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Evaluating the Effectiveness of Septoplasty for Nasal Obstruction: An Outcome-Based Study

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ABSTRACT

Introduction: The nasal obstruction causes difficulty in breathing, reduces the sleep and the daily activities of life. The deviated nasal septum is a common cause of the nasal obstruction. The septoplasty can improve the airflow. The local data from the Pakistan are limited. The study aimed to measure the outcomes of the septoplasty in the adults with the deviated nasal septum.

Objective: The study measured change in nasal obstruction symptoms after septoplasty using the Nasal Obstruction Symptom Evaluation score at twelve weeks after surgery.

Methodology: The prospective study included 94 adults with nasal septal deviation from inpatient and outpatient department not responded the medical therapy. This multicenter study was conducted at Bolan Medical College Quetta and Jhalawan Medical College Khuzdar. The septoplasty was performed under the standard procedures. The symptoms were recorded before the surgery and at the two to twelve weeks after the surgery using the Nasal Obstruction Symptom Evaluation score and the visual analog scale. The data were analyzed to compare the preoperative scores and the postoperative scores to measure the treatment effectiveness.

Results: The mean age was **32.8±10.4 years**. The **59(62.8%)** were **males** and remaining were females. The **61(64.9%)** were from urban areas, while **33(35.1%)** were from rural areas. The mean **duration** of symptoms was **18.6±7.2 months**. Left sided deviated nasal symptoms was founded in **41(43.6%)**, right sided was in **38(40.4%) patients**.

Conclusion: The septoplasty significantly reduced the nasal obstruction in the adults. The patients reported the better airflow and the symptom relief.

INTRODUCTION:

The nasal obstruction is one of the most frequent complaints in the otorhinolaryngology (ORL) practice. It affects the breathing at the rest and during the activity. It disturbs the sleep plus the concentration. It reduces the work productivity plus the overall quality of the life. The causes are multifactorial. These include the allergic rhinitis, the infections, the turbinate hypertrophy and the structural abnormalities. The deviated nasal septum (DNS) is the most common structural cause (1). The DNS may be congenital or acquired after the trauma. It reduces the nasal airway patency by narrowing the one or the both nasal passages. The epidemiological studies report the DNS in up to the 80% of the adults although all of them are not symptomatic. The symptomatic DNS contributes to the snoring, the sleep related breathing disorder, the recurrent sinus infections and the increased healthcare utilization. The condition affects the both sexes and all the age groups but is more frequently addressed surgically in the adults. The public health impact is significant because of the repeated clinic visits, the long term medication use and the indirect costs related to the impaired daily functioning. The preventive measures address the allergens plus the infections but they do not correct the structural deviation. The surgery therefore remains a key therapeutic option for the selected patients (2).

The septoplasty (SP) is the standard surgical treatment for the DNS caused by the septal deviation. The procedure aims to straighten the nasal septum while preserving the structural support. It is performed worldwide and is considered safe when done by the trained surgeons. The previous studies reported the improvement in the subjective nasal airflow, the sleep quality and the patient satisfaction after the SD. The objective measures such as the rhinomanometry and the acoustic rhinometry also showed the postoperative improvement in the selected studies (3). The patient reported outcome measures especially the Nasal Obstruction Symptom Evaluation (NOSE) score are widely used to assess the surgical benefit. The systematic reviews and the cohort studies published over the past decade showed the clinically meaningful symptom reduction after the surgery in the most patients. The complication rates are generally low and include the bleeding, the septal hematoma, the infection, the synechiae and the perforation. The most of the complications are minor and manageable. Despite the widespread use the reported success rates vary across the studies ranging from the moderate to the high depending on the patient selection the outcome tools and the follow up duration (4).

The several studies also compared the SP with the continued medical therapy. These studies showed that the SP provided the greater and the more sustained symptom relief in the patients with the structural obstruction who failed the adequate medical treatment. The randomized and the pragmatic trials reported the better NOSE score improvement and the higher patient satisfaction after the SP compared with the non-surgical management. However, many earlier studies used the heterogeneous methods. Some relied only on the subjective improvement without the standardized tools (5). Others included the combined procedures such as the turbinate surgery which made it difficult to isolate the true effect of the SP. The follow up periods were often short and the baseline severity was not always stratified. The recent observational studies emphasized the importance of the outcome based evaluation using the validated instruments and the clearly defined effectiveness criteria. The regional studies from the South Asia also reported the favorable outcomes but most were limited by the small sample sizes and the single center designs (6).

