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Comparing plastic surgery and otolaryngology surgical outcomes and cartilage graft preferences in pediatric rhinoplasty

A retrospective cohort study analyzing 1839 patients

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Abstract

Rhinoplasty in children has raised concerns about its safety in the pediatric population. There is scarcity of evidence describing outcomes and surgical techniques performed in pediatric rhinoplasty. We analyzed post-operative complications and cartilage preferences between plastic surgeons and otolaryngologists.

Data was collected through the Pediatric National Surgical Improvement Program from 2012 to 2017. Current Procedure Terminology codes were used for data extraction. Patients were grouped according to type of rhinoplasty procedures (primary, secondary, and cleft rhinoplasty). A comparison between plastic surgeons and otolaryngologists was made in each group in terms of postoperative complications. Additionally, a sub-group analysis based on cartilage graft preferences was performed.

During the study period, a total of 1839 patients underwent rhinoplasty procedures; plastic surgeons performed 1438 (78.2%) cases and otolaryngologists performed 401 (21.8%) cases. After analyzing each group, no significant differences were noted in terms of wound dehiscence, surgical site infection, readmission, or reoperation. Subgroup analysis revealed that plastic surgeons prefer using rib and ear cartilage, while otolaryngologists prefer septal and ear cartilage.

The analysis of 1839 pediatric patients undergoing three types of rhinoplasty procedures showed similar postoperative outcomes, but different cartilage graft utilization between plastic surgeons and otolaryngologists.

Abbreviations: ACS-NSQIP = American College of Surgeons National Surgical Quality Improvement Program, ASA = American Society of Anesthesiologists, SSI = surgical site infection.

Keywords: otolaryngology, outcomes, plastic surgery, rhinoplasty

1. Introduction

Rhinoplasty in children was first reported by Freer and Killian in 1902 and 1905, respectively.[1,2] Overtime, as complications and bone growth disturbances of pediatric nasal surgery were identified, surgeons have been cautious in their approach. Nevertheless, there has been continuous debate about timing and extent of rhinoplasty in the pediatric population.[3–5] Animal and prospective clinical studies have demonstrated the impact of early nose surgical intervention on consequent nasal and maxillary growth alterations.[3–8] Current management is to avoid nose surgery until the end of nasal growth, which is approximately at 12 to 16 years of age in girls and 15 to 18 years in boys.[5,9]

Although, enough evidence is known about nose growth patterns and potential alterations if early surgical intervention is performed, there are still surgical indications to perform a rhinoplasty, such as trauma, mass, deviated septum, and congenital defects.[3,10] Other literature has demonstrated that rhinoplasty in pediatric populations had no significant influence on nasal growth. Additionally, the use of conservative techniques may cause no harm.[11–14] Despite publications suggesting that pediatric rhinoplasty is a safe procedure in midface development; the literature remains divided in terms of recommendations.[7]

Taking this into consideration, there is scarcity of large studies describing immediate clinical outcomes of rhinoplasty in the pediatric setting.[3,5,15] Moreover, there is a lack of data

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This study had institutional review board exemption and was conducted following the principles outlined by the Declaration of Helsinki.

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comparing outcomes of pediatric rhinoplasty performed by pediatric otolaryngologists versus plastic surgeons.[5] Therefore, the aim of this study was to compare immediate post-operative complications and cartilage graft preferences between plastic surgeons and otolaryngologists using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) Pediatric database.

2. Materials and methods

2.1. Database and patient selection

A retrospective analysis of the ACS-NSQIP-Pediatric database was conducted over a 6-year period, from 2012 to 2017. This database was developed as the first multicenter, multispecialty quality improving effort targeting pediatric surgical care.[16] It encompasses the collection of preoperative variables, intraoperative details and 30-day post-operative mortality and morbidity outcomes in surgeries performed in pediatric patients within 11 surgical specialties.

Patients who underwent rhinoplasty procedures were identified using Current Principal Terminology codes. They were grouped based on primary, secondary and cleft lip and cleft rhinoplasty procedures (Table 1). Furthermore, within each type of rhinoplasty, cases were classified according to the surgical specialty that performed the procedure:

(1) plastic surgery or
(2) otolaryngology.

