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*Research Article*

# Standardization of Questionnaire about Short-Term Quality of Life Outcomes Following Pediatric Septoplasty

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**Abstract**
**Background:** Septal deviation is one of the commonest disorders in pediatric population, which may cause symptoms of obstructive sleep apnea, headache, epistaxis, hyposmia, and postnasal drip, nasal obstruction, and these symptoms affect the life quality in children. **Aim:** This study aim to is standardized questionnaire about sinus and nasal quality of life survey using Sinus and Nasal Quality of Life questionnaire (SN-5) following septoplasty in pediatric and to assess benefits differences by age and sex in these patients. **Methods:** 30 pediatric patients from 7 to 16 years old with severely deviated septum grade 2 in Cottle's classification diagnosed by endoscopic examination and CT scan with medically unmanageable symptoms, closed endoscopic hemitransfixation septoplasty done for all patients. The pre- and post-operative SN-5 collected by the same questionnaire and in the Arabic translated one. **Results**: There was significant improvement in the nasal obstruction symptoms postoperatively using SN-5 and there is no detected relation between SN-5 and the age or the sex of the patients. **Conclusion:** Septoplasty should be done in severely deviated septum which impacts normal nasal breathing and life quality in these patients as early as possible.

**Keywords:** Pediatric; septoplasty; SN-5.

## Introduction

Deviated septum of the nose assume a basic job in symptoms of nasal obstruction, aesthetic look of the nose, expanded resistance of the nose, and sometimes snoring with or without apnea[1]. Septoplasty is a typical procedure in day-by-day Otorhinolaryngological practice. Different surgical techniques were defined in nasal deformities which produce obstruction of the nose: septoplasty by endoscopic technique for posterior obstruction, septoplasty using Cottle's method for deposition of the septum, and premaxillary area deviation, spreader grafts septoplasty used for deviation of the posterior cartilage, open technique septoplasty with a new septum cartilage scope for the complicated deviation[2].

In spite of the fact that septoplasty is usually performed in grown-ups. The hesitancy to do septoplasty in pediatric group of patients was identified with worries due to the theory of its harmful effects on the growth of the nose and the face[3]. In spite of anthropometric measure-ments, in any case, have appeared nasal and facial development estimations in a pediatric patient receiving septoplasty and more extensive reconstructive surgery of the nose stay dependable with normal data, even after follow-up for a long-term[4]. Pediatric septo-plasty clinical indications are commonly classified into relative and absolute items. Abscess or hematoma of the septum, extreme disfigurement 2$^{ry}$ to acute nasal smash, benign

mature cystic teratoma, and congenital cleft lip and palate are defined as absolute indication in which surgery is mandatory. However, septal deviation causing obstruction is a relative indication[5]. As of late, most creators subscribed that any distortion in the nasal septum prompting obstruction of the nose could be handled without harming or influencing development of the nose and face[6]. Moreover, a few creators recommend that early prevention intercession on any nasal septum abnormalities counteract imperfect positioning, dental complications, facial disfigurement, and respiratory complication[7]. Recently distributed an examination with pediatric cases that concentrates on illness-specified goodness of life effect post-septoplasty utilizing the Nose Obstacle Symptom Evaluation (NOSE) measure. They reasoned that septoplasty is advantageous in pediatric patients as there were advantages seen in the illness-specific quality of life [8].

## Patients and Methods

This was a randomized prospective intervenetional study performed in Beni-suef university hospital within 2 years from December 2017 to December 2019 involving 30 pediatric patients. The study was conducted after approval from the local ethical committee and a written informed consent was obtained from all patient parents.

**(1) Inclusion criteria:**

1- Patients with indications for septoplasty.
2- Age: 7-16 years.
3- Sex: both sexes.
4- Hemoglobin >10mg/dl.
5- Normal coagulation profile, renal and liver function tests.
6- Patients fit for anesthesia.

**(2) Exclusion criteria:**

1- Severely deviated septum with anterior dislocation.
2- Having blood diseases or coagulopathies.
3- Poor general condition.

**(3) all cases were yielded to the following:**

**A. Preoperative evaluation:**

1- Careful taking of the history.
2- Routine Otorhinolaryngological examination.
3- Careful endoscopic nasal examination.
4- Patients and their parents were questioned regarding the presence of symptoms of nasal obstruction using the (SN-5) after Arabic back translation of the questionnaire by the team as a 3rd party to preserve the internal consistency of the questionnaire.
5- C.T. scan of the nose and paranasal sinuses (coronal& axial cuts).
6- Routine laboratory investigations including coagulation profile, blood sugar, complete blood count, renal and liver function tests.
7- Nasal decongestant drops xylometazoline HCL 0.05% 24 hours prior to the operation.

