to fabricate customized porous scaffolds for cell culture has received much attention from the field of tissue engineering and plastic surgery.

Methods:

As an overview, the modified CAD-CAM workflow was regarded as uniform preparation fabricating types of scaffolds to identify the general printability of PCL with Ultimaker 2+. For bioscaffolds, limit test was performed on original scaffold, the resolution for printing scaffolds by PCL was identified as 600 microns by applying method of uniform scaling and limit approaching. For customized auricular constructs, we extract the model from MRI/CT scan and use its mirror image for the general shape of model building in a relatively customized way to fabricate solid auricular constructs. Boolean operation was then applied for fabricating the inner porous microstructure to fabricate porous auricular constructs.

Results:

As there were no significant differences among three groups of filaments regarding the respective dimensions for both bioscaffolds (n=9 for each group: PCL, PLA and ABS) and customized auricular constructs (n=5 for both solid auricular constructs and porous auricular constructs) indicated by the P value ($P > 0.05$) from ANOVA, the printing compatibility of PCL regarding each specific domain of scaffolds were identified

Conclusions:

In Conclusion, our study had indicated a consistent CAD-CAM workflow for Ultimaker 2+ with PCL to fabricate three-dimensional bioscaffolds, solid auricular constructs and porous auricular constructs which could be potentially applied to fill the gap of cartilage

engineering and microtia reconstruction through in-vitro cell culture, surgical simulation and in-situ cell culture respectively.

O-45 Development and preliminary evaluation of a high-fidelity soft tissue microtia simulator

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Aims:

To develop a high-fidelity soft tissue surgical simulator for microtia reconstruction and to assess the simulators realism and value by expert microtia surgeons.

Background:

Microtia reconstruction is one of the most challenging procedures in plastic surgery. As a result, the use of simulation has been implemented widely, but is almost exclusively focused on framework development. However, the creation, dissection and inset of the soft tissue flaps over the framework is arguably more difficult. No such simulator exists to practice this critical component of the procedure.

Methods:

A multi-layered synthetic physical simulator of a lobular type microtia was developed using three-dimensional printing, polymer and adhesive techniques. The simulator comprises of skin, subcutaneous tissue and a cartilage remnant in the superior third of the vestige. Two experienced microtia surgeons performed a simulated one-stage Nagata type reconstruction using a synthetic cartilage framework. The surgeons were given a Likert-type questionnaire assessing the realism and value of the simulator.

Results:

The surgeons successfully performed an end-to-end microtia reconstruction using the simulator. This included marking and dissection of the flaps, removal of the cartilage remnant, insertion of a drain, inset of the framework, mobilization and inset of the flaps over the framework, suturing the flaps with closure, as well as demonstration of the final result using suction. Overall, the surgeons agreed that the simulator is a realistic training tool and strongly agreed that the simulator is a valuable training tool.

Conclusions:

A high-fidelity soft tissue microtia simulator was developed that is realistic and valuable as a training tool. This is one of the first simulators developed that allows practicing the soft tissue reconstruction in microtia. Use of the simulator provides surgeons and trainees a platform to gain experience before operating on real patients.

P-01 Validating a New Surgical Gouge for Autogenous Ear Reconstruction During Simulated Microtia Workshops

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Aims:

This paper assesses the effectiveness and user satisfaction of a novel surgical handle and gouge designed for complex cartilage carving during autologous ear reconstruction. The study is focused on gathering subjective feedback from participants, by comparing their experience to standard instrumentation.

Background:

Autologous ear reconstruction remains a gold-standard surgical technique for treating external ear deformities. This technical procedure requires experience, understanding of aesthetic principles, and techniques that can consistently produce optimal results. The tools used to achieve the three-dimensional ear framework are critical to the carving technique. Here we present the results of a novel surgical instrument designed for complex cartilage carving.

Methods:

The senior author regularly holds microtia workshops to train individuals and during two such workshops held in 2022, participants were given access to both commercially available surgical gouges as well as the novel surgical gouges developed by the authors. Participants then recorded their subjective feedback for both tools using a Likert-scale survey.

Results:

27 participants completed the post-workshop survey. Cumulative results revealed significantly higher ratings for the custom gouge compared to its counterpart in terms of weight (4.4 vs 2.9, $p < .001$), carving speed (4.2 vs 3.1, $p = .002$), hand strain (4.3 vs 3.4, $p = .005$), sharpness (4.1 vs 3.2, $p = .011$), the likelihood of future use (4.1 vs 3.2, $p = .023$), opinion on surgical use (4.1 vs 3.2, $p = .024$), and colleague recommendations (4.1 vs 2.9, $p = .001$).

Conclusions:

The custom gouge designed by the senior author demonstrated higher subjective ratings when compared to what is currently available on the market. This serves as a primary validation study that demonstrates the feasibility of further assessment in a true operative setting.

P-02 Microtia surgery: Optimal age for ear reconstruction with autologous ribcartilage

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Aims:

This study aims to assess the development and growth of costal cartilage to determine the best age to perform the ear reconstruction surgery with autologous cartilage.

Background:

Despite the approach to the construction of the cartilage framework for ear reconstruction is sufficiently established, there is still no consensus about the age of initiation of surgical treatment. The discrepancies over the right moment to perform the surgery stem from the concerns about getting a high-quality, sufficient amount of cartilage that allows the carving without compromising the stability of the framework over time; against psychosocial problems associated with starting school and the frequent teasing in early childhood.

Methods:

Data of 107 patients were included: 40 - patients before surgical treatment and 67 - archival materials aged 5 to 40 years. CT scans were performed and average parameters were calculated (length, width, thickness, cartilage density, and standard deviation in Hounsfield units) of the cartilaginous part of 6,7,8,9 ribs and synchondrosis of 6-7th and 7-8th ribs.

Results:

The optimal anthropometric parameters for an adequate ear frame carving were reached at the age of 8 years for boys and 10 years for girls.

Conclusion:

The criteria for starting surgical treatment in the Russian population was determined by the width of the 6-7 ribs synchondrosis that must be equal to the width of a healthy auricle, and the length of eighth rib that must be longer than 9 cm, therefore, the optimal age for ear reconstruction with autologous costal cartilage is 10 years and older, however, reconstruction can be made earlier in specific cases according to height and weight, and the preoperative CT scan.

P-03 Single stage Bonebridge and Medpor reconstruction for patients with microtia in Hanoi, Vietnam

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Aims:

The senior authors have developed a renowned auricular reconstruction service in Hanoi which until now did not include hearing implants. Following the economic boom in Vietnam these have become a feasible option for patients with microtia. We describe how and why we perform single stage Bonebridge and Medpor reconstruction, and the outcomes.

Materials and Methods:

Demographics, indication, operative details, surgical and audiological outcomes were collected.

Results:

Choice of device was limited to Medel products as the other implant companies are not currently represented in Vietnam. The fee structure for surgery means it is prohibitively expensive to separate hearing implantation and auricular reconstruction operations. Two patients with bilateral microtia and atresia underwent single stage reconstruction: a 26 year old man with Treacher Collins who had previous autologous reconstruction with poor results, and a 7 year old girl with isolated microtia and no previous surgery. Both had bilateral severe conductive hearing loss and reported benefit with an Adhear bone conduction hearing device. The Bonebridge was sited well away from the site of the auricular reconstruction in the parietal bone. Care was required not to damage the Temporo-parietal vascular flap required to cover the Medpor. There were no surgical complications. Datalogged use was 12 hours / day minimum.

Conclusion:

We find this a safe, effective, economical way to manage the hearing and cosmetic aspects of microtia in Vietnam. The hearing implantation is straightforward compared to the auricular reconstruction and it is anticipated that the plastic surgeons will carry out this part independently in the future.

P-04 An Auricular Reconstruction Algorithm for Pediatric Dog-Bite Injury

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Abstract:

Management of pediatric auricular trauma can be a complex and challenging due to the complexity of the anatomy and severity of injury. There are several case reports and case series explaining different techniques of reconstruction for auricular defects. However, few explain the appropriate timing of immediate versus staged reconstruction after dog-bite injury to the auricle, particularly in the pediatric population. This study provides a reconstruction algorithm for auricular defects that will benefit from immediate reconstruction, such as simple and partial skin avulsion, to those requiring multi-staged reconstruction such as complete transection of the cartilaginous auricle. By using the several cases, a pictographic representation of types of auricular defects and reconstruction options will be discussed.

P-05 Further Refinements in Otoplasty Surgery: a modified approach to prevent suture extrusion in cartilage-suturing otoplasty using a postauricular dermofascial flap

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Background:

Suture extrusion has been reported to be the most common complication following cartilage-sparing otoplasty. Several studies have described various designs of postauricular flaps to cover the cartilage sutures and reduce the incidence of suture extrusion.