Patient demographics, medical comorbidities, operative details, and postoperative complications were compared between specialties within each surgical procedure. Additionally, a subgroup analysis was conducted stratifying patients according to the type of cartilage harvested for their rhinoplasty procedure. Comparison between the two surgical specialties was performed to analyze cartilage graft preferences.

2.2. Institutional review board

An institutional review board (IRB) exemption was received due to the public nature of the data utilized for our analyses.

2.3. Statistical analysis

Fisher exact or chi-square test were used for univariate analysis to determine significant differences in patient's demographic variables, medical comorbidities, operative details and postoperative complications between groups. Significance was defined at $P\text{-value} < .05$. All the analyses were performed using SPSS software (Version 25.0. Armonk, NY, IBM Corp.).

3. Results

During the study period, a total of 1,839 patients were identified in the pediatric ACS-NSQIP database who underwent a rhinoplasty procedure; Plastic surgeons performed 1438 (78.2%) cases and otolaryngologists performed 401 (21.8%) cases.

3.1. Patient demographics and medical comorbidities

3.1.1. Primary rhinoplasty. In this study group, 480 patients were included. Plastic surgeons performed 49.3% (237 cases) and 50.7% (243 cases) of the cases were performed by otolaryngologists. Regarding patient's demographics, the majority of the cases were performed in Caucasian patients older than 14 years in both specialties; plastic surgeons performed more procedures in females while otolaryngologists in males ($P = .003$). No significant differences were noted in terms of patients' age and race between specialties (Table 2).

Regarding medical comorbidities, plastic surgery patients had a higher prevalence of developmental delay, whereas otolaryngologists' patients had more prevalence of asthma. No cases of pneumonia and diabetes were noted (Table 3).

3.1.2. Secondary rhinoplasty. In this study group, 66 patients were included. Fifty-nine cases (89.3%) were performed by plastic surgeons and 7 cases (10.7%) performed by otolaryngologists. No significant differences were noted in terms of age, gender and race (Table 2).

Regarding medical comorbidities, no significant differences were seen in term of asthma, chronic lung disease, intestinal disease or developmental delay (all $P > .05$). No cases of pneumonia, diabetes, immune disorders, biliary disease or hematologic disorders were noted (Table 3).

Table 1

Current principal terminology codes.

Primary rhinoplasty	
30400	Primary rhinoplasty; lateral and alar cartilages and/or elevation of nasal tip
30410	Complete primary rhinoplasty; external parts including bony pyramid, lateral and alar cartilages, and/or elevation of nasal tips
30420	Primary rhinoplasty including major septal repair
Secondary rhinoplasty	
30430	Secondary rhinoplasty; minor revision [exclude]
30435	Secondary rhinoplasty; intermediate revision
30450	Secondary rhinoplasty; major revision
Cleft rhinoplasty	
30460	Rhinoplasty for nasal deformity secondary to congenital cleft lip and/or palate, including columellar lengthening; tip only
30462	Rhinoplasty for nasal deformity secondary to congenital cleft lip and/or palate, including columellar lengthening; tip, septum, osteotomies
Cartilage grafts	
21230	Graft; rib cartilage, autogenous, to face, chin, nose or ear
21235	Graft; ear cartilage, autogenous, to nose or ear
20910	Cartilage graft; costochondral
20912	Cartilage graft; nasal septum

Table 2

Demographic information.

