

COMPARISON BETWEEN PRE-OP AND POST-OP PATIENTS WITH DEVIATED NASAL SEPTUM UNDERGOING SEPTOPLASTY USING SNOT-22 SCORE

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Abstract

Aim: To compare the improvement in symptoms using SNOT-22 scores in patients with deviated nasal septum before and after septoplasty. **Methodology:** A prospective study was conducted from June 1 to December 31, 2023, at a tertiary care centre in South India. Thirty patients diagnosed with isolated DNS, aged 18-45, were included. Patients completed the SNOT-22 questionnaire pre-operatively and six weeks post-operatively. Data were analysed using SPSS software. **Results:** The study included 12 males and 18 females, with a mean age of 35.067 years. Significant improvements were noted in the post-operative SNOT-22 scores compared to pre-operative scores for symptoms such as the need to blow nose, sneezes, running nose, cough, nasal secretions, thick secretion, feeling of full/stuffed ear, facial pain/pressure, several sleep-related issues ($p < 0.05$). However, symptoms like dizziness, earache, and difficulty in smelling/tasting did not show significant improvement post-surgery. **Discussion:** The results indicate that septoplasty significantly improves nasal symptoms and overall quality of life, as evidenced by reduced SNOT-22 scores. The study findings are consistent with previous research indicating the efficacy of septoplasty in managing DNS-related symptoms. However, non-nasal symptoms such as dizziness and earache may require additional investigation and management. **Conclusion:** SNOT-22 is a crucial tool for evaluating the severity of symptoms pre-operatively and the effectiveness of septoplasty post-operatively. The study confirms that septoplasty provides substantial relief from nasal symptoms and improves patient quality of life.

Keywords: Septoplasty, Deviated Nasal Septum, SNOT-22, Quality of Life, Sinonasal Symptoms, ENT Surgery.

INTRODUCTION

Septoplasty is one of the most commonly performed surgery in ENT hospitals. The various indications of Septoplasty nasal obstruction, crusting, rhinorrhea, post-nasal discharge, recurrent sinus pressure or pain, epistaxis headache, snoring, and sleep apnea are the indications for septoplasty (1).

Nasal septum deviation is present in 19-65% of the population (3). Scoring systems have been developed over the last two decades to assess nasal function and the impact of treatment on the nose. Of these, the 22-item Sino-Nasal Outcome Test (SNOT-22) has been widely adopted in clinical practice and has been proven to be the most suitable sinonasal outcome scoring system (2).

The majority of septoplasty patients showed marked improvement in disease-specific symptoms, good quality of life, satisfaction & decreased medication use. Severe pre-operative nasal obstruction indicated a higher predicted improvement (1). The commonly used methods to measure the quality of improvement after the procedure are Sinonasal outcome tests: SNOT-20, SNOT-22, and Nasal obstruction and Septoplasty Effectiveness (NOSE).

The main objective of the present study is to ascertain the correlation between SNOT-22 score and general health domains after septoplasty. Various studies have investigated the effectiveness of septoplasty surgery based on improvement in nasal symptoms and quality of life. The study then aims to understand which nasal symptoms were modified by surgery and also which non-nasal domains had significant variations.

Aim of the study: Comparing the improvement in symptomatology in patients presenting with deviated nasal septum with SNOT -22 scoring pre-operatively and post-operatively.

METHODOLOGY

This Prospective study was conducted at the Otorhinolaryngology department of all the patients diagnosed with deviated nasal septum during the period of 1st June to 31st December 2023 conducted in a tertiary care center located in south India.

The study cohort comprised [30] patients who met the criteria were included in the study.

Inclusion criteria are age between (18- 45 years), The patient was diagnosed to have isolated deviated nasal septum with no other coexisting conditions. No Revision surgeries.

Exclusion criteria are septoplasty combined with other surgeries , submucosal Resection operation done for a Deviated Nasal Septum (DNS) patient, Other sinonasal diseases

Each of these patients was asked to fill out the Pre-OP SNOT-22 questionnaire before the surgery. Informed consent was obtained from all the participants in the study. Follow-up was done 6 weeks after the surgery.