Patients and methods:

One hundred consecutive patients with prominent ears were operated between January 2018 and February 2023 using a de-epithelialized postauricular dermofascial flap that is performed as an adjunct to our cartilage-sparing otoplasty technique which is essentially a combined modified Mustardé and Furnas technique. The flap is used to cover the cartilage holding sutures with an extra layer of vascularized tissue to avoid the scar being directly over these sutures.

Results:

The median age of patients was 12 (IQR 9-15) years. One out of the 100 patients (1%) developed a postauricular skin infection requiring surgical removal of sutures. Primary suture extrusion did not occur, compared to our earlier study of cartilage-sparing technique without the postauricular flap in which 17 out of 200 patients had suture extrusion ($p=0.001$). No hematoma occurred that necessitated return to the theatre. Skin necrosis and wound dehiscence did not occur in any case. No patients developed cartilage deformities or relapse requiring surgical correction.

Conclusions:

Combining cartilage-sparing otoplasty using sutures and the described postauricular dermofascial flap is simple to perform and has significantly reduced the complication rate and improved the outcome compared to cartilage-sparing otoplasty alone. We recommend using this flap for both primary and revisional otoplasty.

P-06 Amputated Ear Management: An International Multicenter Survey and Review.

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Ear amputation is a challenging case for the plastic surgeon. There are various options for ear reconstruction, such as microsurgical replantation, ear pocketing, debridement and closure with delayed ear reconstruction and others.

A review of literature has been conducted to ascertain what advice is currently published. The reconstructive options have been considered in several studies; however, they were conducted retrospectively with small numbers of cases. We hope by canvassing centers specialising in ear reconstruction that we can formulate an approach that will facilitate the management of these cases by those less familiar with the complexities.

We produced a 15-item questionnaire shared with ISAR and UK teams. The respondents were requested to share their experience and sought their advice for others. We will continue to collect the opinions of others prior to presentation. The full dataset will be presented. This will allow a debate as to the best management options and advice about what should and should not be done to allow for the best ultimate outcome for these significant deformities.

We hope that we may be able to agree joint advice and surgical approach to achieve the best outcomes for these complex and rare cases of traumatic ear amputation.

P-07 Management of helical adhesion malformation

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Aims:

We describe a surgical approach to correct helical adhesion malformation. Unlike previously described methods, our technique results in an inconspicuous scar on the back of the ear.

Background:

Congenital auricular anomalies are common, however very few articles in the English literature address helical adhesion malformation, whereby the helix is adhered to the scapha, without any intervening layer of skin. This results in an ear with a flattened helix and pointed contour of the upper pole. We illustrate our technique on an 11-year-old girl who complained of being bullied due to her 'elf-like' ears.

Methods:

An incision was made on the posterior aspect of the ear through fascia, down to perichondrium. Dissection in this plane was continued towards the helical rim and over the helix anteriorly to reveal the entire helical adhesion. The adhered section of folded helix was released from the scapha and unfurled. The freed edge of helical rim was trimmed and this cartilage sutured to the rim for support. Fascia and skin were redraped and quilted, and closure completed in layers. The procedure was repeated on the contralateral ear. The patient was followed up after 3 months.

Results:

Satisfactory ear shape was achieved bilaterally without complication.

Conclusions:

Meticulous dissection over the helix and exposure beyond the adhesion is of paramount importance in successfully correcting this malformation. Through using a posterior auricular incision, wide exposure and visualisation of the helix can be attained, with the added benefit of a scar that is barely noticeable on the back of the ear.

P-08 Struggling for perfection. Aesthetic evaluation of our results after introducing 3D planning for auricular reconstruction in microtia.

Mr Wenceslao Calonge¹, Mr Alexandre Ludwig Rodríguez Castaneda¹, Mrs Mireia Riba Martínez¹, Mr Miguel Bejarano Serrano¹, Mr Francisco Parri Ferrandis¹
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Aims:

After performing more than 120 reconstructive surgeries for microtia following the Firmin modification of the Nagata procedure we resolved to evaluate until what extent our own perception of an improvement in the accuracy of topographic anatomical points was shared by the patients themselves and external viewers.

Background:

Recent advances in 3D-printing have allowed refinements in surgical planning, frame design and intraoperative carving of the costal cartilage.

Methods:

We passed satisfaction questionnaires to 30 patients, one of their parents, an external plastic surgeon and one member of our surgical team (120 evaluation questionnaires for a 3-year period).

Results:

Though the average satisfaction scored for 4,1 (in a 1 to 5 scale), it is worth noting that the most severe gradings came from the members of the surgical team. However, the help of a 3D printing and planning, improved the scores for the final esthetic result along the period.

Conclusions:

We underline that some kind of patient satisfaction scale is needed to evaluate the work of a responsible medical team. This evaluation should be carried out by an external observer too.

P-09 Single step closure of polyotia

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Polyotia is an exceedingly rare facial condition consisting of a supranumerary auricle. The presence of anterior helix structures differentiates it from the more common preauricular tags or tragal remnants.

We report the case of a female newborn that presented an anomaly of her right auricle consisting of a mirror image of the auricle. In addition to tragal duplication there was a whole helix structure (which allows to classify the phenotype as true polyotia). There was a hypoplastic inner auditory canal. The right cochlear nerve was not identified on CT-scan there was V wave on impedanciometry. She showed a slight asymmetry with right hemifacial microsomia with mandibular hypoplasia without facial palsy.

Obstetric records included transient pregnancy diabetes treated by insulin. Neonatal hyperbilirubinemia under phototherapy for 24 hours was the only remarkable event after eutocic delivery. There was no family history for ear variations.

Surgical treatment under general anesthesia at the age of 17 months included resection of the supranumerary lobule, conchal and tragal remnants as well as perichondral dissection of the duplicated helix. We proceeded to fold and suture these double helix in lasagna-like layers in order to fill the resulting conchal defect. She underwent full postoperative recovery without incidents.

P-10 Microtia and social media: How we can help our patients?

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Aims:

To determine the importance of microtia and social media.

Background:

Social media and its role in plastic surgery cannot be denied. However, there exists a noticeable gap in the literature regarding microtia and its relationship with social media. This study highlights the presence of microtia surgeons and patients with microtia on social media, recognizing the potential benefits that this presence could bring to both.

Methods:

A survey was conducted, from the families of patients with microtia, present on dedicated Instagram and Facebook microtia groups. The presence of global ear reconstructive surgeons on social media was assessed via responses from the International Society for Auricular Reconstruction (ISAR) official WhatsApp group.

Results:

The findings of this study are quite significant. 81% of the microtia families affirmed that social media plays a crucial role in raising awareness about microtia. 91% of respondents believed that microtia surgeons should have a presence on social media platforms. Facebook, and Instagram, were most frequently followed by the microtia community. 50% expressed that social media facilitated interactions with other families of microtia patients. Additionally, 44% reported that it helped them explore different treatment options, and 8% found it beneficial for engaging with microtia surgeons or their teams. Among the microtia surgeons surveyed, only 46% had an active presence on social media. Instagram was the preferred platform for 40% of them, while 20% used both Facebook and Instagram, 22% exclusively used Facebook, and 8% utilized Twitter.

Conclusions:

This study highlights the significance of social media use for both microtia surgeons and families of microtia patients. It underscores the potential benefits of incorporating social media as a powerful tool in the practice of global ear reconstructive surgeons. By doing so, it can serve as a bridge, fostering closer connections and enhancing communication between these surgeons and their patients.

P-11 Determination of Novel, Cranium-based Relationships for Construct Placement in Microtia Reconstruction for Hemifacial Microsomia Patients

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Aims:

The goal of this study is to determine if the ideal location of the construct in microtia reconstruction for hemi-facial microsomia (HFM) can be more accurately derived from measurements on the cranium.

Background:

Microtia reconstruction is a particular challenge for patients with severe HFM, as the facial landmarks normally used cannot be appropriately mirrored onto the affected side. Thus, placement of the reconstructed auricle in the ideal location remains at the discretion of the surgeon. In reality, however, the ear lies on the cranium, which is affected to a lesser degree in this patient population.

Methods:

A retrospective review of all HFM patients treated at our institution from 2000 - 2021 was conducted. Age-matched controls were similarly retrieved. High-resolution CT images were analyzed through craniometric linear relationships on Multi-Planar Reconstruction (MPR) images, generated by the Voxar 3D workstation. A Bonferroni correction was applied to all statistical analyses.