	Primary rhinoplasty			Secondary rhinoplasty			Cleft rhinoplasty		
	Plastic surgery (%)	Otolaryngology (%)	*P-value*	Plastic surgery (%)	Otolaryngology (%)	*P-value*	Plastic surgery (%)	Otolaryngology (%)	*P-value*
Sample size	237 (49.3)	243 (50.7)		59 (89.3)	7 (10.7)		1,142 (88.3)	151 (11.7)	
Age			**.190**			**.060**			**<.0001**
≤ 2 yr	6 (2.5)	2 (0.8)		3 (5.1)	0 (0.0)		251 (22.0)	15 (9.9)	
2–8 yr	10 (4.2)	6 (2.5)		19 (32.2)	0 (0.0)		330 (28.9)	75 (49.7)	
9–13 yr	27 (11.4)	21 (8.6)		13 (22.0)	1 (14.3)		186 (16.3)	16 (10.6)	
≥14 yr	194 (81.9)	214 (88.1)		24 (40.7)	6 (85.7)		375 (32.8)	45 (29.8)	
Gender			**.003***			**.428**			**.015***
Female	134 (56.5)	104 (42.8)		29 (49.2)	5 (71.4)		551 (48.2)	57 (37.7)	
Male	103 (43.5)	139 (57.2)		30 (50.8)	2 (28.6)		591 (51.8)	94 (62.3)	
Race			**.565**			**.266**			**.005***
White	175 (73.8)	189 (77.8)		43 (72.9)	3 (42.9)		804 (70.4)	126 (83.4)	
Asian	8 (3.4)	6 (2.5)		4 (6.8)	1 (14.3)		133 (11.6)	7 (4.6)	
African American	12 (5.1)	8 (3.3)		3 (5.1)	0 (0.0)		83 (7.3)	9 (6.0)	
Native Hawaiian or Pacific islander	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		7 (0.6)	0 (0.0)	
American Indian or Alaska Native	1 (0.4)	0 (0.0)		0 (0.0)	0 (0.0)		8 (0.7)	0 (0.0)	
Unknown	41 (17.3)	40 (16.5)		9 (15.3)	3 (42.9)		107 (9.4)	9 (6.0)	
Hispanic Ethnicity			**.017***			**.229**			**.001***
Yes	56 (23.6)	33 (13.6)		11 (18.6)	0 (0.0)		218 (19.1)	13 (8.6)	
No	170 (71.7)	195 (80.2)		44 (74.6)	6 (85.7)		871 (76.3)	134 (88.7)	
Unknown	11 (4.6)	15 (6.2)		4 (6.8)	1 (14.3)		53 (4.6)	4 (2.6)	
Congenital Malformation			**< .0001***			.231			**<.065**
Yes (Neonate < 1500 grams)	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		5 (0.4)	0 (0.0)	
Yes (Neonate ≥ 1500 grams)	65 (27.4)	23 (9.5)		34 (57.6)	2 (28.6)		992 (86.9)	140 (92.7)	
No	172 (72.6)	220 (90.5)		25 (42.4)	5 (71.4)		145 (12.7)	11 (7.3)	

* Significance.

3.1.3. Cleft rhinoplasty. Finally, in this group, 1293 patients were included. 1142 cases (88.3%) were performed by plastic surgeons and 151 cases (11.7%) performed by otolaryngologists. A balanced distribution of cases was seen in terms of age, gender and prevalence of congenital malformations in plastic surgery. Otolaryngology, had a higher prevalence of cases in the 2 to 8-year age group and performed more procedures in males. Both specialties had a significantly greater Caucasian population. Significant differences were noted in terms of patients' age, gender, and race. (Table 2).

Regarding medical comorbidities, no significant differences were seen in term of asthma, chronic lung disease, intestinal disease, diabetes, immune disease, hematologic disorder, or developmental delay (all $P > .05$). No cases of pneumonia or biliary disease were noted (Table 3).

3.2. Perioperative characteristics

3.2.1. Primary rhinoplasty. In both specialties, most of the cases were performed in an outpatient setting, additionally, plastic surgeons had a higher number of inpatient cases ($P < .0001$). No significant differences were noted in terms of the American Society of Anesthesiologists (ASA) classification and preoperative wound classification. Median operative times were 2.4 hour. (0.3 – 7.8 h) and 2.0 hour (0.5 – 7.4 hr.) for plastic surgeons and otolaryngologists, respectively ($P = .001$) (Table 4).

Table 3

Medical comorbidities.

	Primary rhinoplasty			Secondary rhinoplasty			Cleft rhinoplasty		
	Plastic surgery (%)	Otolaryngology (%)	*P-value*	Plastic surgery (%)	Otolaryngology (%)	*P-value*	Plastic surgery (%)	Otolaryngology (%)	*P-value*
Pneumonia	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–
Diabetes	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–	0 (0.0)	1 (0.7)	**.087**
Asthma	13 (5.5)	26 (10.7)	**.037***	8 (13.6)	0 (0.0)	**.166**	56 (4.9)	9 (5.9)	**.584**
Chronic lung disease	0 (0.0)	1 (0.4)	**1.000**	1 (0.7)	0 (0.0)	**1.000**	9 (0.8)	1 (0.7)	**1.000**
Esophageal/gastric/intestinal disease	9 (3.8)	6 (2.5)	**.403**	4 (6.8)	1 (14.3)	**.440**	53 (4.6)	9 (5.9)	**.483**
Biliary/liver/pancreatic disease	1 (0.4)	0 (0.0)	**.109**	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–
Developmental delay	16 (6.8)	7 (2.9)	**.047***	4 (6.8)	1 (14.3)	**.440**	114 (10.0)	20 (13.2)	**.223**
Immune diseases	0 (0.0)	1 (0.4)	**.123**	0 (0.0)	0 (0.0)	–	1 (0.1)	1 (0.7)	**.149**
Hematologic disorders	2 (0.8)	3 (0.6)	**1.000**	0 (0.0)	0 (0.0)	–	6 (0.5)	2 (1.3)	**.239**

