

SEPTOPLASTY IN PEDIATRIC POPULATION: A TEN YEARS' EXPERIENCE

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ABSTRACT

Introduction

Septoplasty is a commonly performed surgical procedure worldwide in otorhinolaryngology. Septoplasty aims to correct the deviated nasal septum at the midline thereby opening the nasal airway in patients with long standing nasal obstruction secondary to septal deviation.

Nasal breathing is important for proper facial growth and improvement of quality of life in children. Most surgeons are still reluctant to perform septoplasty in children. But septoplasty should be performed in children if there are severe breathing problems related to septal deviation.

Objectives

The objectives of this study were to identify the incidence of children presenting with symptomatic nasal septal deviation and to analyze the early outcomes of septal surgery in children with regard to improvement in nasal symptoms, residual disease and need for revision surgery.

Methodology

Children less than seventeen years of age who underwent septoplasty for symptomatic DNS from 1st January 2009 to 31st December 2018 were enrolled in the study. Patients having the follow up record of at least 6 months after surgery were included in the final analysis.

Results

There were 37 male and 13 female children enrolled in the study. Male to female ratio was 2.84:1. Majority of children in the study were of 13 years (24%). Left sided DNS was seen in 28 children and right sided DNS in 22 children. Bleeding requiring re-packing, septal hematoma, recurrent DNS, synechia and septal perforation were the common complications, which were comparable to adult population.

Conclusion

Early correction of the obstructed nose due to deviated nasal septum is essential to provide normal nasal breathing, relieve complications of mouth breathing and to promote normal craniofacial growth. Septoplasty can be performed in pediatric population with relatively good results without occurrence of nasal deformity and equal complications as that in adults.

KEY WORDS

Child, nasal septum, nose deformities, rhinoplasty.



INTRODUCTION

Septoplasty is a commonly performed surgical procedure by otorhinolaryngologists' worldwide. It is the third most common head and neck surgery performed in the United States.¹ Septoplasty helps to correct the deviated nasal septum (DNS) thereby opening the nasal airway in patients with long standing nasal obstruction secondary to septal deviation.

Although septoplasty is frequently performed in adults with good results, most surgeons are still reluctant to perform this surgery in children. Traditionally, there is an attitude of restraint by most surgeons till an empirical age of 16 to 18 years. This is possibly to avoid the adverse effects to growth spurts on the nose and midface region which is important for the development of the midface.² As 98% of white adolescent girls become nasally mature at the age of 15.8 years and 98% of white adolescent boys become nasally mature at the age of 16.9 years, septoplasty has been safely practiced after the age of 16 years in girls and 17 years in boys.³ It is thought that performing surgery before this age might influence the normal growth of the nose or child may require revision surgery due to continuous growth of nose leading to recurrence of DNS.

In the past, pediatric septoplasty was limited for functional problems secondary to congenital anomaly, tumors, septal hematoma or abscesses and severe septal deviation leading to mouth breathing.⁴ At present surgeons report that septoplasty can be performed easily after 6 years of age. Septal surgery may be performed in younger children and even at birth if required.^{5,6} Nasal septal surgery in children has been reported to lead to significant improvement in quality of life.⁷ As a growing number of studies have demonstrated the safety of this technique and its positive effect on quality of life outcomes, septoplasty is gaining greater acceptance as a central treatment for pediatric nasal obstruction.⁸ However, high-quality guidelines for when to perform pediatric septoplasty are lacking.

Small nasal framework, inadequate space for instrumentation, improper post-operative care and continuous growth of the nasal architecture even after surgery make the pediatric endonasal surgery a challenge. Radical surgery in children is not advocated as it can deform the growing nose. Chance of permanent facial deformity due to disruption of growing parts of the face has led to a primarily conservative approach.⁹ As the technique of performing septoplasty has undergone many modifications since its introduction, the more radical surgery in the past has now become more conservative both in terms of instrumentation and techniques. This helps to minimize tissue injury and avoid trauma to a small nose which in turn reduces the chance of post-operative complications.

As there are no documented studies regarding experience with pediatric septoplasty in Nepal, this study shall be useful to surgeons practicing pediatric septoplasty in our country. This study aims to present the experience of a single surgeon in surgical treatment of children with nasal septum deviation. This study can be a milestone for making guidelines in pediatric septoplasty in Nepal, too.

The objectives of this study were to analyze the early outcomes of septal surgery in children regarding improvement in nasal symptoms, residual disease and need for revision surgery.