**B. Surgical technique:**

Closed endoscopic hemitransfixation septoplasty was done for all patients using 0° rigid 2.7mm or 4mm nasal endoscope with application of silastic sheet at the end of procedure to limit the development of septal hematoma and synechiae postoperatively and to ensure linear healing of the septum which removed one week postoperatively then anterior nasal packing applied which removed on the second day postoperatively. Patients were called for endoscopic examination and follow up after 1 month. Subjective assessment of the patients nasal obstruction symptoms was done on this follow up examination. Patients and their parents were questioned regarding the presence of symptoms of nasal obstruction using the (SN-5) postoperatively in its Arabic form.

## C. At the follow up visits:

Instructions: Please help us understand the impact of sinus and/or nasal problems on your child's quality of life by checking one box [x] for each question below. Thank you.

SINUS INFECTION: Nasal discharge, bad breath, daytime cough, post-nasal drip, headache, facial pain or head banging. How often a problem for your child during the past 4 weeks?

[ ] None of the time
[ ] Hardly any time at all
[ ] A small part of the time
[ ] Some of the time
[ ] A good part of the time
[ ] Most of the time
[ ] All of the time

NASAL OBSTRUCTION: Stuffy or blocked nose, nasal congestion, reduced sense of smell, trouble breathing with mouth closed. How often a problem for your child during the past 4 weeks?

[ ] None of the time
[ ] Hardly any time at all
[ ] A small part of the time
[ ] Some of the time
[ ] A good part of the time
[ ] Most of the time
[ ] All of the time

ALLERGY SYMPTOMS: Sneezing, itchy nose/eyes, need to rub nose/eyes, or watery eyes. How often a problem for your child during the past 4 weeks?

[ ] None of the time
[ ] Hardly any time at all
[ ] A small part of the time
[ ] Some of the time
[ ] A good part of the time
[ ] Most of the time
[ ] All of the time

EMOTIONAL DISTRESS: Irritable, frustrated, sad, restless, or trouble sleeping. How often a problem for your child during the past 4 weeks because of nose or sinus illness?

[ ] None of the time
[ ] Hardly any time at all
[ ] A small part of the time
[ ] Some of the time
[ ] A good part of the time
[ ] Most of the time
[ ] All of the time

ACTIVITY LIMITATIONS: Missed school/daycare, lost time with family/friends, unable to do projects. How often a problem for your child during the past 4 weeks because of nose or sinus illness?

[ ] None of the time
[ ] Hardly any time at all
[ ] A small part of the time
[ ] Some of the time
[ ] A good part of the time
[ ] Most of the time
[ ] All of the time

OVERALL, HOW WOULD YOU RATE YOUR CHILD'S QUALITY OF LIFE AS A RESULT OF NOSE OR SINUS PROBLEMS?
(Circle one number)

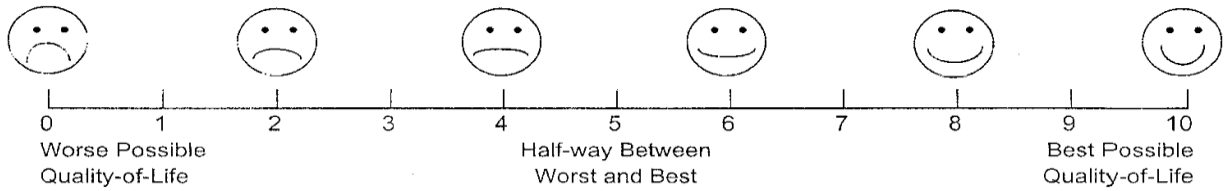



**Figure (1): the sinus and nasal quality of life survey (SN5)[9].**

**استبيان جودة الحياة للأطفال الذين يعانون من مشاكل الأنف و/ أو الجيوب الأنفية**

**التعليمات**: **من فضلك ساعدنا لكي ندرك تأثير مشاكل الأنف و / أو الجيوب الأنفية على جودة الحياة لطفلك وذلك باختيار أحد الإجابات لكل من الأسئلة التالية وشكرا لكم:**