* Significance.

Table 4

Operative characteristics.

	Primary rhinoplasty			Secondary rhinoplasty			Cleft rhinoplasty		
	Plastic surgery (%)	Otolaryngology (%)	*P-value*	Plastic surgery (%)	Otolaryngology (%)	*P-value*	Plastic surgery (%)	Otolaryngology (%)	*P-value*
Total operation time, Median, hr.	2.48 (0.3–7.8)	2.08 (0.5–7.4)	**.001***	1.3 (0.35–3.7)	1.6 (0.85–2.1)	**.739**	2.13 (0.5–7.6)	2.1 (0.35–8.7)	**.805**
Anesthesia Type									
General	236 (99.6)	243 (100.0)	**.494**	59 (100.0)	7 (100.0)	**1.000**	1,142 (100.0)	151 (100.0)	**1.000**
Inpatient/Outpatient			**< .0001***			**.584**			**< .0001***
Inpatient	37 (15.6)	7 (2.9)		8 (13.6)	0 (0.0)		408 (35.7)	17 (11.3)	
Outpatient	200 (84.4)	236 (97.1)		51 (86.4)	7 (100.0)		734 (64.3)	134 (88.7)	
ASA classification			**.342**			**.737**			**.901**
I	115 (48.5)	121 (49.8)		23 (39.0)	4 (57.1)		372 (32.6)	50 (33.1)	
II	107 (45.1)	114 (46.9)		28 (47.5)	2 (28.6)		699 (61.2)	94 (62.3)	
III	14 (5.9)	8 (3.3)		7 (11.9)	1 (14.3)		66 (5.8)	7 (4.6)	
IV	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		2 (0.2)	0 (0.0)	
V	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		1 (0.1)	0 (0.0)	
Wound Classification			**.070**			**.581**			**.428**
Clean	35 (14.8)	20 (8.2)		9 (15.3)	0 (0.0)		89 (7.8)	17 (11.3)	
Clean/Contaminated	201 (84.8)	222 (91.4)		50 (84.7)	7 (100.0)		1,049 (91.9)	133 (88.1)	
Contaminated	1 (0.4)	0 (0.0)		0 (0.0)	0 (0.0)		3 (0.3)	1 (0.7)	
Dirty/Infected	0 (0.0)	1 (0.4)		0 (0.0)	0 (0.0)		1 (0.1)	0 (0.0)	

* Significance; ASA = American Society of Anesthesiologists, Hr = Hour.

3.2.2. Secondary rhinoplasty. Again, most of the cases were performed in an outpatient setting in both specialties. No significant differences were noted in terms of the ASA classification and preoperative wound classification. Median operative times were 1.3 hour (0.3 – 3.7 h) and 1.6 hour (0.8 – 2.1 h) for plastic surgeons and otolaryngologists, respectively ($p = 0.739$) (Table 4).

3.2.3. Cleft rhinoplasty. In the plastic surgery and otolaryngology groups, most of cases were performed in the outpatient setting; 734 cases (64.3%) and 134 cases (88.7%), respectively. No significant differences were seen between ASA classification and wound classification in both groups. Plastic surgery and otolaryngology median operative times were 2.1 hour (0.5 – 7.6 h) and 2.1 hour (0.35 – 8.7 h), respectively ($P = .805$) (Table 4).

3.3. 30-day postoperative complications

3.3.1. Primary rhinoplasty. No occurrences of deep wound infection, wound dehiscence, unplanned or related reoperation were noted. Otolaryngology had one case of a superficial wound infection and three readmissions. No significant differences were noted between specialties (all $P > .05$) (Table 5).