METHODOLOGY

This study was performed in the department of ENT-HNS, Manipal College of Medical Sciences, Pokhara, Nepal from 1st January 2009 to 31st December 2018. Children less than seventeen years of age undergoing septoplasty for symptomatic DNS were enrolled in the study. Ethical approval was obtained from the institutional review committee. Patients were either inquired over the telephone or were asked to attend to the operating surgeon to assess the outcome of their surgery. Patients having the follow up record of at least 6 months after surgery were included in the final analysis if they could not be contacted. Children with known history of trauma to the nose and those who underwent revision surgery were excluded from the study. Data about the demographic characters, age at surgery and outcome of the surgery were taken and analysis was done.

Surgical Technique:

All the septoplasty procedures were performed by the author under general anesthesia with endotracheal intubation and throat pack. Topical anesthesia was applied with 1:1000 adrenaline-soaked cotton pledget. It was kept into both the nostrils five minutes before surgery. After this, 1:200000 lignocaine with adrenaline was infiltrated in the septal mucosa of both nostrils and left for 5 minutes. Freer's incision was made on the concave side and mucoperichondrial and mucoperiosteal flaps were elevated. Cartilaginous and bony deviations were meticulously excised taking care to preserve the growth spurts of developing nasal septum. Partial excision of the anterior end of inferior turbinate was performed if deemed necessary. Hemostasis was obtained with the help of bipolar cautery. Incision was closed with catgut 3-0 cutting suture. Nasal cavity was packed, and bolsters applied. Till the end of 2014, ribbon gauze soaked in antiseptic cream was used for nasal packing. Since then Merocel packs have been used for nasal packing. Nasal pack was removed on the third post-operative day, cleaning of nose was done, and patient sent home after explaining the technique of nasal douching. Patients were called for follow up at around 2 weeks from the date of surgery. Nasal discharge and crusts were removed, early adhesions were released, and they were advised to follow up after 2 more weeks (one month after surgery). Assessment about the adhesions, residual septal deviation, septal perforations, and external deviation was done. Subjective improvement was asked, and nasal patency test was performed to look for adequate nasal airway. Patients were asked to follow up after 6 months and when required thereafter if they had severe upper respiratory symptoms or nasal obstruction.

RESULTS

There were Sixty-three children from 6 to 16 years of age who had undergone septoplasty over a period of 10 years for symptomatic DNS. Out of them, 11 patients could not be contacted, and 2 children required revision surgical procedure. Hence, the final analysis was done in 50 children. There were 37 (74%) male and 13 (26%) female children with the mean age of 12.78 ± 0.35 years. Male to female ratio was 2.84:1. (Figure 1).

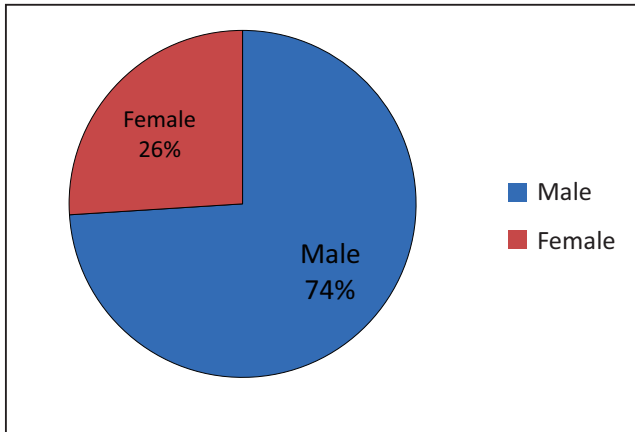


Figure 1: Pie chart of male and female children undergoing septoplasty (n=50).

Majority of children in our study were of 13 years (24%), followed by 14, 15 and 16 years, respectively. Only eight children (16%) up to the age of 10 years had undergone septoplasty. (Table. 1). Fisher's exact test calculated for age up to 10 years and after 10 years in male and female children was not significant ($p=1$)

Age	Males	Females	Total
6 yrs	1	1	2
8 yrs	2	0	2
9 yrs	3	0	3
10 yrs	0	1	1
11 yrs	2	1	3
12 yrs	6	0	6
13 yrs	10	2	12
14 yrs	5	3	8
15 yrs	5	2	7
16 yrs	3	3	6
Total	37	13	50