The despite the available evidences on the topic, but important knowledge gaps remain present. The outcomes data after the SP are not uniform across the populations and the healthcare settings. The relationship between the baseline symptom severity and the postoperative improvement is still debated. The minimum clinically important change in the patient reported scores is not consistently applied. The data from the low and the middle income regions are limited particularly from the underserved areas (7). In the Pakistan the published studies are few and often lack the standardized outcome measures or the prospective design. There is the scarce data from the Baluchistan, where the environmental factors, the access to the care and the disease patterns may differ from the other regions. The local complication rates, the patient reported effectiveness and the short term outcomes are not well documented. The lack of the context specific

evidence limits the informed patient counseling and the service planning (8).

The study is undertaken to address the gaps by providing the prospective outcome based evidence from the tertiary care center in the Quetta. It aims to evaluate the effectiveness of the SP using the validated patient reported tools in the adults with the symptomatic DNS who failed the medical therapy (9). By measuring the changes in the NOSE score and the visual analog scale (VAS) score before and after the surgery the study seeks to generate the reliable local estimates of the symptom improvement and the safety. The findings will inform the clinicians and support the evidence based decision making. The findings will also contribute the national data to the existing literature. The primary objective is to assess the change in the nasal obstruction symptoms at the 12 weeks after the SP directly linking the research question to the identified knowledge gap (10).

MATERIALS AND METHODS

The multicenter prospective outcome based observational study was conducted in the Department of the ORL at the Bolan Medical College Quetta and Jhalawan Medical College Khuzdar. These departments were serving as the tertiary care hospitals for the urban populations and the rural populations of the Baluchistan. The patients were recruited from inpatient and outpatient department ORL admitted for the elective SP were evaluated. The study environment included the standard outpatient examination rooms, the endoscopy facilities and the operating theatres equipped for the routine nasal surgery. The study duration was planned for the 12 months. The enrollment and the follow up started only after the formal ethical approval. All the eligible patients underwent the baseline assessment, the surgical intervention and the structured follow up within the same institution to maintain the uniformity of the care and the outcome assessment. The observational design was selected to measure the real world effectiveness of the SD under the routine clinical conditions rather than under the experimental constraints.

A sample size of 94 was calculated using the openEPI sample size calculator for the effectiveness of SD in relieving nasal obstruction among patients with a DNS, based on a population size of 151, an assumed outcome proportion of 80.1% with $\pm 5\%$ precision ($d = 5\%$), a 95% confidence level, and a design effect of 1 (simple random sampling).

The study was initiated after the approval from the Institutional Review Board of the Bolan University of Medical and Health Sciences Quetta (IRB No. 1062/BUMHS/IRB/24 dated 10.01.2024 Annexure I). The ethical principles outlined in the Declaration of the Helsinki were followed throughout the study. All the participants were informed about the study objectives the procedures the benefits and the possible risks in the simple language. The written informed consent was obtained from each participant before the enrollment (Annexure II). The confidentiality was ensured by assigning the coded identification numbers to all the data forms. The personal identifiers were not entered into the electronic database. The participation was voluntary and the patients retained the right to withdraw at any stage without affecting the standard medical care. Any adverse event related to the surgery was documented and managed The participants were selected using the non-probability consecutive sampling technique. All the eligible adult patients presenting with the nasal obstruction due to the DNS were screened in the outpatient department or admitted electively for the surgery. The adults aged 18 to 65 years were eligible for this study. The inclusion criteria comprised of the symptomatic nasal obstruction primarily attributed to the septal deviation confirmed by the anterior rhinoscopy or the nasal endoscopy and the failure of the adequate medical therapy for at least the four weeks. The medical therapy included the intranasal corticosteroids and the saline irrigation. The patients had to be fit for the anesthesia and willing to undergo the surgery and the follow up visits. The exclusion criteria included the previous septal surgery, the presence of the sinonasal polyposis, the chronic rhinosinusitis with the polyps, the acute nasal infection the craniofacial anomalies, the pregnancy, the recent nasal trauma within the three months, the uncontrolled allergic rhinitis and the planned extensive concomitant nasal procedures likely to alter the airflow independently. The demographic data such as the age and the sex were collected by the direct patient interview and recorded as the self-reported. The ethnicity was not used as the

selection variable. These criteria ensured the homogeneous study population in which the septal deviation was the primary cause of the obstruction.

The data were collected using the structured proforma (Annexure III). The baseline assessment included the demographic details the duration of the symptoms the comorbid conditions and the nasal examination findings. The nasal obstruction severity was measured using the NOSE score questionnaire which produces the score from 0 to 100 with the higher scores indicating the worse symptoms. The VAS ranging from 0 to 10 was also used to assess the subjective nasal blockage. The anterior rhinoscopy and the rigid nasal endoscopy were performed using the 0-degree rigid nasal endoscope (Karl Storz SE & Co KG Tuttlingen Germany). The SP was performed under the general anesthesia by the senior residents under the consultant supervision using the standard surgical techniques. The limited turbinate reduction was performed only when the clinically indicated. The postoperative care followed the departmental protocols. The patients were reviewed at the 2, the 6 and the 12 weeks after the surgery. The NOSE and the VAS scores were recorded at each visit. The complications such as the bleeding, the septal hematoma, the infection the synechiae or the perforation were recorded for up to the 30 days after the surgery. The data collectors were trained before the study initiation and the pilot testing was performed on the 10 patients to ensure the clarity and the consistency.

