# Office Based Pediatric Otoplasty Under Local Anesthesia

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Abstract

Background: Many parents seek otoplasty for their school age children but fear having to undergo general anesthesia (GA). In our experience, otoplasty can safely be performed in an office based setting under local anesthesia (LA). There is a gap in the literature regarding pediatric otoplasty under LA.

Methods: All children aged 5-10 who underwent otoplasty between 2017- 2021 were included in a retrospective review. Demographics, operative techniques, complications, recurrences, and re-operation rates were collected. Surveys were provided three months after treatment to assess parental satisfaction and anxiety. Results were compared between patients who received otoplasty under GA & LA.

Results: 13 patients (6M,7F) , with a mean age of seven years (ranging 5-10) underwent otoplasty under LA. 12 children (6M,6F), with a mean age of five years (ranging 4-7) underwent otoplasty under GA. The only complications seen were three minor conchal bowl hematomas that were aspirated, each retrieving less than 1 cc of blood; no revisions were necessary. The LA subgroup was more likely to repeat otoplasty under identical conditions (P=0.025). Post-operatively, mean parental anxiety scores between the LA and GA subgroups were significantly different (1.4 ± 1.1 vs 4.8 ± 2.7, P=0.0005). Lastly, the mean satisfaction scores between the LA and GA subgroups were marginally different (3.83 ± 0.58 vs 3.17 ± 1.03, P=0.063).

Conclusion: Pediatric otoplasty under LA is a safe and feasible operation for patients between five and ten years of age.

## Introduction

Otoplasty is a common procedure used to correct prominent ears, with over 53,000 cases done last year in the US.[1] In 1845, Dieffenbach described the first prominauris correction technique.[2]

Following Dieffenbach, Ely, Luckett and Becker each developed their own excision techniques to recreate the antihelical fold via differing incision depths and suturing techniques.[3,4,5] Subsequently, Gibson and Davis highlighted the utility of one-sided cartilage carving/warping, which laid the foundation for Stenström's and Chongchet's cartilage weakening and incision-scoring techniques.[6,7,8] Cartilage-sparing otoplasty was popularized by Mustardé and Furnas, who solely used sutures for antihelical recreation and conchal-mastoid setback.[9,10,11] Sparing techniques are commonly utilized, as they have low rates of required revisions, receive high patient and surgeon satisfaction, and have short operative times.[9, 12-14] The abundance of otoplasty variations has led surgeons to combine techniques, leading to over 200 published approaches.[12, 13, 15-23]

Otoplasty can safely be performed under local anesthesia (LA).[12] Although the benefits of otoplasty under LA have been well documented for adults, there is a gap in the literature regarding pediatric otoplasty under LA alone. While some studies mention pediatric otoplasty, they were either unclear about which patients received LA, or they gave additional sedation or general anesthesia (GA) to children.[13, 15-18] The only research that discussed using LA in children before otoplasty recorded a mean age of 12 in its LA subgroup, or only used LA in children over 13.[12,19] Furthermore, the literature is severely lacking patient reported outcomes that can corroborate satisfaction and comfort. The aim of this study is to provide support for feasibility and satisfaction with otoplasty under LA in children between 5 and 10 using patient reported outcomes.

Methods:

All children between ages 5-10 who underwent otoplasty at Northwell's Clinics between 2017-2021 were included. One pediatric plastic surgeon with over a decade of experience with

pediatric otoplasty completed these procedures. Demographics, operative techniques, and complications were collected, with a minimum follow-up period of six months. Asymmetry, recurrence, and reoperation rate were recorded.

The selection process for preadolescent children depends on the temperament and willingness shown by the child to the provider. Children are usually shown what their ears will look like after otoplasty, and if children are satisfied, they assent to the procedure. Children usually have no previous history of difficulty with vaccinations or dental visits. Once a child assents, a calming environment is created; parents are instructed to embrace their children and watch distracting videos with them. The providers reassure the children with honest descriptions of when they can expect discomfort. The medical assistants and parents subtly keep the patients still without the use of physical restraints. The patient receives positive reinforcement throughout via ‘rewards’ for cooperation such as stickers/games. The rewards are kept near the patient in order to provide motivation, as seen in Figure 1. Topical lidocaine cream can be applied 60 minutes before the local block is performed; the lidocaine and epinephrine is reconstituted with bicarbonate in a 9:1 ratio to reduce the “burning” sensation. The anesthetic is injected directly into the auricle and into all incision sites in order to provide a comprehensive local block. After cleaning with betadine, a pinch test is performed with forceps to ensure adequate anesthesia. From this point on, the surgical technique is identical to that done under general anesthesia: an elliptical skin incision is excised in the auriculo-mastoid sulcus to reduce anticipated redundancy and provide for lobule setback. The posterior surfaces are skeletonized, exposing the underlying perichondrium; the posterior auricular muscles are divided and a portion of the conchal bowl is excised, if hypertrophic. The posterior helix is then dissected to the edge. The Mustardé sutures are placed in the nadir of the scapha or fossa triangularis and the opposite nadir of the conchal