Left sided DNS was seen in 28 children (56%) and right sided DNS in 22 children (44%). Impacted DNS was noted in 11 children (22%), 7 males and 4 females. Side of DNS amongst male and female children was also not significant in Fisher's exact test ($p=0.5$) (Table. 2)

Table 2 : Number of children according to site of DNS (n=50)

	DNS Right	DNS Left	Total	Impacted DNS Rt.	Impacted DNS Lt.	Total
Males	15	22	37	4	3	7
Females	7	6	13	3	1	4
Total	22	28	50	7	4	11

There were no intraoperative complications in any of the children. Immediate post-operative period was also uneventful in all the children. However, minor bleeding was noted in few children during nasal pack removal. Re-packing of nose was required in two children and was packed in the ward only. One child developed septal hematoma which was drained locally.

Almost all the children had crust and discharge on the first visit after surgery in two weeks. Meticulous cleaning was performed, early adhesions were released, and they were sent home after explaining the technique of proper nasal douching.

All the children under study were reviewed after a month and till 6 months. Crusting was negligible in a month's follow up and the wound had healed.

Total of twelve children (24%) developed the complications. Bleeding during pack removal and septal hematoma were treated in the ward. Recurrent/ residual DNS was the commonest complication. Out of 5 children having residual DNS, two required revision surgery and three of them did not require surgery but required regular follow up. Synechia were released and small septal perforation did not require any additional treatment. (Table 3.)

Table 3: Early and late complications of septoplasty (n=50)

Complications	No. of patients
Bleeding requiring re-packing	2 (4%)
Septal hematoma	1 (2%)
Recurrent / Residual DNS	5 (10%)
Synechia	3 (6%)
Septal perforation	1 (2%)
Total	12 (24%)

DISCUSSION

Septoplasty in pediatric population has always become a controversial topic for otorhinolaryngologists in the past. It is a well-known fact that nasal breathing is important for symmetrical facial growth. Early septoplasty in children avoids development of deformities resulting from mouth breathing.¹⁰ It has been stated that obstructing deviation of nasal septum in childhood has to be an absolute indication for surgery, main outcome of success being the subjective feeling of nasal patency.¹¹

We had 50 patients of symptomatic deviated nasal septum in our study. Out of those, 37 (74%) were males and 13 (26%) were females. Deviated nasal septum was almost three times more common in males than females. Our study is in consistent with the study performed in Dehradun, India in which incidence of DNS was three times more frequent in males

than females.¹² Similar results with male predominance have been recorded from India, South Korea, and Saudi Arabia.¹³⁻¹⁵

Age range of our patients was from 6 years to 16 years with the mean age of 12.78 ± 0.35 years. Twelve out of fifty (24%) children were of 13 years of age. Although there is no consistency in time of septal surgery, majority of the surgeons advocate the timing of septal surgery to be 6 years and older.⁶ After 6 years of age, it becomes easier to perform a complete examination of nose to determine the exact cause of the nasal obstruction. Hospitalization, nasal pack, and suture removal are better tolerated after that age.¹⁶ As the nasal bone usually matures at the age of 16 years, septoplasty can be safely practiced after the age of 16 years.³

In our study, left sided DNS was marginally more common than the right side (28 vs 22 children). Matinand colleagues found left sided DNS in 84% of their patients.¹⁷

Septoplasty in pediatric population is not free from the complications. Although there were no major intraoperative and immediate post-operative complications, 12 of our patients (24%) developed complications. Bleeding requiring re-packing, septal hematoma, recurrent DNS, synechia and septal perforation occurred in our patients.

Short term complications were bleeding requiring re-packing in 2(4%) children and septal hematoma in 1(2%) child. Both the complications were managed in our ward and they were not life threatening. Conventional nasal packing with ribbon gauze was used till few years back in our institution and it was difficult to remove in children leading to more pain and fear, too. Bleeding is rare nowadays after using merocel pack.

Other complications noted in our study were recurrent DNS in 5 (10%) patients, synechia in 3 (6%) and septal perforation in 1 (2%) patient.

In a study on complications of septoplasty, excessive bleeding requiring re-packing, septal perforation, hyposmia, infection (prolonged healing), adhesions, tooth/upper lip anesthesia, and ocular complications like temporary reduced visual acuity were the common complications. Excessive bleeding occurred in 3.3% of their patients and 4% of our patients which is comparable to their study.¹⁸

Muhammad and colleagues performed a study on complications of septal surgery in Karachi, Pakistan.¹⁹ Their patients were both children and adults who had undergone septoplasty and Submucosal Resection of Septum (SMR) surgery. Complications were reported in 21% of the patients. Common complications reported in their study were: adhesions in 14 cases (7%), recurrence of symptoms or deformity in 12 cases (6%) and septal perforation in 10 cases (5%). Our results were also similar to their results which were performed both in adult and pediatric populations.