The data were entered into the secure electronic database with the double entry verification to minimize the errors. The statistical analysis was performed using the SPSS version 26 (IBM Corp Armonk NY USA). The continuous variables were summarized as the mean with the standard deviation (Mean \pm SD). The categorical variables were expressed as the frequencies and the percentages n (%). The primary analysis compared the preoperative and the postoperative NOSE scores at the 12 weeks using the paired t-test for the normally distributed data or the Wilcoxon signed rank test for the non-normal data. The mean change with the 95% confidence intervals and the effect size were reported. The secondary analyses included the comparison of the VAS scores and the calculation of the proportion of the patients achieving the predefined effectiveness criteria. The complication rates were calculated with the 95% confidence intervals. The exploratory subgroup analyses were conducted based on the baseline severity and the demographic variables using the appropriate statistical tests. The missing data were handled using the complete case analysis with the sensitivity analysis planned if the missing data exceeded the 5%. The two sided p-value of less than the 0.05 was considered the statistically significant.

RESULTS

The mean age of the participants was **32.8 \pm 10.4 years**. There were **59 males**, comprising **62.8%** of the study population. A total of **61 participants (64.9%)** belonged to urban areas, while **33 participants (35.1%)** were from rural areas. The mean **duration** of symptoms was **18.6 \pm 7.2 months**. The baseline demographic and the clinical characteristics of the study participants are summarized in the Table 1.

Table 1. Baseline Demographic and Clinical Characteristics of Study Participants (n = 94)

Variable	Category / Value	n (%) or Mean \pm SD
Comorbidities*	Hypertension	12 (12.8)
	Diabetes mellitus	9 (9.6)
	Allergic rhinitis	21 (22.3)
	Asthma	7 (7.4)
Primary presenting complaint	Nasal obstruction	94 (100)

*Multiple responses possible

The left sided DNS was founded in **41 (43.6%) patients**, right sided DNS was reported in **38 (40.4%) patients** and bilateral DNS was noted in **15 (16.0%) patients**. The grade of deviation was mild in **18 (19.1%) patients**, moderate in **46 (48.9%) patients** and was severe in **30 (31.9%) patients**. The detailed baseline nasal examination findings and the surgical characteristics are summarized in the table 2.

Table 2. Baseline Nasal Examination Findings and Surgical Characteristics (n = 94)

Variable	Category	n (%)
Associated findings	Septal spur	27 (28.7)
	Turbinate hypertrophy	19 (20.2)
Type of anesthesia	General	87 (92.6)
	Local with sedation	7 (7.4)
Surgical procedure	Standard SD	77 (81.9)
	SD + turbinate reduction	17 (18.1)
Surgeon level	Consultant	58 (61.7)
	Senior resident	25 (26.6)
	Junior resident (supervised)	11 (11.7)

Both NOSE and VAS scores showed a statistically and clinically significant reduction at 12 weeks after SD. The table 3 demonstrates the comparison of pre-operative and post-operative NOSE and VAS scores.

Table 3. Comparison of Pre-operative and Post-operative NOSE and VAS Scores

Outcome Measure	Baseline Mean ± SD	12-Week Mean ± SD	Mean Change (95% CI)	Statistical Test	p-value
NOSE score (0–100)	67.5 ± 11.3	18.3 ± 7.1	-49.2 (-52.1 to -46.3)	Paired t-test	<0.001
VAS score (0–10)	7.1 ± 1.4	1.6 ± 0.9	-5.5 (-5.9 to -5.1)	Paired t-test	<0.001

The effectiveness outcomes and the postoperative safety data are presented in the Table 4. The seventy-eight (83.0%) achieved the ≥ 30 -point reduction in the NOSE score and the 74 (78.7%) attained the $\geq 50\%$ reduction in the VAS score. The overall 82 patients (87.2%) met the predefined criteria for the effectiveness. The postoperative complications within the 30 days were infrequent with the 86 patients (91.5%) experiencing no complications. The minor complications included the bleeding in the 3 (3.2%) the septal hematoma in the 2 (2.1%) the synechiae in the 2 (2.1%) and the infection in the 1 patient (1.1%) while no the perforations were reported. The effectiveness was significantly associated with the baseline NOSE severity ($p = 0.002$) whereas the age group and the sex showed no significant influence on the outcomes.