The Post-Op SNOT-22 questionnaire was filled then. All the surgeries were scheduled 2 days after admission to check for co-morbidities and serology was also checked. All the surgeries were performed by a single surgeon for a qualitative analysis. Each surgery took approximately 90-110 minutes.

The SNOT -22 questionnaire filled out by the patients Pre-operatively and post-operatively was compared and analyzed using SPSS software.

RESULTS

Out of the 30 patients evaluated, there were 12 male and 18 female patients. None of the patients withdrew in the middle of the trial. The mean age of the 30 patients was calculated to be 35.067.

The frequency and percentage of patients for each symptom in the pre-op and post-op SNOT -22 questionnaire are given below.

The primary method for statistical analysis involved comparing the mean scores of the SNOT-22 questionnaire before and after the surgery. The paired t-test was used to determine the significance of the differences observed.

Table 1: Frequency and Percentages of Symptoms in the Pre-test

Symptoms		Frequency	Percent
Need to blow nose	2	3	10
	3	14	46.7
	4	10	33.3
	5	3	10
Sneezes	0	2	6.7
	1	8	26.7
	2	12	40
	3	7	23.3
	4	1	3.3
Running Nose	2	4	13.3
	3	18	60
	4	8	26.7
Cough	2	13	43.3
	3	11	36.7
	4	6	20
Nasal secretion going to your throat	2	5	16.7
	3	14	46.7
	4	11	36.7
Thick secretion from your nose	2	10	33.3
	3	17	56.7
	4	3	10
A feeling of a full or stuffed ear	0	3	10
	1	13	43.3
	2	12	40
	3	2	6.7
Dizziness or vertigo	0	3	10
	1	15	50
	2	12	40
Earache	0	10	33.3
	1	12	40
	2	8	26.7
Facial pain or pressure	0	7	23.3
	1	15	50
	2	8	26.7
Difficulty to sleep	0	3	10
	1	12	40
	2	10	33.3
	3	5	16.7
Wake up in the middle of the night	0	7	23.3
	1	9	30
	2	7	23.3
	3	7	23.3
Lack of good sleep in the night	0	8	26.7
	1	7	23.3
	2	6	20
	3	9	30
Wake up tired	0	7	23.3
	1	9	30
	2	12	40
	3	2	6.7
Fatigued during the day	0	7	23.3
	1	13	43.3
	2	7	23.3
	3	3	10

Low performance in doing your daily activities	0	11	36.7
	1	17	56.7
	2	2	6.7
Low concentration to do your daily activities	0	17	56.7
	1	12	40
	2	1	3.3
Frustrated, restless, or irritated	0	13	43.3
	1	9	30
	2	8	26.7
Sadness	0	24	80
	1	6	20
A feeling of shame	0	24	80
	1	6	20
Difficulty to feel smells or tastes	0	7	23.3
	1	9	30
	2	9	30
	3	5	16.7
Stuffed nose	1	2	6.7
	2	12	40
	3	15	50
	4	1	3.3

Table 2: Frequency and Percentages of Symptoms in Post-Test

Symptoms		Frequency	Percent
Need to blow nose	0	9	30
	1	16	53.3
	2	5	16.7
Sneezes	0	10	33.3
	1	18	60
	2	2	6.7
Running Nose	0	7	23.3
	1	20	66.7
	2	3	10
Cough	0	11	36.7
	1	16	53.3
	2	3	10
Nasal secretion going to your throat	0	13	43.3
	1	14	46.7
	2	3	10
Thick secretion from your nose	0	8	26.7
	1	16	53.3
	2	6	20
A feeling of a full or stuffed ear	0	8	26.7
	1	17	56.7
	2	5	16.7
Dizziness or vertigo	0	7	23.3
	1	16	53.3
	2	7	23.3
Earache	0	11	36.7
	1	15	50
	2	4	13.3
Facial pain or pressure	0	30	100
Difficulty to sleep	0	30	100
Wake up in the middle of the night	0	30	100
Lack of good sleep in the night	0	30	100