Residual /Recurrent DNS was found to be the commonest complication in our series in 5(10%) patients. As the surgery was more of the conservative type, it might have occurred. But there were no cases of external deviation including supra-tip deformity or saddle nose in our cases. Two

children out of five required revision surgery (4%) and they were better after second surgery. Both the primary surgery were performed in children with impacted DNS, one in eight years child and next in 12 years child. Rest three did not require surgery. Two of them are in regular follow up and require treatment during upper respiratory tract infections only. and one is not on follow up.

In Becker's study, 12.79% adult patients had undergone revision nasal surgery in a ten-year period.²⁰ A significant number of their patients had nasal valve collapse. As in our study, the residual/ recurrent DNS was found to be equal. Spataro et al, did a retrospective study in revision rates and risk factors of 175842 patients undergoing septo rhinoplasty and found out that patients with the younger age were at increased risk of revision surgery (5.9%).²¹

In a retrospective study aimed to investigate the revision nasal surgery rate after septoplasty in adults based on the grade of the primary surgeon, Karlsson found that a revision rate of 3.2% was noted if the surgery was performed by a consultant surgeon and 4.4% if it was performed by a junior trainee.²²

Looking at all these studies, it becomes clear that complications in pediatric septoplasty were not different from adult septoplasty as our study had the revision rate of 4% and most other complications were either comparable or less than the surgeries performed in adults.

Therefore, we conclude that pediatric septoplasty can be performed easily as the adult cases. However, small nasal cavity with relatively difficult access, difficulty and pain while removing the nasal pack, improper douching after surgery and noncompliance with the post-operative advice are the difficulties that the surgeon might encounter during pediatric septoplasty.

Furthermore, it is evident from the study performed by different researchers that septoplasty performed in pediatric patients leads to significant improvement in disease-specific quality-of-life, allows appropriate craniofacial growth and development, prevents abnormalities in somatic and psychic components thus mystifying the concept that septoplasty should only be performed after 17 to 18 years of age.^{10,23}

CONCLUSION

Early correction of the obstructed nose due to deviated nasal septum leads to improvement in nasal breathing required for normal craniofacial growth. Septoplasty can be performed in pediatric population with relatively good results without occurrence of nasal deformity. Although residual DNS occurs in few children, revision surgery is rarely required.

RECOMMENDATION

This study recommends that septoplasty in children can be performed with good results as in adults. Septoplasty is to be performed in children to allow their proper facial growth if they are having long standing nasal obstruction.

LIMITATIONS OF THE STUDY

This study was carried out in a single institution and in patients operated by a single surgeon. Multicentric study performed in a larger sample size would be of more significance.