Results:

Thirty-six patients accounting for 44 CT scans were included. Patients were on average 10.57 +/- 7.2 years old. Image analysis suggested that the posterior cranial vault is unaffected in HFM ($p > 0.001$). Further, craniometric relationships between the tragus and the foramen magnum, as well as between the tragus and the posterior cranium, have been shown to be highly similar and equally precise in predicting tragus position in healthy controls ($p > 0.001$). These relationships held true across all age groups ($p > 0.001$), and importantly among HFM patients, where the mean absolute difference in predicted tragus position never surpassed 1.5mm.

Conclusions:

Relationships between the tragus and the cranium can be used as an alternative to distorted facial anatomy or surgeon's experience to assist in pre-operative planning of construct placement in microtia reconstruction for HFM patients.

P-12 Total Ear and Partial Scalp Reconstruction After Traumatic Degloving - Technique Description

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Aims:

This abstract aims to present a comprehensive technique for total ear and partial scalp reconstruction following traumatic degloving injuries.

Background:

Auricular and scalp degloving injuries can result from severe traumas, causing extensive soft tissue loss and deformity. Achieving successful reconstruction in such cases requires a comprehensive and multi-stage approach.

Methods:

The technique described in this abstract begins with local preparation and treatment aimed at promoting granulation formation and epidermalization. This local treatment sets the foundation for subsequent stages of reconstruction. Sequential fat injections are employed to restore subcutaneous tissue, which is essential for achieving optimal aesthetic and functional outcomes. A tissue expander is then utilized to facilitate the expansion of available tissue, creating a suitable bed for auricular reconstruction. Costal cartilage grafts are harvested and skillfully shaped to reconstruct the ear framework.

Results:

The step-by-step approach outlined in this abstract has demonstrated its efficacy in the successful reconstruction of both the total ear and partial scalp following traumatic degloving injuries. By meticulously addressing tissue quality and quantity at each stage of the process, this technique ensures not only the restoration of form but also the preservation of function and natural aesthetics.

Conclusions:

Total ear and partial scalp reconstruction after traumatic degloving injuries require a well-structured and sequential approach to achieve optimal results. The technique described in this abstract, involving local preparation, fat injection, tissue expansion, and the use of costal cartilage for auricular reconstruction, offers a valuable method to address these challenging cases. Surgeons and reconstructive specialists can benefit from this comprehensive approach to provide patients with improved quality of life and enhanced aesthetic outcomes.

P-13 Refining the Sulcus in Microtia Repair, A Novel Modification of Advancement SMAS Flap: bipedicle superficial peri-mastoid fascia flap

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Aims:

This study introduces and assesses a novel surgical approach using a bipedicle superficial peri-mastoid fascia (SMAS) flap to improve auricular projection and sulcus depth during microtia reconstruction, both with and without external ear canal atresia repair.

Background:

The conventional SMAS advancement flap and temporalis fascia pedicled flap are commonly used techniques in auricular reconstruction for microtia. However, achieving a well-defined and stable sulcus remains challenging. This study presents a modification of the SMAS technique to create a deeper and more angular sulcus intra-operatively, resulting in predictable auricular projection enhancement.

Methods:

A retrospective analysis was performed on 11 microtia patients who underwent total auricular reconstruction between August 2022 and August 2023. The senior author utilized the bipedicle superficial peri-mastoid fascia flap for the second stage of reconstruction in these patients, with seven cases receiving simultaneous atresia repair and four controls treated with the traditional SMAS advancement flap. Outcome measures included 3-month postoperative auricular projection and surgical complications.

Results:

The cases showed a mean auricular projection of 13.7 mm, significantly deeper than the 12.3 mm seen in the control group. Complication rates were similar in both cohorts.

Conclusion:

The modified bipedicle superficial peri-mastoid fascia (SMAS) flap technique exhibits promise for achieving a more distinct sulcus in microtia repair while maintaining a comparable safety profile to the traditional approach. This innovation holds potential to enhance reconstructive standards, pending further research.

P-14 Auricular Pseudocyst: an unusual clinical presentation

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Aims:

To describe an unusual clinical presentation of auricular pseudocyst in order to avoid misdiagnosis and sequela.

Background:

Auricular pseudocyst is a rare condition that is characterised by a benign intracartilaginous collection. Usually, it appears in young adults with no trauma history associated, and unilateral. The etiology is still unclear. The ultrasound findings are characteristic. A correct treatment allows the preservation of the auricular structure with no recurrence. When the clinical presentation is unusual, it could be misdiagnosed.

Methods:

A case report of a patient with bilateral metachronous auricular pseudocysts. Clinical presentation, ultrasounds and histology were compared to what is described in the literature.

Results:

A 13-year-old male with swelling on scaphoid fossa that was resolved spontaneously. 7 months later a new swelling was observed. Ultrasound informed a cavity with multiple septum and calcification. Surgical findings included hypertrophic deformed auricular cartilage. Histology described cartilage tissue with calcifications and young scarring. Reconstruction of the upper auricle was performed 3 years later. Another swelling on the scaphoid fossa of the contralateral auricle was identified. Ultrasound showed an intracartilaginous cyst. Due to this pathognomonic image of auricular pseudocyst, a surgical deroofting of the cyst was performed promptly. No evidence of recurrence.

Conclusions:

This teenage patient presented two metachronous auricular pseudocysts. The first event had a misleading evolution and sonographic finding. In addition, the auricular cartilage was found hypertrophic with calcifications and scarring at the histology. The second event was identified at an early stage, with a pathognomonic ultrasound finding that allowed a correct diagnosis and a treatment with better results.

This entity is very infrequent in the pediatric population and could have an unusual clinical presentation. Therefore, the knowledge of this pathology and its variants is important to avoid a misdiagnosis and mistreatment with esthetic sequelae.

P-15 Artificial Intelligence Assisted Ear Deformity Classification

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Aim:

To establish an automatic diagnostic model for multilevel classification of ear malformations based on artificial intelligence. The model is proposed to be based on a convolutional neural network to realize the classification of various types of ear deformities through the automatic recognition of two-dimensional images of the auricles.

Background:

Deep learning models represented by convolutional neural networks (CNN) have made breakthroughs in the field of computer vision. Currently, a large number of studies have been conducted on the use of neural networks for the classification of medical images, including the classification of skin cancer based on photographs, the classification of retina based on fundus images, and the classification of lung nodules based on CT images, all of which have made significant progress.

Methods:

A collection of 1,500 neonatal auricular morphologies (3,000 auricular morphology images) was collected and a deep learning classification study was performed for the most common auricular morphology deformities. Two plastic surgeons performed auricular morphology classification diagnosis; then images diagnosed as normal, helix deformity, cup ear, lop ear, and stahl's ear were trained using YoLov5 in combination with the ResNet-18 network (70% training set, 30% test set).

Results:

For the 5 common ear types and 2 classifications (normal and abnormal), the agreement between the two surgeons was 78% and 83%, respectively, and the classification accuracy of machine learning (using the labeling results of a particular physician as a standard value) reached 76% and 81%.

Conclusions:

Artificial intelligence's judgment on the classification of auricular deformity is basically up to the level of experts.

P-16 Long-Term Effectiveness of Ear Molding and Factors Affecting Outcomes

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Aim:

To evaluate the long-term effectiveness of ear molding and factors affecting outcomes.

Background:

The EarWell System offers an opportunity for babies born with ear anomalies. However, the long-term effectiveness of ear molding remains unclear. This study aimed to explore the long-term effectiveness of this novel technique and to determine the risk factors for recurrence.

Methods:

This retrospective, population-based cohort study was performed from 2017 to 2021. Infants who completed ear molding therapy and were followed for more than 6 months were enrolled. The main outcomes were immediate and long-term efficacy, which were graded by two blinded plastic surgeons.

Results:

A total of 226 infants with 334 ears were recruited. The most common anomalies included helical deformities [113 ears (33.8%)], and the rarest deformities were cryptotia [5 ears (1.5%)] and conchal crus [5 ears (1.5%)]. The age of initiation treatment was a factor affecting both immediate ($p=0.004$) and long-term effectiveness ($p=0.009$). The type of anomaly also influenced long-term molding outcomes. For cup ears, the success rate of long-term outcomes (76.0%) was significantly lower than that of immediate outcomes (98.7%) ($p<0.001$). Prominent ear, cup ear, and microtia were found to be the most likely to relapse during long-term follow-up. The results of logistic regression also demonstrated age, duration time, and the type of anomaly were risk factors of ear molding effects.

Conclusions:

The EarWell System was shown to be a secure and effective method for congenital ear anomalies. Some infants' ears recurred after successful immediate results. The age of initiation treatment and the type of anomaly were predictors of long-term outcomes. Key words: ear molding, long-term, ear deformity, outcome

P-17 On the management of patients with microtia and other auricular anomalies

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In my lecture 'Being able to hear is more than just having ears', I take you on a journey that caretakers and their child, born without ears, make. In historical perspective, the current journey and a view on the future; I believe in working in a healthy ecosystem or a so called holistic approach to healthcare.