cartilage, as determined by folding back the ear. Two to four 4-0 clear nylon concho-scaphal and/or concho-fossa triangularis horizontal mattress sutures are secured under tension. The conchal bowl is set back by removing soft tissue and suturing the base to a reduced position. Lobule reduction is performed via wedge excision when indicated. After closure, a light compressive dressing is applied for 24 hours. Patients are asked to use an athletic headband nightly for two weeks and are permitted to wear it continually if desired. Patients are followed up in the office at 1, 4, 12, and 24 weeks post-operation.

Survey: An electronic non-validated survey was sent three months after completion of otoplasty. The survey, seen in Figure 2, measures parental satisfaction, anxiety, and quality of care provided.

Results:

13 patients, six male and seven female, with a mean seven years of age (ranging 5-10) underwent otoplasty with local anesthesia between 2017-2021. All patients had congenital prominauris; no patients had any past craniofacial pathologies or pathologic syndromes. No relevant surgery was previously performed on any patient. Within the same time period, 12 children, with a mean five years of age (ranging 4-7 years) underwent otoplasty under general anesthesia.

Complications: No patients experienced any epidermolysis, cyanosis, chondritis, dehiscence, infection, asymmetry, or prominence recurrence. No major complications were recorded, and no additional hospitalizations were required. The only minor complications seen were three minor conchal bowl hematomas (two in the office group, one in the OR group) that were aspirated, each retrieving less than one milliliter of blood.

No patients required additional oral or intranasal sedation. There were no instances of having to cancel office procedures in advance or abort ongoing procedures due to anxiety. Operations ranged from 34-65 minutes. Office preparation ranged between 15-75 minutes, depending on request for topical anesthetic. Postoperative dressing time took up to ten minutes. Three patients, two in the LA group and one in the GA group, had minor hematomas which were aspirated, each retrieving less than 1 cc of blood. After aspiration, xeroform, gauze fluffs and wraps were placed behind the ears.

Survey: 12/13 parents from the LA group completed the survey; no one required unplanned follow ups. Two parents wrote about excess post-auricular skin that was later removed to idealize scar aesthetics. 11/12 parents would choose the office experience again over the OR. 8/12 said that the ability to be present with their child was the most important reason for choosing office otoplasty; The other 4/12 said avoiding general anesthesia was most important. 6/12 parents rated the witnessing of their child getting local anesthesia as the most discomforting part of the experience; the other 6/12 rated witnessing their child being held down was most discomforting. The average parental anxiety level before the procedure was 4.4/10, which significantly decreased to 1.4/10 after the procedure ($4.4 \pm 1.6$ vs $1.4 \pm 0.7$, $P=0.0001$). 11/12 parents gave 4/4 ratings for satisfaction with quality of care, responsiveness of the team, pain management of the child, team's effort to maximize comfort, and management of expectations. Lastly, 11/12 parents stated their child did not have any traumatic response to the procedure (a score of one out of four).

12/12 parents from the GA subgroup completed the survey; 6/12 would choose the OR experience again over the office. The average parental anxiety level before the procedure was 6.3/10, and 4.8/10 after the procedure (not significantly different at $6.3 \pm 2.3$ vs $4.8 \pm 1.9$,

P=0.10). 6/12 parents gave 4/4 ratings for satisfaction with quality of care, responsiveness of the team, pain management of the child, team's effort to maximize comfort, and management of expectations. Lastly, 7/12 parents stated their child did not have any traumatic response to the procedure (a score of one out of four).

Comparisons: There is a statistically significant association between location of procedure/Anesthesia type and choice to repeat procedure, as seen in supplemental table 1. Preoperatively, the mean anxiety scores between the LA and GA subgroups were marginally different (4.4 ± 1.8 vs 6.3 ± 2.8, P=0.061). Post-operatively, the mean anxiety scores between the LA and GA subgroups were significantly different (1.4 ± 1.1 vs 4.8 ± 2.7, P=0.0005). The mean change in anxiety scores was significantly different between the two groups (3.0 ± 1.9 vs 1.5 ± 1.4, P=0.039). Furthermore, the mean satisfaction scores (with quality of care) between the LA and GA subgroups were marginally different (3.83 ± 0.58 vs 3.17 ± 1.03, P=0.063). Lastly, the average parental score for child traumatic response was significantly lower in the local anesthesia subgroup (1.17 ± 0.58 vs 2.00 ± 1.28, P=0.051).