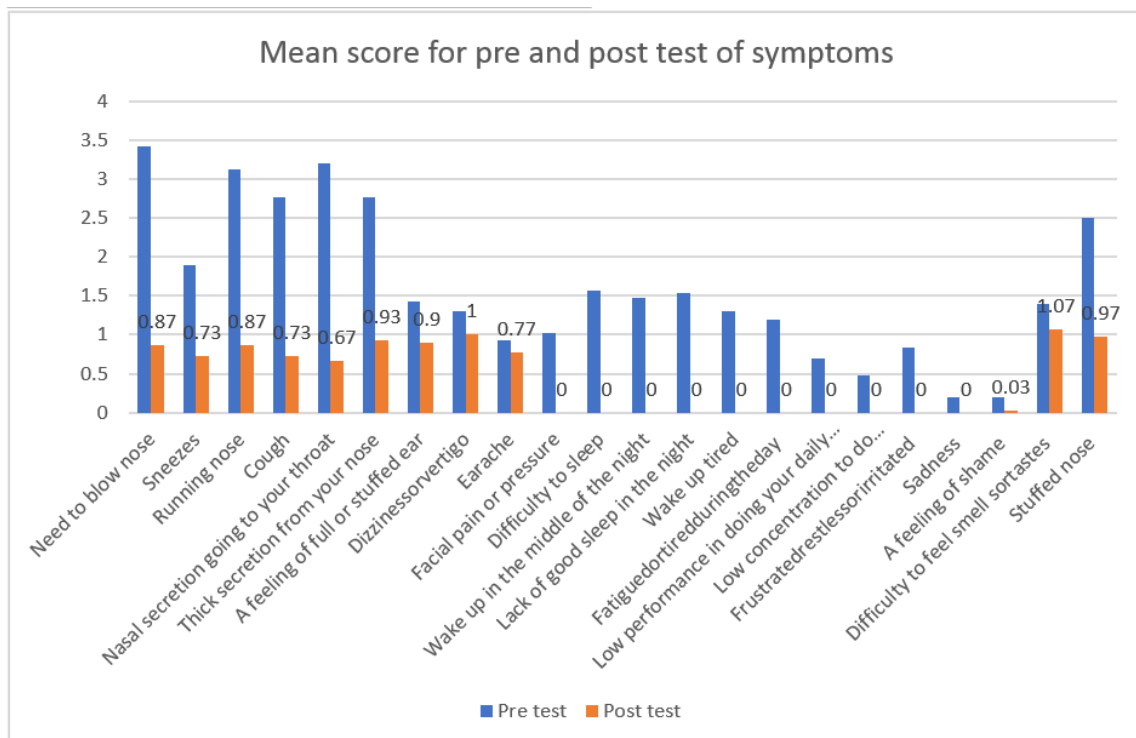
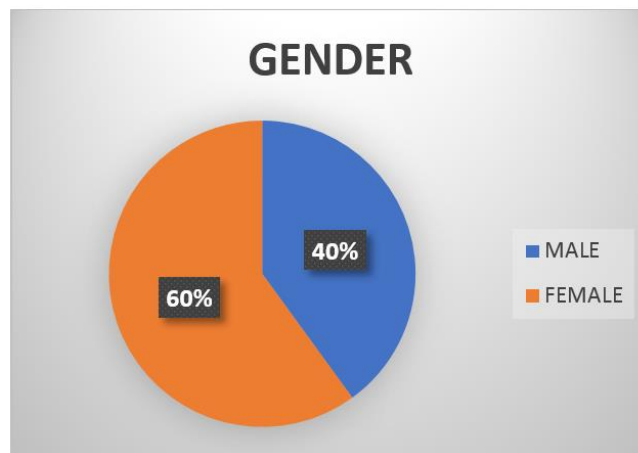
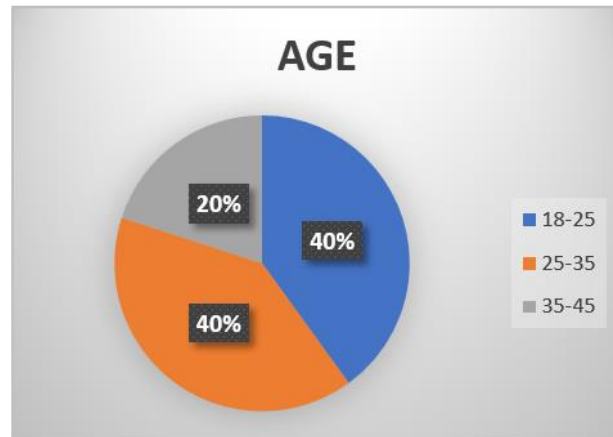
Wake up tired	0	30	100
Fatigued during the day	0	30	100
Low performance in doing your daily activities	0	30	100
Low concentration to do your daily activities	0	30	100
Frustrated, restless, or irritated	0	30	100
Sadness	0	30	100
A feeling of shame	0	29	96.7
	1	1	3.3
Difficulty to feel smells or tastes	0	5	16.7
	1	18	60
	2	7	23.3
Stuffed nose	0	5	16.7
	1	21	70
	2	4	13.3