Born without ears you cannot hear. There is no auricle to wear a conventional hearing aid. Fortunately hearing aids that transmit sounds by means of bone conduction exist. An implant in the temporal bone travels sound through the skull to your hearing organ. The options for auricle reconstruction are great and not one size fits all.

Together we provide care for the ear and hearing in a multidisciplinary team. Strong collaboration provides optimal care. Historically this was different. Current pressure on healthcare means that we need to transform the way we work, move towards working in ecosystems using a holistic approach to anchor our care for future generations.

P-18 Assessment of cost and Health-Related quality of life following three different methods of microtia reconstruction in 30 patients

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Aims:

The goal of this study was to evaluate the cost burden and QoL benefit, for patients having either alloplastic, autologous, or prosthetic ear reconstruction.

Background

Microtia patients usually have both a functional and an aesthetic deficit. Physicians should address both of these issues in consultation with a microtia patient. The aesthetic component of microtia can be treated with one of three methods of auricular reconstruction. The advantages and disadvantages have been reported for each technique.

Methods:

Consecutive Dutch microtia patients who underwent auricular reconstruction between January 2011 and April 2018 either in Los Angeles or Nijmegen were recruited for retrospective chart review. Since alloplastic ear reconstruction is not performed in Nijmegen, we recruited Dutch patients who travelled to Los Angeles for microtia surgery in order to minimise bias as much as possible by studying culturally similar patients. Patients who had aural atresia repair combined with auricular reconstruction were excluded.

Results:

Thirty patients with 34 ear reconstructions were included in this study. Patient demographics and generic outcomes are shown. Cost variables are shown. GBI and GCBI results are shown.

Conclusions:

While the quality of life improvement following each type of reconstruction was similarly positive, the cost of each reconstructive method varied. Autologous ear reconstruction was associated with a longer hospital admission, longer surgery time, and more outpatient visits compared to alloplastic and prosthetic ear reconstruction. Besides the clinical variables contributing to the care costs, this study shows also additional factors influencing patients' choice for a reconstructive technique and all aspects should be taken into consideration when counselling a microtia patient.

P-19 Simultaneous formation of the auricle and external auditory canal

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Starting in 2022, we began operations for one-stage reconstruction of the auricle and atresia of the auditory canal. During 2022-2023, we operated on 8 patients aged 7 to 14 years. All had unilateral ear anomaly and normal hearing in the unaffected ear. Before surgery, all patients underwent audiometry and MSCT of the mastoid process. After determining the location of the ear frame, the formation of the ear canal and its plasticity was done. Then a standard operation was performed to reconstruct the auricle. The average duration of the operation was 7 hours.

Postoperative condition - the first ligation of the ear canal was carried out on the 20th day, since we used skin with a free flap for plastic surgery of the walls of the ear canal. There was a significant improvement in hearing on the operated side.

Conclusion. Positive aspects - one-stage reconstruction helps to reduce the time of surgical intervention in the future and control the location of the ear frame.

Negative aspects - longer rehabilitation is required in the postoperative period.

P-20 Morphological aspects of the condition of cartilage during experimental otoplasty

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Purpose of the study: to study the morphological changes in cartilage tissue during experimental otoplasty in rabbits of various age groups.

Materials and methods: A study of the transplanted cartilaginous autograft (rabbit rib cartilage) was carried out in different age groups in the dynamics after otoplasty. 54 gray rabbits (chinchillas) were divided into 3 biological age groups: young, middle-aged and adults. Under short-term anesthesia, a fragment of costal cartilage was taken from them and inserted into the subcutaneous part in the temporal region behind the ear, reproducing the otoplasty method used.

Results and discussion: The material (installed cartilage autograft) was taken for research on days 10, 20 and 30 after surgery. When studying the age-related morphology of autograft cartilage hyaline tissue of rabbits, individual characteristics were identified that characterize the development of cartilage in young, middle-aged and adult rabbits. As a result of the analysis of morphological studies, the best results were obtained with auto-transplantation of cartilage in adult rabbits. This allows us to develop appropriate surgical treatment tactics for otoplasty in the age aspect.

P-21 Using Materials Science and 3D Printing Technology to Teach and Plan Ear Reconstruction

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Aims:

The aim of this study was to review the range of models used for teaching auricular framework carving and validate a carvable 3D printed costal cartilage simulation tool for teaching and planning auricular reconstruction.

Background:

Owing to the complexity and variability of autologous auricular reconstruction, there is a need for reliable simulation to facilitate the planning, teaching and training of this procedure. There are a range of materials reported to enhance learning, from fruit to rubber, yet few provide a realistic simulation of the texture and geometry of costochondral cartilage.

Methods:

A systematic review using PRISMA guidance was conducted to identify simulation models for ear framework carving from MEDLINE, Embase and Cochrane databases. A novel foam impregnated silicone material was designed and compared to costochondral cartilage for mechanical properties. Auricular frameworks and costal cartilages 6 to 9 were printed using an Ultimaker3 3D Printer and reproduced using the silicone for carving.

The models were validated by 12 plastic surgery trainees, who each attempted auricular reconstruction using the carvable models. Pre- and post-training Likert questionnaires were completed to assess confidence, comprehension and educational value of the models.

Results:

354 articles were identified and 13 met inclusion criteria. Vegetables, animal tissue, synthetic materials and 3D printed moulds were identified. 3D printing and silicone-based impressions were deemed consistently superior for framework planning. Using our novel silicone-sponge composite with 3D printing yielded statistically significant improvements in understanding the different components of an auricular framework ($p < 0.0001$), the location of subunits ($p = 0.006$) and confidence in carving and handling cartilage ($p < 0.0001$). 100% felt the 3D printed teaching aids directly enhanced their learning.

Conclusions:

In this study we have demonstrated the value of 3D printing in producing a suitable simulated costal cartilage model and as an adjunct to comprehending and planning a framework for auricular reconstruction.

P-22 A data linkage study of the epidemiology, surgical management and psychosocial impact of microtia in Wales.

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Aims:

This study aims to use data linkage to characterise the incidence of microtia in Wales and determine whether patients opt for autologous or prosthetic reconstruction and if this is influenced by socioeconomic factors. We additionally explore whether microtia, and subsequent surgery, conveys any risk of influencing school performance or the development of anxiety or depression.

Background:

Previous studies of microtia epidemiology have demonstrated global variability and an association with bullying and psychosocial implications.

Methods:

Patients with microtia were identified from the Patient Episode Database for Wales and Primary Care GP dataset using International Classification of Disease 10 (ICD-10) codes and read codes. Data linkage of primary and secondary National Health Service (NHS) datasets was used to study patient demographics and hospital episode statistics. Ordinal and logistic regression analyses were used to determine the odds of impaired school performance or diagnosis of an affective disorder compared to age matched controls.

Results:

101 microtia patients were identified between 2000-2018, of which 48 patients (47.5%) had auricular reconstructive surgery. The mean annual incidence was 2.13 microtia cases per 10,000 births over the study period. 27.1% had prosthetic and 72.9% had autologous auricular reconstruction. There were no significant differences in socioeconomic status between the autologous and prosthetic reconstruction cohorts ($p=0.488$). Microtia was not predictive of school performance or a diagnosis of anxiety ($p=0.4$) or depression ($p=0.7$). Socioeconomic status and gender were found to influence both outcomes, independently of a microtia diagnosis.

Conclusions:

The incidence of microtia in Wales is double that previously reported, with regional geographic variation, with most patients opting for autologous reconstruction. That a diagnosis of microtia is not associated with impaired psychosocial parameters may be indicative of good psychosocial integration and support

P-23 The Interdisciplinary Team as The New Standard of Care for Microtia and Aural Atresia Patients

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Aims:

To present a comprehensive model to routinely address the needs of microtia and atresia patients through coordinated interdisciplinary care.

Background:

Children with microtia and atresia require coordinated subspecialty care for optimal outcomes. While interdisciplinary care for patients with craniofacial differences is standard, microtia children often receive isolated care. We present our comprehensive model for an interdisciplinary approach.

Methods:

Modeled after craniofacial centers nationwide, the interdisciplinary clinic for microtia patients includes plastic surgery, otolaryngology, audiology, speech pathology, genetics, social work, and ophthalmology. Team discussions facilitate review of microtia grade, surgical options, ear anatomy, and degree of hearing loss relative to language development. Reconstructive choice guides timing, type, and placement of hearing aids to optimize access to sound from an early age. Genetic counseling and social, educational events facilitate dynamic learning experiences. Social work, behavioral assessments, and psychological evaluations address patients' coping abilities, reinforcing holistic care.