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CONFLICT OF INTERESTS

None

FINANCIAL DISCLOSURE

None

REFERENCES

- Pynnonen MA, Davis M M. Extent of sinus surgery, 2000–2009: A population-based study. *Laryngoscope* 2014; 124(4): 820–5. doi: 10.1002/lary.24335.
- Barsova G K, Nikolovski N. Justification for Rhinoseptoplasty in Children – Our 10 Years Overview. *Open Access Maced J Med Sci*. 2016 Sep 15; 4(3): 397–403. doi: 10.3889/oamjms.2016.080.
- Heijden P, Korsten-Meijer A G, Laan B F, Wit H P, Goorhuis-Brouwer SM. Nasal Growth and Maturation Age in Adolescents: A Systematic Review. *Arch Otolaryngol Head Neck Surg*. 2008; 134(12):1288–93. doi: 10.1001/archoto.2008.501.
- Justicz N, Choi S. When should pediatric septoplasty be performed for nasal airway obstruction? *Laryngoscope* 2019; 129 (7):1489-90. doi: 10.1002/lary.27602.
- Cingi C, Muluk NB, Ulusoy S, Lopatin A, Şahin E, Passali D et al. Septoplasty in children. *Am J Rhinol Allergy* 2016 Mar-Apr; 30(2): e42–7. doi: 10.2500/ajra.2016.30.4289.
- Lawrence R. Pediatric septoplasty: a review of the literature. *Int J Pediatr Otorhinolaryngol*. 2012 Aug; 76(8):1078-81. PMID: 22595463.
- Saniasiaya J, Abdullah B. Quality of life in children following nasal septal surgery: A review of its outcome. *Otolaryngology Head and Neck Surgery* 2019; 3(3): 180-4. DOI: 10.1002/ped4.12145
- Yilmaz MS, Guven M, Akidil O, Kayabasoglu OG, Demir D, Mermer H. Does Septoplasty Improve the Quality of Life in Children? *Int J Pediatr Otorhinolaryngol*. 2014 Aug; 78(8):1274-6. PMID: 24880925.
- Gary CC. Pediatric nasal surgery: timing and technique. *Curr Opin Otolaryngol Head Neck Surg*. 2017 Aug; 25(4):286-90. PMID: 28509670.
- Martins MBB, Lima RG, Lima FVF, Barreto VMP, Santos ACG, Santos RCJ. Demystifying Septoplasty in Children. *Int Arch Otorhinolaryngol*. 2014 Jan; 18(1): 54–6. DOI: 10.1055/s-0033-1358576.
- Dispenza F, Saraniti C, Sciandra D, Kulamarva G, Dispenza C. Management of naso-septal deformity in childhood: long-term results. *Auris Nasus Larynx*. 2009; 36(6):665–70. PMID: 19411151.
- Prasad S, Varshney S, Bist S S, Mishra S, Kabdwal N. Correlation Study Between Nasal Septal Deviation and Rhinosinusitis. *Indian J Otolaryngol Head Neck Surg*. 2013 Dec; 65(4): 363–6. PMID: 24427600.
- Sriprakash V. Prevalence and clinical features of nasal septum deviation: a study in an urban centre. *Int J Otorhinolaryngol Head Neck Surg*. 2017 Oct; 3(4):842-844. DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20173670.
- Min YG, Jung HW, Kim CS. Prevalence study of nasal septal deformities in Korea: Results of a nation-wide survey. *Rhinology* 1995; 33:61-5. PMID: 7569653.
- Sumaily I, Hudise J, Aldhabaan S. Relation between deviated nasal septum and paranasal sinus pathology. *Int J Otorhinolaryngol Head Neck Surg*. 2017 Oct; 3(4):786-90. DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20174124
- Crysdale W S. Septoplasty in Children—Yes but Do the Right Thing. *Arch Otolaryngol Head Neck Surg*. 1999; 125(6):701-2. PMID: 10367933.
- Matin MA, Islam Md N, Ali Md R, Azad A K. Septoplasty in children: Results of 250 cases. *Bangladesh J Otorhinolaryngol* 2015; 21(2): 110–4. DOI: https://doi.org/10.3329/bjo.v21i2.27650.
- Dąbrowska-Bień J, Skarżyński PH, Gwizdalska I, Łazęcka K, Skarżyński H. Complications in septoplasty based on a large group of 5639 patients. *Eur Arch Otorhinolaryngol*. 2018; 275(7): 1789–94. PMID: 29770875.
- Muhammad I A, Rahman N. Complications of the Surgery for Deviated Nasal Septum. *J Coll Physicians Surg Pak*. 2003 Oct; 13(10):565-8. PMID: 14588169.
- Becker SS, Dobratz EJ, Stowell N, Barker D, Park SS. Revision Septoplasty: Review of Sources of Persistent Nasal Obstruction. *Am J Rhinol*. Jul-Aug 2008; 22(4):440-4. PMID: 18702913.
- Spataro E, Piccirillo J F, Kallogjeri D, Branham G H, Desai S C. Revision Rates and Risk Factors of 175842 Patients Undergoing Septorhinoplasty. *JAMA Facial Plast Surg*. 2016 May 1; 18(3): 212–9. PMID: 26967651.
- Karlsson T R, Shakeel M, Al-Adhami A, Suhailee S, Ram B, Ah-See K W. Revision Nasal Surgery After Septoplasty: Trainees Versus Trainers *Eur Arch Otorhinolaryngol*. 2013 Nov; 270 (12):3063-7. PMID: 23455577.
- Manteghi A, Din H, Bundogji N, Leuin S C. Pediatric Septoplasty and Functional Septorhinoplasty: A Quality of Life Outcome Study. *Int J Pediatr Otorhinolaryngol*. 2018 Aug; 111:16-20. PMID: 29958602.