The following table shows the mean Pre-op and post-op values for each symptom of the SNOT22 questionnaire along with the probability value for each symptom.

Table 3: Mean Score of Symptoms for Pre and Post-Test

Symptoms	Pre-test	Post-test	p-value
	Mean ±S.D	Mean ±S.D	
Need to blow nose	3.43±0.82	0.87±0.68	0
Sneezes	1.90±0.96	0.73±0.58	0
Running nose	3.13±0.63	0.87±0.57	0
Cough	2.77±0.77	0.73±0.64	0
Nasal secretion going to your throat	3.20±0.71	0.67±0.66	0
Thick secretion from your nose	2.77±0.63	0.93±0.69	0
A feeling of a full or stuffed ear	1.43±0.77	0.90±0.66	0.001
Dizziness or vertigo	1.30±0.65	1.00±0.70	0.142
Earache	0.93±0.30	0.77±0.30	0.393
Facial pain or pressure	1.03±0.72	0.00±0.00	0
Difficulty to sleep	1.57±0.90	0.00±0.00	0
Wake up in the middle of the night	1.47±1.11	0.00±0.00	0
Lack of good sleep in the night	1.53±1.2	0.00±0.00	0
Wake up tired	1.30±0.92	0.00±0.00	0
Fatigued during the day	1.20±0.93	0.00±0.00	0
Low performance in doing your daily activities	0.70±0.60	0.00±0.00	0
Low concentration to do your daily activities	0.47±0.57	0.00±0.00	0
Frustrated, restless, or irritated	0.83±0.83	0.00±0.00	0
Sadness	0.20±0.41	0.00±0.00	0.012
A feeling of shame	0.20±0.41	0.03±0.18	0.057
Difficulty to feel smells or tastes	1.40±1.04	1.07±0.64	0.186
Stuffed nose	2.50±0.68	0.97±0.56	0

Probability values ≤ 0.05 are taken to be statistically significant. Paired T-test was used to analyze the data. The items that seemed to have significantly improved post-surgery are: need to blow nose, sneezes, running nose, cough, nasal secretion going to throat, thick secretion from nose, feeling of full/stuffed ear, facial pain/pressure, difficulty to sleep, waking up in the middle of the night, lack of good sleep in the night, waking up tired, fatigued or tired during the day, low performance in daily activities, low concentration to do daily activities, frustrated or less irritated, sadness, difficulty to feel smell or taste, stuffed nose.



SNOT 22 QUESTIONNAIRE

Below you will find a list of symptoms and social/emotional consequences of your rhinosinusitis. We would like to know more about these problems and would appreciate your answering the following questions to the best of your ability. There are no right or wrong answers, and only you can provide us with this information. Please rate your problems as they have been over the past two weeks. Thank you for your participation. Do not hesitate to ask for assistance if necessary.