Results:

Patients with microtia were evaluated (n=37; unilateral: n=35; bilateral: n=2). Microtia repair was completed in patients of appropriate age (n=2; autologous: n = 1; allogeneic: n=1). Patients with concerns for autism were referred to behavioral health (n=4; 11%). Following speech-language pathology evaluation patients were referred for audio-verbal therapy (n=6; 16%). All patients identified with conductive hearing loss secondary to atresia were fitted with bone conduction hearing devices. Patients were identified as syndromic (n=2; 5%) or non-syndromic (n=35; 95%) and referred to genetics (n=7; 19%). Ophthalmology referrals were also provided (n=4; 11%).

Conclusions:

Interdisciplinary teams help reveal trends, highlight new concerns, and select individualized reconstructive options. They draw attention to critical developmental periods, holistically addressing needs beyond plastic surgery and otolaryngology,

including speech development, access to hearing, and building confidence in these children to achieve their full developmental potential.

P-24 Quantitative Framework Fabrication with Autogenous Costal Cartilage in Microtia Reconstruction

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Aims:

We presented one quantitative framework fabrication method to reduce the learning curve and obtain satisfactory aesthetic results.

Background:

Auricular reconstruction remains one of the most challenging surgeries for its delicate structures and potential complications. The aesthetic results vary greatly depending on the surgeon's experience and learning curve. As the core of the microtia reconstruction, quantitative framework fabrication was proposed based on our abundant clinical experience of auricular reconstruction to shorten the learning curve and to achieve relative stable aesthetic results.

Methods:

Our team has used autologous costal cartilage in microtia reconstruction since 2005. Two stages of microtia reconstruction are performed. Quantitative framework mainly refers to the size, thickness and the fabrication details of the base frame, helix, antihelix, scapha, triangular fossa and tragus. The aesthetic results are rated as excellent, good or fair. We analyzed the aesthetic results and complications of auricular reconstruction with quantitative framework from January 2020 to September 2021.

Results:

A total of 525 patients who underwent two-stage microtia reconstruction with quantitative framework were reviewed. The average age was 10.7 ± 4.0 years. The mean follow-up time was 16.5 ± 6.3 months. There were 263 (50.1%) patients who obtained excellent outcomes with natural aesthetics, 238 (45.3%) patients who obtained good outcomes, and 24 (4.6%) patients who obtained fair outcomes. Complications such as flap necrosis, framework absorption, helix displacement or fracture occurred in 36 (6.8%) patients.

Conclusions:

This quantitative framework fabrication method can reduce the learning curve, obtain satisfactory aesthetic results with few complications and reserve a certain space for future canaloplasty.

P-25 Collaborators in Care - The Role of the Advanced Practice Provider in a Microtia Practice

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Aims:

Discuss the incorporation and utilization of Advanced Practice Providers in a Microtia Practice

Background

Integration of Nurse Practitioners (NPs) and Physician Assistants (PAs), which may be collectively known as Advanced Practice Providers (APPs), in a surgical subspecialty can improve cost effective, quality patient care and be a valuable contributor in medical residency training, particularly in auricular reconstruction. We describe the role of the APP in microtia care at Stanford Medicine Children's Health in an academic medicine setting. In the operating room, an APP can function as a first assist, assisting the primary surgeon as well as completing certain tasks of the surgery. The APP can then provide support caring for the patient in the hospital, when there is a rib cartilage harvest requiring admission. They can be an integral role in preoperative education and teaching wound care, as well as in post operative wound surveillance. Although there is variable education and preparation of the NP and PA, the broad knowledge of the APP allows these clinical experts to specialize in the specialized care delivery of patients with complex conditions throughout the perioperative continuum. Investment in the training and retention of an APP in the surgical subspecialty role may allow for variably broad utilization in the outpatient, inpatient, or operative settings dependent upon the needs of the surgical team. APPs with optimal clinical preparation and experience may additionally participate in clinical research, quality improvement, leadership, and management in auricular reconstruction programs while providing clinical continuity in an academic setting.

Conclusions

APPs working in an academic setting can be a positive core collaborator of the perioperative care team for patients with complex condition.

P-26 A three-dimensional measurement method to quantify human auricle parameters: A pilot cadaver study

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Aims:

The aim of this study is to introduce and evaluate a novel automated surface-based three-dimensional (3D) anthropometric measurement method for quantifying human auricle parameters.

Background:

Measurement of auricle parameters for post-operative evaluation and planning in plastic surgery presents significant challenges due to the complex 3D structure of the human auricle. Traditional measurement methods have often relied on subjective and manual techniques, resulting in limited precision.

Methods:

This study introduces a novel automated surface-based three-dimensional (3D) anthropometric measurement method for quantifying human auricle parameters. The automatic and manual measurements were applied to a cadaver and Computed Tomography (CT) reconstructed virtual ears repeatedly, measuring important aesthetical ear parameters including ear length, width, protrusion, auriculocephalic (AC) angle, and inclination angle. The variations in these parameters were compared to evaluate their measurement precision. This was performed using a contemporary sophisticated CT scanner and 10-year-old CT scanner, at a normal scanning dose (160 mAs) was repeated at half the dose (80 mAs).

Results:

The automatic method demonstrated significantly higher precision in measuring auricle parameters compared to manual methods. Improved precision of measuring auricle parameters was associated with using the contemporary scanner. Using the higher dose only favored the precision of measuring the left auricle length in our analyses.

Conclusions:

The findings of this study emphasize the advantages of an automated surface-based approach auricle measurements, showcasing improved precision compared to traditional methods. This novel method has the potential to enhance auricle reconstruction and other applications in plastic surgery, offering a promising avenue for future research and clinical practice.

P-27 Gaze patterns of normal and microtia ears pre- and post-reconstruction

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Aims:

To understand attentional preferences for normal and microtia ears.

Background:

The ear is a complex form with multiple features of interest for auricular reconstruction. Eye tracking has been used to measure attentional differences for surgical outcomes. No prior research has characterized gaze patterns of normal or microtia ears pre- and post-reconstruction.

Methods:

Eye tracking technology was used to characterize gaze preferences. 71 participants viewed images of 5 patients with unilateral microtia. Profile images of patient faces and isolated ears including normal, microtia, and post-reconstruction microtia ears were shown. Total time of fixation in predefined areas of interest (AOI) were measured. Inferential statistics were used to assess significance of fixation differences between AOIs within and between facial or auricular features.

Results:

The ear received most visual attention in lateral view of the face (1.91s, 1.66–2.16s) [mean, 95% CI], followed by features of the “central triangle”–the eyes (1.26s, 1.06–1.46), nose (0.48s, 0.38–0.58), and mouth (0.15s, 0.15–0.20). In frontal view, microtia ears received less attention following surgical reconstruction (0.74s vs. 0.4s, $p < 0.001$). The concha was the most attended feature for both normal (2.97s, 2.7–3.23) and reconstructed microtia ears (1.87s, 1.61–2.13). Scars on reconstructed ears altered the typical visual scan path.

Conclusion:

The ear is an attentional gaze landmark of the face. Attention to microtia ears, both pre- and post-reconstruction, differs from gaze patterns of normal ears. The concha was the most attended to subunit of the ear. Attentional gaze may provide an unbiased method to determine what is important in reconstructive surgery.

P-28 Meta Analysis on the Risk Factors of Congenital Microtia

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Aims:

To clarify the risk factors leading to the isolated congenital microtia

Background:

The etiopathogenesis and risk factors of microtia is still unknown in the majority of the cases, particularly for individuals presenting with isolated microtia.

Methods:

Publications about related risk factors of isolated congenital microtia were totally indexed, 11 papers were selected, the table of basic characteristics and the form of statistics analysis was built by using Microsoft EXCEL. And the latter one was included into the data pool of software STATA 12.0. The combined odds ratio (OR), which was used as standard effect index, was calculated and its corresponding 95% confidence interval (95%CI) was also adopted at the same time, random effect model was applied to export Forest Plot to present the results visually, heterogeneity was evaluated by related index. Finally, appropriate funnel plot combined with begg's and egger's test were implemented in order to evaluate publication bias.

Results:

Related literatures were included for Meta-analysis based on the standard of exclusion. The following risk factors had significant difference:, The combined OR and 95%CI were respectively as follows, multiple birth[1.72(1.22,2.41)], smoking[1.44(1.02,2.05)] ,alcohol consumption [2.73(1.52,4.88)], high maternal age[2.73(1.52,4.88)]. On the contrary, maternal diabetes, hypertension, abortion, low maternal education level, folic acid usage bear no significant relationship with isolated congenital microtia.