3.3.2. Secondary rhinoplasty. No occurrences of superficial wound infection, deep wound infection or wound dehiscence were noted. Plastic surgery had two cases of unplanned reoperation, two cases of related reoperations and five cases of readmission. No significant differences were noted between specialties (all $P > .05$) (Table 5).

3.3.3. Cleft rhinoplasty. No cases of deep wound infection were seen in both groups. Two cases of superficial wound infection were reported in each specialty; No significant differences were noted in terms of unplanned or related reoperation and readmission rates. No significant differences were noted between specialties (all $P > .05$) (Table 5).

3.3.4. Cartilage graft preferences. Sub-group analysis revealed that in 15% (286 cases) of the total cases analyzed, a cartilage graft was involved.

In primary rhinoplasty, plastic surgeons more often harvested rib cartilage compared to otolaryngologists (38.1% versus 8.6%, $P = .013$), while otolaryngologists harvest more septal cartilage than plastic surgeons (71.5% versus 28.6%, $P = .002$) (Table 6).

In secondary rhinoplasty, no significant differences were noted using ear, rib, or septal cartilage between specialties (all $P > .05$) (Table 6).

Table 5

30-day postoperative complications.

	Primary rhinoplasty			Secondary rhinoplasty			Cleft rhinoplasty		
	Plastic surgery (%)	Otolaryngology (%)	*P*-value	Plastic surgery (%)	Otolaryngology (%)	*P*-value	Plastic surgery (%)	Otolaryngology (%)	*P*-value
Superficial wound infection	0 (0.0)	1 (0.4)	**1.000**	0 (0.0)	0 (0.0)	–	2 (0.3)	2 (1.3)	**.107**
Deep wound infection	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–
Wound dehiscence	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	–	1 (0.1)	0 (0.0)	**1.000**
Unplanned reoperation	0 (0.0)	0 (0.0)	–	2 (3.4)	0 (0.0)	**1.000**	7 (0.6)	1 (0.7)	**1.000**
Related reoperation	0 (0.0)	0 (0.0)	–	2 (3.4)	0 (0.0)	**1.000**	7 (0.6)	1 (0.7)	**1.000**
Readmission	0 (0.0)	3 (1.2)	**.249**	5 (8.5)	0 (0.0)	**.560**	19 (1.7)	1 (0.7)	**.499**

Table 6

Cartilage graft preferences among surgical specialties.

	Primary rhinoplasty			Secondary rhinoplasty			Cleft rhinoplasty		
	Plastic surgery (%)	Otolaryngology (%)	*P*-value	Plastic surgery (%)	Otolaryngology (%)	*P*-value	Plastic surgery (%)	Otolaryngology (%)	*p*-value
Ear cartilage	7 (33.3)	7 (20.0)	**.265**	3 (50.0)	1 (100.0)	**.571**	96 (49.2)	21 (72.4)	**.02***
Rib cartilage	8 (38.1)	3 (8.6)	**.013***	2 (33.3)	0 (0.0)	**.714**	87 (44.6)	4 (13.8)	**.002***
Septal cartilage	6 (28.6)	25 (71.5)	**.002***	0 (0.0)	0 (0.0)	–	12 (6.2)	4 (13.8)	**.136**

* Significance.

In cleft rhinoplasty, plastic surgeons harvested more rib cartilage compared to otolaryngologists (44.6% versus 13.8%, $P=.002$), while otolaryngologists harvested more ear cartilage than plastic surgeons (72.4% versus 49.4%, $P=.02$) (Table 6).

4. Discussion

To the best of our knowledge, this study analyzed the largest pediatric population of patients that underwent rhinoplasty procedures on a national level. In general, we found that 30-day complication rates after rhinoplasty were low and comparable between plastic surgery and otolaryngology. Interestingly, patients' characteristics, types of rhinoplasty procedures and cartilage graft preferences varies between the two surgical specialties analyzed. With respect to the subgroup analysis, our findings showed that plastic surgeons preferentially used rib cartilage; whereas, otolaryngologists utilized more septal and ear cartilage.