**التهاب الجيوب الانفية**: افرازات الانف، رائحة الفم الكريهة، السعال اثناء النهار، سقوط قطرات انفية خلفية، الصداع، الم الوجه او ضجيج بالرأس. كم مرة حدثت هذه المشكلة لطفلك خلال اخر اربعة اسابيع؟

ولا مرة. {...} بالكاد في أي وقت على الاطلاق. {...} جزء كبير من الوقت. {...}
في جزء بسيط من الوقت. {...} معظم الوقت. {...}
بعض الوقت. {...} طوال الوقت. {...}

**انسداد بالأنف:** اختناق او انسداد بالأنف، احتقان بالأنف، ضعف حاسة الشم، صعوبة التنفس مع الفم مغلق. كم مرة حدثت هذه المشكلة لطفلك خلال اخر اربعة اسابيع؟

ولا مرة. {...} بالكاد في أي وقت على الاطلاق. {...} في جزء كبير من الوقت. {...}
في جزء بسيط من الوقت. {...} معظم الوقت. {...}
بعض الوقت. {...} طوال الوقت. {...}

**أعراض الحساسية**: العطس، حكة بالأنف\ العين، الحاجة الى فرك الانف\ العين، او عيون دامعة. كم مرة حدثت هذه المشكلة لطفلك خلال اخر اربعة اسابيع؟

ولا مرة. {...} بالكاد في أي وقت على الاطلاق. {...} جزء كبير من الوقت. {...}
في جزء بسيط من الوقت. {...} معظم الوقت. {...}
بعض الوقت. {...} طوال الوقت. {...}

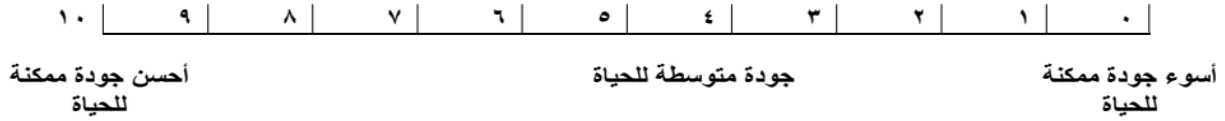
**الاضطراب النفسي**: سريع الغضب، محبط، حزين، ارق، او صعوبة بالنوم. كم مرة حدثت هذه المشكلة لطفلك خلال اخر اربعة اسابيع؟

ولا مرة. {...} بالكاد في أي وقت على الاطلاق. {...} جزء كبير من الوقت. {...}
في جزء بسيط من الوقت. {...} معظم الوقت. {...}
بعض الوقت. {...} طوال الوقت. {...}

**تقييد بالأنشطة**: الغياب من المدرسة\ الروضة، الوقت الضائع مع الاهل والأصدقاء، عدم القدرة على القيام بالمشاريع. كم مرة حدثت هذه المشكلة لطفلك خلال اخر اربعة اسابيع؟

ولا مرة. {...} بالكاد في أي وقت على الاطلاق. {...} جزء كبير من الوقت. {...}
في جزء بسيط من الوقت. {...} معظم الوقت. {...}
بعض الوقت. {...} طوال الوقت. {...}

بشكل عام كيف تقيم جودة الحياة لطفلك كنتيجة لمشاكل الأنف والجيوب الأنفية
ضع دائرة حول رقم واحد




**Statistical methodology**

- The following data analysis was carried out using an IBM computer using SPSS 22, a statistical tool for social science.
- The mean± SD, and range for quantitative values.
- Tests of significance were used:
  - Wilcoxon Signed Ranks Test for two related non-parametric samples.
  - For two independent non-parametric samples we used the Mann Whitney U Test.
  - Spearman Correlation.
- Statistics P-values $\leq$ 0.05 were considered significant statistically
- Rate of change was calculated by calculating the difference between pre- and post- operative assessment.

## Results

This study was conducted at Beni-Suef university hospital for 2 years from December 2017 to December 2019. A total of 30 pediatric patients, 17 males and 13 females. 14 cases out of 30 showed positive history of trauma.