Conclusions:

Risk factors associated with isolated congenital microtia were multiple birth, maternal, smoking, maternal alcohol consumption and high maternal age.

P-29 Quantifying the Threshold of Clinical Acceptability of Auricular Configuration Following Microtia Reconstruction in Chinese Population

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Aims:

The objective of this study was to establish a quantifiable perceptual threshold for the acceptable discrepancies in auricular dimension and position.

Background: Currently, there is a lack of data in this area to guide microtia reconstruction.

Methods:

Sequentially, four sets of features were digitally processed in photographs of an adult female model's auricles. These photographs were presented in a randomized sequence through an online survey to otolaryngologists, nurses and medical students. Following each photograph, participants responded to survey questions. The measurement at which 50% of observers deemed fairly unacceptable or unacceptable was determined. Demographic data were collected, and analysis of variance was employed.

Results:

A total of 40 participants (26females and 14males) with an age range of 30-39 provided comprehensive responses to the survey. The perception of auricular position was negatively impacted with an upward shift by 6mm or downward shift by 3mm in a full-face frontal view. The perceptual threshold is higher when the auricle is shifted up by 12mm or down by 9mm in a split face and side view. Furthermore, the auricle became unacceptable when the auricle is contracted by 6mm while keeping the lower border unchanged. Importantly, the perception thresholds remained consistent irrespective of the gender, age, or role of the raters.

Conclusions:

This study revealed that a slightly higher or larger auricle tends to be more readily accepted. Notably, a smaller reconstructed auricle may achieve greater acceptance if the lower border aligns with the nasal base. Throughout the reconstruction process, it is crucial to consider contralateral landmarks for optimal outcomes. The parameters obtained can serve as a valuable guide for making informed decisions for preoperative planning and during microtia reconstruction, aiding surgeons in achieving desirable aesthetic results.

P-30 Microsurgical Replantation of The Total Ear Avulsion: Our Experience From 4 Success Cases

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Aims:

We would like to report 4 success cases replantation of total ear avulsion by microsurgical technique and review the literature.

Background:

Total ear avulsion is a rare injury, but can leave serious functional, aesthetic and psychological consequences for the patient. Because the blood vessels to the ear are very small, successful microsurgical anastomosis has become rare even in world medical literature. In 1980 Pennington and colleagues successfully performed the first surgery to transplant the human ear microsurgery. Until now, only about 30 successful cases have been reported.

Methods:

Retrospective studies on all the case ear avulsion treated at VDUH. The following data and methods were assessed: age, cause of accidents, time of ischemia, which vessels repaired, method of replantation, vein grafts required, blood transfusion, total operating time, early and long-term results.

Results:

From 2014 to 2018 we have successfully replant of 4 total avulsion ears by microsurgical technique. There a 3 male and one woman, age from 21 to 55 years old. The causes are traffic accident and violent. Ischemia time from 4 to 14 hours. Revascularization was obtained by suture branch of posterior auricular artery (only 0,4 – 0,5 mm of diameter) but venous anastomosis is extremely difficult because the vein was so small or no vein could be identified. In case of venous congestion, the drainage was obtained by application of natural leeches or “chemical” leeches.

Conclusions:

Total Ear amputation is a rare emergency lesion and each case is unique. The surgeon will have to apply the appropriate treatment techniques accordingly. When microsurgery cannot be applied, treatment methods depend on the size and location of the severed part. If possible, microsurgical ear replantation is the optimal choice because it gives unparallel aesthetic results.

P-31 Nonsurgical Correction of Congenital Concha Cavum Deformity Using a Commercial Ear Molding Device

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With the recent introduction of commercial auricular molding devices, nonsurgical ear correction has become an important option for the treatment of mild neonatal auricular deformities. The nonsurgical correction of relatively uncommon deformities, such as concha cavum deformities, has not been addressed in the literature. In particular, in concha cavum deformities, the narrowing of the external auditory canal may cause functional problems such as hearing loss; thus, it is necessary to treat this condition as soon as possible, for both cosmetic and functional reasons. This study aimed to investigate whether congenital concha cavum deformities could be corrected nonsurgically using a commercial ear molding device. A concha cavum deformity was confirmed in three of the 83 ears that underwent nonsurgical ear correction using a commercial ear molding device between May 2018 and December 2020, and splinting was performed in these three ears. The deformity was a state in which the cavum of the conchal cartilage convexly protruded and the external auditory canal was narrowed. All patients were newborns within 1 month of birth, and they underwent nonsurgical auricular correction using EarWell (Becon Medical, Naperville, IL, USA) on the day of the visit based on their caregivers' decision. In all patients, the ear molding device was in place for 4 weeks, with removal after 2 weeks to check the skin condition. At the end of the 4-week correction period, the concha cavum deformity was completely corrected in all patients, and the partial occlusion of the external auditory canal was also normalized. There was no evidence of recurrence of corrected concha cavum even after 6 months.

P-32 Low-cost microtia frame carving simulation training and results evaluation with Objective Structured Assessment of Technical Skills (OSATS-microtia)

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Aims:

The objective of this work is to develop a simulation model of ex vivo material for teaching carving for Auricular reconstruction handset with accessible materials and create an objective evaluation.

Background:

Reconstruction in microtia used autologous cartilage from the rib cage.

Methods:

As a reference for the reconstruction of the auricular, the technique of Firmin. The materials to be used for carving de framework are: sheet of paper or acetate mica, pencil, cutting board, scissors, scalpel with handle, carrots, histoacryl® or 5/0 or 6/0 nylon or prolene® suture. The materials to be used for the skin are: 3 mm silicone tattoo skin practice, embroidery hoop, spacesaver vaccum storage bag and vacuum cleaner. Students are evaluated with Objective Structured Assessment of Technical Skills (OSATS-microtia) specially designed to evaluate carving. OSATS dominains includes helix extension, antihelix concavity, frame thickness, and shape, depth and wide of the triangular and intertragic fossa, and conchal wide. The Michigan Standard Simulation Experience Scale (MiSSES) is used to measure performance of the simulation training by the students.

Results:

A simulation model with readily available materials is presented and describes the realization of a Firmin type 1 framework, which contributes to the practice and improvement. The OSATS performed better for previous trained surgeons than beginners. 95% of the students rated this experience as good as it increases their confidence and abilities skill in carving.

Conclusions:

The proposed model with carrot allows learning to give shapes and three-dimensionality, in an accessible, reproducible and frequently applicable way in teaching to inexperienced surgeons. The OSATS-microtia allows objective evaluation of shortcomings and improvements in carving.

P-33 Ear Reduction for Aesthetic Harmonization of Facial: A Case Report

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Aims:

This article reports the case of a female patient who sought out plastic surgery to reduce her ear due to the psychosocial discomfort caused by their size.

Background:

The external auricles have a significant role in aesthetic harmony of the facial. When an ear's size, shape, position, and location are normal, it could go unnoticed. Any alteration, however, results in a notable and significant aesthetic disruption. The orientation and appearance of the ear reveal information on the age and gender of an individual and contribute for facial beauty.

Methods:

A scapha reduction was carried out with Gersuny technique. This is a simple and fast recovery procedure that give pleasant long-term results. The main incision is made along scapha, and once the excess skin and cartilage have been excised, the helical rim is then reattached to help restore proper shape and form.

Results:

The procedure does not pose any challenges or complications. The position of the scar was performed in such a way to ensure that the position of the scar would be the least visible possible. The reduction not only adjusted its size and contour, but also had a psychological effect on the patient, as the procedure improved the physiognomic appearance of the patient which in turn increased his self-esteem in relation to his appearance. The results proved to be satisfactory as the patient had more proportional ear in relation to the rest of her face and achieve aesthetic improvement.

Conclusions:

After having an ear reduction, a patient's self-image can often change dramatically. Instead of feeling self-conscious and trying to cover up their ears with hairstyles, the patient now loves their appearance and feels comfortable wearing hairstyles that show off their ears.

P-34 The struggles of establishing a microtia center in Indonesia, a developing Southeast Asian country

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The struggles of establishing a microtia center in Indonesia, a developing Southeast Asian country

Aims:

To illustrate the difficulties of making microtia centers in developing countries

Background:

Microtia is generally less popular than other craniofacial congenital defects, especially those located in the central part of the face. Long hair or head coverings can also hide its clinical appearance. Surgeries are often considered aesthetic-only procedures and felt to be less important than the need for hearing devices. Its extremely difficult and long-hour surgery results in a lack of available experts, leading to numerous unsatisfactory results that can traumatize and devastate patients and persuade those who haven't had surgery to abandon their plans to undergo it.