1. Considering how severe the problem is when you experience it and how often it happens, please rate each item below on how "bad" it is by circling the number that corresponds with how you feel using this scale: →	No Problem	Very Mild Problem	Mild or slight Problem	Moderate Problem	Severe Problem	Problem as bad as it can be		5 Most Important Items
1. Need to blow nose	0	1	2	3	4	5		<input type="radio"/>
2. Nasal Blockage	0	1	2	3	4	5		<input type="radio"/>
3. Sneezing	0	1	2	3	4	5		<input type="radio"/>
4. Runny nose	0	1	2	3	4	5		<input type="radio"/>
5. Cough	0	1	2	3	4	5		<input type="radio"/>
6. Post-nasal discharge	0	1	2	3	4	5		<input type="radio"/>
7. Thick nasal discharge	0	1	2	3	4	5		<input type="radio"/>
8. Ear fullness	0	1	2	3	4	5		<input type="radio"/>
9. Dizziness	0	1	2	3	4	5		<input type="radio"/>
10. Ear pain	0	1	2	3	4	5		<input type="radio"/>
11. Facial pain/pressure	0	1	2	3	4	5		<input type="radio"/>
12. Decreased Sense of Smell/Taste	0	1	2	3	4	5		<input type="radio"/>
13. Difficulty falling asleep	0	1	2	3	4	5		<input type="radio"/>
14. Wake up at night	0	1	2	3	4	5		<input type="radio"/>
15. Lack of a good night's sleep	0	1	2	3	4	5		<input type="radio"/>
16. Wake up tired	0	1	2	3	4	5		<input type="radio"/>
17. Fatigue	0	1	2	3	4	5		<input type="radio"/>
18. Reduced productivity	0	1	2	3	4	5		<input type="radio"/>
19. Reduced concentration	0	1	2	3	4	5		<input type="radio"/>
20. Frustrated/restless/irritable	0	1	2	3	4	5		<input type="radio"/>
21. Sad	0	1	2	3	4	5		<input type="radio"/>
22. Embarrassed	0	1	2	3	4	5		<input type="radio"/>

2. Please mark the most important items affecting your health (maximum of 5 items) _____ ↑

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 SNOT-22 Developed from modification of SNOT-20 by National Comparative Audit of Surgery for Nasal Polyposis and Rhinosinusitis
 Royal College of Surgeons of England.

DISCUSSION

This study mainly aims to assess the effectiveness of septoplasty in patients with deviated nasal septum (DNS) using the SNOT 22 questionnaire. Septoplasty is a surgical procedure commonly used for DNS to relieve nasal obstruction and other associated symptoms. These findings provide us with valuable results on the impact of septoplasty on nasal function and overall quality of life.

Pre-op and post-op SNOT - 22 Questionnaire was used in a previous study which showed significant improvement in the need to blow nose, loss of smell or taste

sneezing, cough, running nose, nasal obstruction, post nasal discharge, facial pain/pressure, difficulty in falling asleep, waking up at night, lack of good night's sleep, wake up tired, reduced productivity and embarrassed ($p < 0.005$) (1). Which was correlating with our study with similar results.

The majority had nasal symptoms, which showed significant improvement post-surgery which was similarly reported in previous studies. (2,4,8).

Medeiros N, et al said, in their sample, disease-specific QoL significantly improved in the post-operative period which was assessed using the SNOT-22 questionnaire. (9) Which was similarly reported in our study.

The Pre-SNOT score mean was 33.3 and the post-SNOT score mean was 9.54 with a difference of 23.76. whereas in the previous study, was mean total pre-SNOT score was 26.93 & the total post-SNOT score was 17.01 with a mean difference of 9.92. (1)

The Sino-Nasal Outcome Test 22 (SNOT-22) is widely recognized as a valuable tool in assessing sinonasal symptoms. Combining both rhinology and general health issues, it offers a comprehensive evaluation of patient-reported outcomes. Its reliability, validity, responsiveness, and ease of use make it the preferred choice among patient-reported outcome measures for sinonasal conditions (5).

Post-operative scores for sadness, frustration, and feelings of shame which reflect emotional and psychological symptoms had a significant reduction post-surgery which gives a positive sign of septoplasty (3).

It is very essential to consider associated factors such as Obstructive sleep apnoea, smoking, and asthma before proceeding with septoplasty (3, 10).

However, it is important to note that certain symptoms, such as dizziness or vertigo, earache, and difficulty feeling smells or tastes, did not show significant improvement post-surgery (1). These findings suggest that septoplasty mainly addresses nasal symptoms, it may have limited impact on certain non-nasal symptoms, possibly due to underlying aetiologies or comorbidities [10].