There is scarcity of studies analyzing pediatric rhinoplasty procedures. A recent publication by Garg *et al.* compared characteristics and outcomes among pediatric rhinoplasty patients in an outpatient versus inpatient setting using the ACS-NSQIP-Pediatric database. In their analysis, the most common complication was readmission (inpatients: 3.5% and outpatients: 1.1%), followed by superficial surgical site infections with 0.54%.[15] Although, their study included a smaller sample size, our findings are similar in respect to related reoperations and superficial surgical site infection in all three of our procedures.

From an institutional standpoint, large series of pediatric rhinoplasty studies are difficult to find. Only one systematic review by Gupta *et al.* included 253 patients from 7 different studies. Six studies were published in otolaryngology journals and one in a plastic surgery journal.[5] In terms of postoperative complications, authors found favorable results with respect to obstructive symptoms,[6,17] aesthetic appearance [18,19] and patient satisfaction.[3] The variables listed above were not included in our analysis due to the limitations of the ACS-NSQIP database.

Previous studies have analyzed differences in outcomes between surgical specialties.[1,16] A recent publication compared plastic surgery and otolaryngology management in cleft lip and palate care using the ACS-NSQIP-Pediatric database. They identified that plastic surgeons performed the majority of cleft lip and palate surgical care and that a significant variation was found in terms of surgical procedures. However, short-term outcomes between surgical specialties remained the same.[22]

Regarding cartilage graft preferences, a previous study published in a otolaryngology journal demonstrated that the most harvested cartilage graft for pediatric rhinoplasty is septal (52.8%), followed by ear (16.5%) and then rib cartilage (4.6%).[5] Although, percentages vary, we also found the same trend in the otolaryngology rhinoplasty population: 44.6%, 44.6% and 10.8%, respectively.

In contrast, we found that plastic surgeons prefer cartilage grafts from the ear (47.9%), followed by rib (43.8%) and then septal (8.1%). No specific data was found in the pediatric plastic surgery literature on cartilage preferences.

Many factors play an important role in the choice of cartilage preferences between plastic surgeons and otolaryngologists. According to our findings, plastic surgeons are involved in more rhinoplasty cases associated to cleft lip and palate. In these patients, there is often a paucity of available septal cartilage,[1] a risk of disrupting nasal growth development,[5] and surgical difficulties due to a small nasal opening. Additionally, there is a greater amount of ear cartilage available in younger patients. Taken together, this is a potential explanation why plastic surgeons use more ear and rib cartilage.

Along the same line, otolaryngologists operated more on older non-cleft Lip and palate patients (≥14 years old) and harvested septal and ear cartilage. These patients usually have large noses with more septal cartilage available, along with a decrease risk of facial growth disturbances.

Septal cartilage is the preferred grafting material in rhinoplasty. It is preferentially used in older pediatric patients where nasal growth is nearly completed to decrease the risk of disrupting nasal development.[5,23]

This study provides assurance to patients and families that immediate post-operative clinical complications in pediatric rhinoplasty are low, and comparable between the two specialties trained to perform this procedure.

4.1. Limitations

There are important limitations in this study. Although, the ACS-NSQIP-Pediatric database was developed as an effort to improve pediatric surgical care, a retrospective analysis is always subject to missing data and loss of data entry accuracy. Also, misinterpretation of results is a risk of this study due to its retrospective nature.

Specific for this analysis, we were unable to include postoperative patient and family satisfaction variables, as well as functional outcomes because these variables are not included in the ACS-NSQIP database. Although very important variables when analyzing outcomes after pediatric rhinoplasty, this is out of the scope of this analysis. Moreover, due to database limitations, was not possible to identify brands of the costal grafts allografts analyzed.

Lastly, it is important to mention that the current principal terminology code 30420 (primary rhinoplasty including major septal repair) includes the septal cartilage grafting. This could

modify our results in the primary rhinoplasty group, however the trend will still be the same, with otolaryngologists more often harvesting septal cartilage.

5. Conclusion

After analyzing 1839 pediatric patients undergoing three types of rhinoplasty procedures, our data showed similar postoperative outcomes, but different cartilage graft preferences between plastic surgeons and otolaryngologists. In this study, we expect to promote clinical knowledge behind pediatric rhinoplasty procedures and contrast outcomes information between two specialties that perform rhinoplasties.

Author contributions

Conceptualization: Andres F. Doval, Ariel Ourian, Michael A. Lypka, Anthony Echo.
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