Methods:

We managed the first microtia center in Indonesia with a multidisciplinary approach. Initially, only three fields were involved, including plastic surgery, ENT, and psychiatry, which were based on the key problems in microtia: aesthetics, hearing function, and psychology. Coincidentally, all three experts are women, so a motherly approach is predominantly adopted in treating patients. The center shifted to become a microtia and craniofacial center as the number of other congenital craniofacial deformity patients increased, resulting in an increase in other disciplines involved in the center.

Results:

It is currently the biggest microtia center in Indonesia, with one to two surgical cases every week and high post-op satisfactory results. The parents are presently thinking about ear reconstruction while their child is still young. The rise in the number of surgeries implies that patients desire for reconstructive surgery is increasing.

Conclusions:

Starting a microtia center in a developing country is not easy. It takes determination and dedication to become the best in the country. Multidisciplinary treatment is unquestionably superior than just one related scientific discipline. Do remember: When there is a will, there is a way.

P-35 A four-year experience of first-stage microtia reconstruction using a custom 3D cutting guide approach.

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Aims:

To make the ear carving process simpler and more effective.

Background:

For microtia reconstruction, 3D-model assistance has been widely employed. The availability of a 3D model was supposed to make the construction of a 3D ear framework easier for surgeons. A 3D-printed cutting guide with aligned holes consisting of three framework pieces was created so that the model not only serves as a visual reference but also aids in the carving process, making it easier, more efficient, and faster.

Methods:

Prior to surgery, the remnant ear, adjacent skin, normal ear, eyebrow position, lower eyelid crease, lateral alar crease, sideburns hairline, and rib cartilages had to be assessed. Each patient received a precise and customized 3D reference framework of a normal ear. The base frame, helix, tragus, and antihelix were adjusted with the 3D model to create a solid, personalized framework. The framework will have aligned holes for suturing the outline to the sixth to eighth contralateral costal cartilages. This approach cut down on the amount of cartilage needed for ear reconstruction, shortened surgery time, and facilitated the efficient transfer of knowledge among surgeons.

Results:

The duration of the surgery, including rib harvesting, was recorded as four hours. After two to three months of waiting for edema to subside, the reconstructed ears were well-formed in color, texture, size, and position. The patient's current state or prior exposure to environmental factors are the main drivers of all complications, including hematoma, skin necrosis, and absorption framework.

Conclusions:

By using this approach, a solid and advanced framework could be built with less cartilage and less surgery time. Based on preoperative evaluation, customized design, and careful sculpting, a harmonious and personalized auricle with detailed anatomical characteristics was created.

P-36 Airlangga Microtia Center Protocol for Microtia Care in Indonesia, a developing country in Southeast Asia

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Aims:

To explain the protocol of one of the microtia centers in Indonesia.

Background:

Microtia is a congenital craniofacial deformity that is less prevalent than cleft lip and palate (CLP). Every country and continent has CLP management protocols. However, despite the fact that microtia is as serious as other congenital craniofacial defects, finding a treatment protocol in a country is quite difficult. For microtia patients, having ears is like holding the world in their hands.

Methods:

Because the primary concerns of microtia patients were aesthetic issues, poor hearing function, and psychology, developing a microtia protocol entails three major disciplines: plastic surgery, ENT, and psychiatry. In the beginning, the patient's parents would receive counseling about microtia management and how to cope with microtia in children. As well as routine examinations related to hearing evaluation and management of hearing loss. The surgeries were performed when the chest circumference was at least 60cm. Post-op evaluation was carried out until at least 1 year after surgery, unless other further complaints were found.

Results

This protocol made communication easier with the patient's parents and patients. Microtia patients were handled in a more efficient and coordinated manner. Collecting related examination data and complete documentation of the patient treatment process aided in the evaluation and improvement of future protocols with the goal of providing better and more effective microtia treatment.

Conclusions

Although the incidence of microtia is not as high as that of other congenital deformities, surgical reconstruction has a very high level of difficulty. Hearing loss and psychological issues are also serious issues that must not be ignored. It is critical to develop protocols for treating microtia more efficiently and effectively.

P-37 Post-microtia surgery complications, causal probability, and how to deal with them

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Aims:

To explain the management of complications following microtia surgery.

Background:

Complications following microtia surgery are quite common, given the difficulty, complexity, and length of the procedure. The types of complications that occur vary widely and can be caused by various factors related to the patient and the operative environment.

Methods:

A retrospective study of complications findings after microtia surgery as well as individual data collection on each patient with complications regarding factors that may be involved in the occurrence of complications.

Results:

Flap necrosis, cartilage exposure and resorption, graft failure, unshaped ear, pleural tear, pneumothorax, reattached ear after elevation, hypertropic scar, and keloid are complications encountered after microtia surgery. Smoking, cartilage calcification, obesity, pressure injury, an unhealthy diet, poor self-hygiene, and heavy exercise are factors that are thought to contribute to the occurrence of these complications.

Conclusions:

Secondary reconstruction following complications from microtia surgery is difficult, considering the limited cartilage and flap donors available. Complication management must be done carefully to avoid recurring complications, which will make future surgery more difficult.

P-38 Atlantoaxial instability post microtia surgery: A case report.

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Aim:

To report an atlantoaxial instability case following microtia surgery.

Background:

Atlantoaxial instability following microtia surgery is quite uncommon. The trigger is considered to be excessive cervical mobilization during surgery. It often occurs in Klippel-Feil syndrome and may be present with microtia. Here we present a case of atlantoaxial instability post-op microtia surgery.

Methods:

A 12-year-old female patient with right unilateral microtia complained of stiffness in the neck area and difficulty holding her head up two days after the second stage of microtia surgery. The parents tried to help straighten the neck, but it slowly fell back in the right posterolateral direction. On the first day after surgery, there were no similar complaints, and the patient was able to actively mobilize. The patient was given ice pack cold compress therapy four to six times per day, muscle relaxants, soft collars and gradual neck isometric strengthening exercise.

Results:

A complete recovery was found five days after therapy. The patient was able to straighten her neck again actively, with motor strength and sensory sensation returning to normal, and no recurrence was found.

Conclusion:

Although atlantoaxial instability is a rare consequence, surgeons should keep it in mind when treating patients with neck pain after microtia surgery. It is critical to undergo preoperative neck radiography and detect the deformity as soon as possible.

P-39 Assessment of Change in Patient Reported Outcome Using Ear-Q Scale in Patients with Pinna Deformities Undergoing Pinna Corrective Surgery

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Aims:

To assess the change in EAR-Q scales preoperatively and post-operatively for patients with pinna deformity undergoing pinna reconstruction.

Background:

Pinna reconstruction is a crucial procedure for individuals with congenital deformities, traumatic injuries, or aesthetic concerns related to their outer ear. The study aims to evaluate the impact of pinna reconstruction surgery with EAR-Q, a new Patient Reported Outcome Measure (PROM) on patients' quality of life and satisfaction with their appearance.

Methods:

Data was collected in an ongoing study from 10 participants older than 10 years and underwent pinna reconstruction surgery at All India Institute of Medical Sciences (AIIMS) Jodhpur, an apex care public health and teaching hospital from Feb 2023 onwards.

Results:

Out of 10 patients, participants with microtia (n=8) (2 were Grade II, rest Grade III) and post traumatic (n=2) were assessed. Scores were given according to Rasch Model Theory (RMT) analysis and Paired T-Test was applied comparing preoperative and postoperative values. A significant change was noticed in EAR-Q scales in all except one, which was suggestive that better appearance of ear (p= 0.002) had better outcomes in psychological (p=0.03) and social (p=0.017) scales.

Conclusion:

The findings of this assessment may inform clinical decision-making, patient counselling, and future advancements in pinna reconstruction surgery, ultimately leading to better outcomes and improved patient satisfaction. By analysing changes in PROMs, this research contributes to our understanding of the holistic benefits of the surgical intervention. If a participant is unsatisfied as seen in the study, he can be further evaluated for body dysmorphism and related psychological disorders. This research underscores the importance of incorporating patient-reported outcomes into the evaluation of surgical procedures, highlighting the significance of patient-centred care in reconstructive surgery.

P-40 Novel Ear Molding Technique for Conchal Crus and Stahl Ear Deformities

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Aims:

Describe novel ear molding technique.

Background:

The prevalence of congenital ear anomalies ranges from 15% to 55%. These deformities pose a risk for psychosocial distress. Conchal crus and Stahl deformities are common and also difficult malformations to correct surgically. Though conventional non-surgical therapies exist, their use is typically restricted to newborns younger than 6 weeks of age. We describe a novel non-surgical approach to these ear anomalies in children. This custom method decreases the discomfort reported with commercial ear splints and expands application to children beyond the 6-week age timepoint.