SNOT 22 Scoring is not only essential for assessing pre-op and postoperative symptom analysis in septoplasty it is also useful in other nasal conditions like chronic rhinosinusitis and nasal polyps (6, 7).

Therefore SNOT 22 score was essential to assess the importance of the symptoms preoperatively selecting the patient for the surgery and assessing the improvement in symptoms postoperatively assessing the surgical intervention (1, 2).

CONCLUSION

SNOT 22 scoring was very essential to assess the severity of symptoms preoperatively and improvement in symptoms following surgery, which reflected the patient's positive impact on surgery with relief of symptoms.

Declarations

Statements and Declarations: No funding was received to assist with the preparation of this manuscript. The authors have no relevant financial or non-financial interests to disclose.

All authors contributed to the research article. All authors read and approved the final manuscript.

Ethical committee approval was obtained to carry out this study.

Informed Consent was obtained from the patient for investigations used in this manuscript.

Competing Interests: Authors have declared that no competing interests exist.

References

- 1) HS Satish, KT Sreedhar, Septoplasty Outcome Using Snot- 22 Questionnaire Study. IOSR-JDMS. May - Jun. 2013; 6(5): 34-38.
- 2) Poirrier, A. L., Ahluwalia, S., Goodson, A., Ellis, M., Bentley, M., & Andrews, P. (2013). Is the Sino-Nasal Outcome Test-22 a suitable evaluation for septorhinoplasty? *The Laryngoscope*, 123(1), 76–81.
- 3) Dizdar, D., Bozan, A., Dizdar, S. K., Göde, S., & Alpay, H. C. (2019). Evaluation of nasal symptoms in septoplasty patients using SNOT-22. *Acta otorhinolaryngologica Italica : organo ufficiale della Societa italiana di otorinolaringologia e chirurgia cervico-facciale*, 39(2), 98–102.
- 4) Buckland, J. R., Thomas, S., & Harries, P. G. (2003). Can the Sino-nasal Outcome Test (SNOT-22) be used as a reliable outcome measure for successful septal surgery? *Clinical otolaryngology and allied sciences*, 28(1), 43–47
- 5) Plath, M., Sand, M., Cavaliere, C., Plinkert, P. K., Baumann, I., & Zaoui, K. (2023). Normative data for interpreting the SNOT-22. *Acta otorhinolaryngologica Italica : organo ufficiale della Societa italiana di otorinolaringologia e chirurgia cervico-facciale*, 43(6), 390–399.
- 6) Kennedy, J. L., Hubbard, M. A., Huyett, P., Patrie, J. T., Borish, L., & Payne, S. C. (2013). Sino-nasal outcome test (SNOT-22): a predictor of postsurgical improvement in patients with chronic sinusitis. *Annals of Allergy, asthma & immunology: official publication of the American College of Allergy, Asthma, & Immunology*, 111(4), 246–251.e2.
- 7) Khan, A. H., Reaney, M., Guillemin, I., Nelson, L., Qin, S., Kamat, S., Mannent, L., Amin, N., Whalley, D., & Hopkins, C. (2022). Development of Sinonasal Outcome Test (SNOT-22) Domains in Chronic Rhinosinusitis with Nasal Polyps. *The Laryngoscope*, 132(5), 933–941.
- 8) McKee, O'Neill, Roberts, t. h. j. lesser, Nasal airflow after septorhinoplasty. *Clin. Otolaryngol.* June 1994;19(3): 254-257.
- 9) Medeiros, N., Aguiar, C., Pina, P., Lima, N. B., Larangeiro, J., & Condé, A. (2022). Disease-Specific Vs Non-Specific Questionnaires on Septoplasty Outcomes. *Iranian journal of otorhinolaryngology*, 34(122), 163–170.
- 10) Qu, X. X., Esangbedo, I. C., Zhang, X. J., Liu, S. J., Li, L. X., Gao, S., & Li, M. (2015). Obstructive Sleep Apnea Syndrome is Associated with Metabolic Syndrome among Adolescents and Youth in Beijing: data from Beijing Child and Adolescent Metabolic Syndrome Study. *Chinese Medical Journal*, 128(17), 2278–2283.