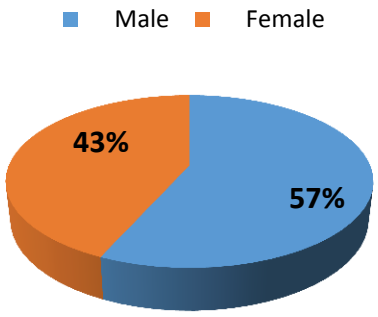



**Figure (2):** Gender distribution of the studied population.

**Table (1):** Pre-Operative Assessment of Nasal Symptoms Using the SN-5 Scale Mean Score; (N= 30).

| SN-5 | Descriptive Statistics | |
|---|---|---|
| **Minimum** | 2.60 | |
| **Maximum** | 5.80 | |
| **Range** | 3.20 | |
| **Mean ±SD** | 4.66 ±0.8 | |

As demonstrated in the table the overall mean for SN-5 score ranged from 2.60 to 5.80 points with a mean of 4.66 ±0.8 (SD).

**Table (2):** Post-Operative Assessment of Nasal Symptoms Using the SN-5 Scale Mean Score; (N= 30).

| SN-5 | Descriptive Statistics | |
|---|---|---|
| **Minimum** | 1 | |
| **Maximum** | 2.80 | |
| **Range** | 1.80 | |
| **Mean ±SD** | 1.69 ±0.5 | |

As demonstrated in the table the overall mean for SN-5 scores post-operative ranged from 1 to 2.80 points with a mean of 1.96 ±0.5 (SD).

**Table (3):** Comparison between preoperative and postoperative assessment of nasal symptoms using the SN-5 Scale Total Score; (N= 30),

| | SN-5 | | |
|---|---|---|---|
| | **Pre-Operative N=30** | **Post-Operative N=30** | ***p-value*** |
| **Minimum** | 2.60 | 1 | **0.001*** |
| **Maximum** | 5.80 | 2.80 | |
| **Range** | 3.20 | 1.80 | |
| **Mean ±SD** | 4.66 ±0.8 | 1.69 ±0.5 | |

***p- value was significant***.

As illustrated in the table there was a marked improvement in the nasal symptoms as measured by the SN-5 scale between the pre- and post- operative assessment of cases where the mean scores were (4.66 ±0.8 vs. 1.69 ±0.5) in pre- and post-operative with a significant p-value 0.001.

**Table (4):** Correlation between SN-5 Score for Assessment of Nasal Symptoms and age of studied patients; (N= 30):

| SN-5 Score | Age of patients | |
|---|---|---|
| | r | p-value* |
| **SN-5 Score** (Pre-Operative) | -0.129 | 0.496 |
| **SN-5 Score** (Post-Operative) | -0.110 | 0.565 |
| **SN-5 Score** (Rate of Change) | 0.022 | 0.908 |

*r= Spearman Correlation Coefficient, *p-value ≤0.05 is considered significant.*

No detected correlation between SN-5 Score for Assessment of Nasal Obstruction Symptoms and age of studied patients as p-values were >0.05.

**Table (5):** Relation between SN-5 Score for Assessment of Nasal Symptoms and Gender of studied patients; (N= 30):

| | Gender of cases | | |
|---|---|---|---|
| | **Male n= 17** | **Female n= 13** | ***P-value*** |
| **SN-5 Score** (Pre-Operative) | | | |
| **Minimum** | 3.80 | 2.60 | 0.514 |
| **Maximum** | 5.80 | 5.60 | |
| **Mean ±SD** | 4.7 ±0.6 | 4.6 ±0.9 | |
| **SN-5 Score** (Post-Operative) | | | |
| **Minimum** | 1 | 1 | 0.570 |
| **Maximum** | 2.40 | 2.80 | |
| **Mean ±SD** | 1.7 ±0.4 | 1.6 ±0.5 | |

***p-value ≤0.05 is considered significant by Mann Whitney U Test.***

No detected relation between SN-5 Score for assessment of nasal obstruction symptoms pre- and post-operative and gender of studied patients as p-values were >0.05.

## Discussion

The optimal timing and the extent of surgical intervention in nasal surgery for functional and aesthetic indications in the pediatric population remain controversial. The expected benefits of early intervention in a given indication have to be weighed against the possible adverse outcomes owing to the ongoing nasal and midfacial growth.

Septoplasty is a tissue-reserving operation. In most conditions, the area of deviation was removed or corrected to leave cartilage and bone behind it as much as possible. Cartilage removal is minimized, especially when the deviation was located beside a structurally important area (e.g., dorsal, and caudal areas of the septum). In these cases, the cartilage can be reshaped, or repositioned, recontoured using a variety of procedures[10].

Septoplasty is used to improve the nasal function by removing obstruction of nose caused by deviations in the quadrilateral cartilage and its related bony structures[11].