Methods:

Records from patients with conchal crus or Stahl deformity were evaluated retrospectively. Data included age at initiation of treatment, duration of treatment, and complications. For conchal deformities, a prosthesis was fabricated from silicone putty in a custom fashion. Akin to dental aligners, the prosthesis was replaced every 1-2 weeks to gradually increase the applied pressure on the deformity. For Stahl ear, an impression was also taken and casts made. A custom acrylic ear clip device was then designed to apply pressure on the prominent cartilage in an effort to create a smooth scapha and helix.

Results:

30 infants with conchal crus and Stahl deformity were treated during the study period from 2019 to 2023 (n=15 for each). Average age at initiation of treatment was 9.0 ± 5.8 weeks. Mean treatment duration was 7.8 ± 3.0 weeks. Follow-up photographs were taken at 12 and 16 weeks post-treatment. Qualitative improvement could be appreciated in all patients at the conclusion of treatment.

Conclusion:

Our novel technique offers a comfortable and efficient substitute for commercial ear molding components through custom fabrication techniques. This has potential benefit for older patients and may reduce the future need for operative intervention. The technique will also be adaptable to modern 3D-printing paradigms.

P-41 3D modelling for construct creation in microtia reconstruction: Lessons learned

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Abstract

There are two main challenges in microtia repair with autologous cartilage: the creation of a good framework and how to use skin to cover that construct. We have found that the design and creation of 3D printed models has improved both aspects in microtia repair. In our experience over 133 patients we describe how our 3D modelling design technique has improved the surgical plan for placement of the ear in relationship to the microtia ear. We have found that 3D printed models have improved costal cartilage splitting intraoperatively, and improved the creation of a construct that is a more accurate in size and design compared to the contralateral ear. We share lessons learned in optimizing planning, size of models, color added to 3D printed models to add contrast, and design of subunits. We find 3D printed models offer more information compared to conventional 2D templates. The foundations of this 3D modelling design can be the foundation of design of 3D bioprinted ears in the future.

P-42 3D Technologies for Effective Treatment of Microtia

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Aims:

The development of a straightforward workflow based on 3D scanning, CAD modelling, and 3D printing of customized surgical guides in order to create instruments capable of assisting surgeons in modelling the cartilages for ear reconstruction, is the aim of this research.

Background:

Autologous ear reconstruction in cases of microtia is a challenging procedure demanding high levels of technical expertise and extended surgical time. Current clinical practices begin by drawing a 2D contour of the patient's healthy ear using a transparent film placed over the ear. Unfortunately, 2D template does not provide information about the three-dimensional geometry of the ear, and the physician has to find the missing shape details directly on the patient, moving back and forth from the working table to the operating table.

Methods:

The procedure, developed by T3Ddy laboratory, starts with the 3D acquisition of the patient's contralateral healthy ear, if present. To this end, different scanning techniques were evaluated, optimising the requirements for speed, accuracy and usability. The acquired model is then processed using a specially developed software. Such a tool can semi-automatically generate the CAD model of the guides using few anatomical inputs and without the requirement for design skills expertise. The developed guides are manufactured by using 3D printing techniques and sterilized in the final phase.

Results:

These guides enable the surgeon to achieve a harmonious and repeatable auricular reconstruction during surgery, significantly cutting down on the amount of time needed. The procedure has so far been successfully used on 30 patients, demonstrating notable advantages in terms of technical simplicity and enhanced cosmetic outcomes.

Conclusions:

The integration of 3D imaging, 3D modelling and additive manufacturing technologies pave the wave for transforming a complex and time consuming procedure into an effective process.

P-43 Genotype-phenotype associations in microtia: A systematic review

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Background:

Microtia is a congenital malformation of the ear that can occur as isolated microtia or as part of a syndrome. The etiology is currently poorly understood, although there is strong evidence that genetics has a role in the occurrence of microtia. The aim of this systematic review was to determine the genes involved and the abnormalities in microtia patients' head and neck regions.

Methods:

We used seven search engines to search all known literature on the genetic and phenotypic variables associated with the development or outcome of microtia. The identified publications were screened and selected based on inclusion and exclusion criteria and assessed for methodological quality using the Joanna Briggs Institute (JBI) critical appraisal tools. We found 40 papers in this systematic review with phenotypic data in microtia involving 1459 patients and 30 articles containing genetic data involved in microtia.

Result:

The most common accompanying phenotype of all microtia patients was external ear canal atresia, while the most common head and neck abnormalities were the auricular, mental, and oral regions. The most common syndrome found was craniofacial microsomia syndrome. In the syndromic microtia group, the most common genes were *TCOF1* (43.75%), *SIX2* (4.69%), and *HSPA9* (4.69%), while in the non-syndromic microtia group, the most frequently found gene was *GSC* exon 2 (25%), *FANCB* (16.67%), *HOXA2* (8.33%), *GSC* exon 3 (8.33%), *MARS1* (8.33%), and *CDT1* (8.33%).

Conclusions:

Our systematic review shows some genes involved in the microtia development, including *TCOF1*, *SIX2*, *HSPA9*, *GSC* exon 2, and *FANCB*, *HOXA2*, *GSC* exon 3, *MARS1*, and *CDT1* gene. We also reveal a genotype-phenotype association in microtia. In addition, further studies with more complete and comprehensive data are needed in the future, including patients with complete data on syndromes, phenotypes, and genotypes.

P-44 Microtia Reconstruction Practices Among Otolaryngologists in the United States

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Aims:

Describe current practices among the Otolaryngology trained community of microtia surgeons in the United States.

Background:

Microtia repair is a technically complex surgery with a number of different decision points and thus significant variability in practice. Over the past 100 years, many methods have been used to achieve outcomes satisfactory to the patient and the surgeon. Though almost half of microtia repair is performed by Otolaryngology-trained surgeons, their characteristics, referral patterns, and preferences are poorly understood.

Methods:

A 22-question anonymous digital survey of practice patterns and surgical methods was distributed to all members of the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS) and the American Society of Pediatric Otolaryngology (ASPO). Responses were collected and analyzed using descriptive statistics and linear regression models.

Results:

The survey was distributed to 1,730 members. Eighty-three survey responses were adequate for analysis, yielding a 4.8% response rate. Forty-three respondents (51.8%) were members of AAFPRS, 39 (47.0%) were members of ASPO, and 1 (1.2%) reported dual membership. Respondents had multiple practice models, were at different stages in their practice experience, and were well distributed geographically. Forty (48.2%) reported they do not do microtia repair and about half (52.5%) refer to a FPRS-trained colleague. Among microtia surgeons, most (N=30, 69.8%) received fellowship training. Autologous reconstruction was the most popular method for both training and practice, however, most perform multiple methods (N=33, 76.7%). Surgical site infection was the most frequent complication. Training in autologous rib reconstruction was positively correlated with experience >20 years in practice. Pediatric Otolaryngology fellowship training was correlated with combined autologous/alloplastic reconstructive practice.

Conclusions:

Otolaryngology-trained microtia surgeons come from a variety of academic backgrounds and progress to varied practices. They tend to be trained and practice in both alloplastic and autologous repair methods, though autologous methods remain the most common.

P-45 A New Method of Correcting Cryptotia by Changing Mechanical Fulcrum After Constricted Cartilage Overturned

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Background:

Many techniques have been introduced to correct cryptotia. The previous methods are releasing the constricted cartilage and changing the mechanical fulcrum partly to the right position. However, some patients are still not satisfied with the treatment results, due to cryptotia recurrence and insufficient superior 1/3 width. This study aimed to develop a new method for completely changing the mechanical direction of constricted cartilage for correcting cryptotia.

Methods:

From 2007 to 2020, twenty-four cryptotia patients were treated. During surgical reconstruction, the retroauricular skin flap was elevated, the posterior aspect of the upper auricular cartilage was completely exposed, and the abnormal insertion of the auricular intrinsic muscles detached. The sharply curved antihelical cartilage was cut and overturned, and the scalp skin flap was undermined and advanced toward the postauricular sulcus. The edge of the retroauricular scalp flap is fixed on the mastoid periosteum. The incision was closed.

Results:

Eighteen patients had unilateral cryptotia, and six had bilateral cryptotia. Relatively favorable results were obtained in the follow-up period (range, 6–48 months). There were no cases of skin necrosis, complications, or revision surgery.

Conclusions:

The main advantages of this technique are the surgically reproducible results, and that it can be applied to most cases. The method described in this paper could potentially increase the width of the upper third of the auricle and reduce recurrence rate, while also leaving an inconspicuous scar and a satisfactory auricular contour. It is suggested that this technique could be an alternative method of cryptotia correction.