Discussion:

One of the most comprehensive studies examining the pediatric otoplasty LA/GA comparison was done by Lancaster, who showed that the LA group was associated with significantly lower rates of postoperative vomiting; there was also no difference in rates of overnight stay, bleeding, dehiscence, or revisions required compared to the GA group.[19] Lancaster's study provided support for the safety of pediatric otoplasty under local anesthesia. However, the LA subgroup was of adolescent age ( mean 12 years of age). This study's LA subgroup average age is seven years old, and this study includes patient reported outcomes that provides evidence to the feasibility of pediatric otoplasty under local anesthesia.

The argument against the use of LA in pediatric otoplasty hinges on the discomfort of skin infiltration and the possible negative psychological consequences related to subsequent procedures. It is theorized that office procedures and exposure to surgery without sedation can traumatize a pediatric patient, which may worsen future medical aversion, and fear/anxiety with the health system. Furthermore, the stress of witnessing office procedures may be too excessive for observing parents, which may lead to parental aversion to surgical care for their children. Nonetheless, it is our experience that LA is well tolerated due to the reassuring atmosphere created and the optimization of LA administration. This is corroborated by the significantly higher percentage of parents who prefered to repeat the office procedure compared to those who prefered to repeat the OR procedure. It is also supported by the significant decrease in parental anxiety levels after parents experienced the otoplasty under local anesthesia and the significantly lower average child trauma scores in the local anesthesia subgroup. The benefits of pediatric office procedures include minimal parental absence from work, minimal patient absence from school, and the ability to eat before the procedure.[24,25] Other advantages include less waiting time and decreased price via forging facility and anesthesia fees.[26,27] Parents can also be shown results immediately to confirm uniformity of aesthetic appeal. It is important to note that possible reimbursement differences did not play a role in patient selection, as candidacy primarily focuses on the child's psychological maturity. It is difficult to ascertain the percentage of 5-10 year old children who would be deemed ideal candidates for LA otoplasty due to the highly personalized nature of patient selection; however, the senior author posits that the current estimates may be too conservative, as anecdotal trends are showing an increase in assenting children over time. Currently, the majority of the senior author's pediatric otoplasties (5-10 years of age) are done under local anesthesia alone.

Furthermore, Parents had marginally higher anxiety levels before otoplasty was done under general anesthesia compared to local anesthesia; this is understandable, as parents tend to be anxious when their children have to undergo GA.[28,29] Interestingly, parents of the GA subgroup had higher postoperative anxiety levels compared to postoperative anxiety in parents of the LA subgroup. This may be due to the parents' ability to stay with their children when otoplasty is performed under local anesthesia alone, which may diffuse anxiety about the possible trauma their children may experience intraoperatively. This theory is supported by the fact that 67% of parents stated the most important reason for choosing otoplasty under local anesthesia was due to their ability to be present throughout the procedure. Furthermore, the lack of difference in preoperative and postoperative anxiety levels seen in the parents of the GA subgroup is consistent with the literature which highlighted that parents who were present during induction of their children remained anxious after the operation.[28,29]

It is important to highlight that the safety results of this cohort further corroborates the literature that claims office otoplasty under local anesthesia is safe. Studies show that the common medical consequences of otoplasty involve hematoma, bleeding, postoperative infections, perichondritis, dehiscence, skin necrosis, excessive scarring, suture extrusion, hypersensitivity, and poor aesthetic outcomes.[30,31] The most common complication is unfavorable aesthetic outcome, and the most worrisome complication is hematoma formation.[31] In our cohort, there were no cases of telephone deformity, reverse telephone deformity, vertical post deformity, or hidden helix deformity. The only aesthetic concern raised in this cohort was excess post-auricular skin which was seen with two patients (one per group) that was later removed upon request of the parents to idealize scar aesthetics. The three hematomas found in this cohort were mild and small, retrieving less than one milliliter upon aspiration for all cases.

The main limitation of this study is the relatively small sample size and the use of a non-validated survey; however, we maintain that our results reinforce the argument for LA as an option for otoplasty in the younger pediatric population, assuming careful patient selection and parental counseling. Future studies with larger sample sizes should undergo thorough surveillance of parent and patient tolerance of procedures under GA and LA, and monitor patient reported outcomes using validated materials.

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Figure Legends

Figure 1: Office Set-Up

This photo depicts the office set up for otoplasty under local anesthesia alone. The surgeon stands to the right of the seated patient. The patient's rewards are always kept within viewing distance, and the parent and medical assistant can assist & comfort the patient on the opposite end of the seat. There is a monitor available for distracting video and audio.

Figure 2: Survey

The survey is provided to the parents around three months after otoplasty. The survey provides the parents with an opportunity to rate satisfaction, comfort, anxiety and provide comments.

Supplemental Table 1

LA= Local Anesthesia alone, GA= General Anesthesia alone, Repeat= would repeat otoplasty under the same conditions.