Obstructive nasal septal diseases can lead to obligatory mouth breathing, which certainly affect craniofacial development as it requires an open mouth and lips and anterior tongue. It also results in decreased maxillofacial muscle tone. This led to lack of normal developmental forces which causes narrowing of the maxilla, retrognathia, protrusion of the maxillary incisors, and micrognathia. moreover, it has been shown that uncorrected deviated septum will continue to make worse and will impact on the occurrence of sinusitis and otitis media[12].

Concerning nasal surgery, the optimal time as well as the degree of intervention in pediatric is

still controversial. For functional and aesthetic indications. So, a comparison between the anticipated benefits of early surgery in certain conditions and the expected side effects as regard to growth of the nose and midfacial structures should be done[13]. In 1996 &1997[14] have revealed that the nasal septal growth decreases significantly after two years of age, reaching a plateau by the age of thirty-six. In addition, they suggested that at 2 years; the cartilage of the septum pf the nose reaches the adult size while further growth occurs at the bony perpendicular plate,[15] stated in 2009 that the nasal septum cartilage complete its growth at fifth to six years of age, while the vomer and perpendicular plate continue to grow till adolescence.

The suitable age for septoplasty in children is 5 years old or more because at that age it is easy to do full examination including flexible endoscopy to detect the accurate cause of nasal obstruction. The hospital stay, removal of packing and removal of sutures are all better to be afforded at this age. If the obstruction is causing obstructive sleep apnea, surgery can be done at any age[16].

[17] In 2014 study was done on Thiry five patients, 24 were boys & 11 were girls with a mean âge 13.4 ± 2.8. Have shown an incredibly significant improvement in NOSE score 3 months postoperatively.

Our study was done on 30 patients who enrolled in This study, 17 cases were males & 13 cases were females with a ratio 2.3:1 with a mean age 12 ±2.7. There was a significant improvement in the Nasal Obstruction Symptoms as measured by the SN-5 scale with a significant p-value 0.001.[9] in 2016 done their retro-spective study on 28 patients, 19 were males & 9 females with mean age 13 or older using both open and closed septoplasty techniques. Results have shown that females had significantly greater short-term symptomatic benefit than males, indicating sex may be one of the patient characteristics.

In our study, both males and females had significantly short-term symptomatic benefits equally, indicating that sex have no role in outcomes as p-values were >0.05. Similar short-term improvements were observed between younger and older children, suggesting an equal benefit, regardless of age.

[9] In 2016 their results showed significant improvement from pre- to post-septoplasty with no difference by surgical approach either open or closed techniques.
Yilmaz's opinion was that external approach for septoplasty offers no additional advantage over the hemitransfixion method and it is more traumatic, and it may be used in case of severe nasal tip deformity combined with septal deviation[18].

Internal approach hemitransfixion incision, which was done in this study when the nasal septal disease affects the caudal part of quadrilateral cartilage is present posteriorly in relation to the anterior nasal spine it is characterized by low rate of complications. It keeps the blood supply of the cartilage, so, prevents perforations of the septum, Allowing elimination of the nasal packing on the second day after operation minimizing the discomfort sensation in children after surgery. It reduces postoperative septal infections and medications because the used suture is absorbable within days vicryl rapid 3/0 [19]. It takes short time, it is rapid, simple, and safe[15]

[17] In 2014 their study on 35 pediatric patients with closed technique showed no major post-operative complication. One patient showed mild synechiae while 3 patients showed minimal residual nasal septal deviation with no revision septoplasty was needed.

In our study two patients showed post-operative mild synechiae due to disuse of alkaline nasal wash. While one patient shown mild epistaxis controlled by antihemorrhagic drugs.

**Conclusion and recommendations:**
Septoplasty should be done in severely deviated septum which impacts normal nasal breathing and life quality as early as possible. Hemitransfixation incision is a suitable surgical technique for pediatric septoplasty with minimal invasive and post-operative compli-cations. According to our collected data and statistical analysis in this study we assert that there was a marked improvement in the nasal obstruction symptoms between the pre- and post- operative assessment of cases using SN-5.

SN-5 could be used efficiently for assessing the outcomes of septoplasty in pediatrics. The results of this study was consistent, furthermore supporting the possible short-term symptomatic usefulness of septoplasty in pediatric.

Future long term follow up should be done and on a broad basis in order to put eye on the facial growth, any post- surgical nasal deformity and provide more statistically valuable results.

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