Table 4. Effectiveness Outcomes, Complications, and Exploratory Associations (n = 94)

Variable	Category	n (%)	Statistical Test	p-value
Baseline NOSE severity vs effectiveness	Significant association	—	Chi-square	0.002
Age group vs effectiveness	No significant association	—	Chi-square	0.418
Sex vs effectiveness	No significant association	—	Chi-square	0.536

DISCUSSION

The study demonstrated that the SP significantly improved the nasal obstruction in the adults with the DNS. The postoperative NOSE and the VAS scores showed the marked reductions compared to the baseline indicating the clinically meaningful symptom relief. The most patients achieved the ≥ 30 -point reduction in the NOSE scores and the $\geq 50\%$ reduction in the VAS scores by the 12 weeks confirming the procedure's effectiveness. The complications were infrequent and the minor including the bleeding, the septal hematoma, the synechiae and the nasal infection. The effectiveness was significantly associated with the baseline severity while the age and the sex had no influence consistent with the prior studies showing that the higher preoperative symptom burden predicts the greater improvement (11). These findings align with the international and the regional studies demonstrating the safety and the efficacy of the SP and highlight the value as the preferred intervention for the symptomatic structural obstruction when the medical therapy fails (12). The standardized surgical technique and the careful patient selection likely contributed to the high success rates observed in this study (11-13).

These results indicate that the SP effectively reduces the subjective nasal obstruction in the real world clinical practice. The marked reduction in the NOSE and the VAS scores reflects the both objective improvement in the nasal airflow and the enhanced patient perception of the breathing ease. This supports the hypothesis that the SP provides the clinically significant symptom relief. The observed association between the baseline severity and the postoperative outcome suggests that the patients with the more severe preoperative obstruction experience the greater perceptible benefit likely due to the larger scope for the improvement (14). The minor postoperative complications such as the bleeding the septal hematoma or the synechiae resolved without the long term morbidity. These findings align with the prior studies demonstrating the high effectiveness and the safety of the SP for the symptomatic DNS (15).

These findings are consistent with the recent global research supports the effectiveness of the SP in relieving the nasal obstruction. The meta-analysis and the randomized trials reported the significant improvement in the NOSE and the VAS scores at the 6 and the 12 months after the SP compared with the non-surgical management with the low complication rates reinforcing the role of the surgical intervention in the symptomatic DNS (16). The recent international study using the NOSE scores also demonstrated the large reductions in the subjective obstruction after the SP with or without the turbinate surgery (17). In the Pakistan the studies have shown the similar effectiveness and the patients undergoing the SD with or without the turbinoplasty reported the high satisfaction and the improved nasal obstruction (18). The differences in the magnitude between the studies may be due to the sample size, the follow up duration and the technique variations. But the overall direction of the benefit is the consistent.

The study has the several strengths that enhance the confidence of the patients. The its prospective outcome based design using the standardized and the validated measures (NOSE and VAS) ensures the reliable assessment of the symptom improvement. The systematic follow up at the 2 the 6 and the 12 weeks allowed the consistent capture of the postoperative outcomes minimizing the information bias. The relatively large cohort from the tertiary referral center provides the real world evidence in the population underrepresented in the literature particularly from the Baluchistan (19). The including the both subjective assessments and the exploratory subgroup analyses adds the clinical relevance by identifying the factors associated with the treatment effectiveness and the baseline symptom severity (20). These methodological strengths increase the generalizability and the applicability of the results to the similar clinical settings (21).

The despite its strengths the study has the several limitations. The being the single center study may limit the generalizability to the other healthcare settings or the populations with the different environmental exposures and the access to the care. The follow up was restricted to the 12 weeks which may not capture the long term symptom stability and the recurrence or the late complications (22). The objective airflow measurements such as the rhinomanometry or the acoustic rhinometry were not included which could have provided the complementary physiological data to the patient reported outcomes (23). The additionally the use of the non-probability consecutive sampling introduces the potential selection bias possibly affecting the

representativeness. The however this approach was the pragmatic in the clinical context ensuring the feasible enrollment and the consistent care. The acknowledging these limitations helps the contextualize the findings while preserving the relevance of the results (24).

The clinical implications of these findings are the significant. The SD should be considered the primary intervention for the adults with the symptomatic DNS who have not adequately responded to the medical therapy (25). The substantial reduction in the NOSE and the VAS scores demonstrates the meaningful improvement in the nasal airflow the quality of the life the sleep and the daily functioning (26). The baseline NOSE severity can guide the clinicians in the counseling of the patients as the those with the higher initial scores are likely to experience the greater perceptible benefit. The additionally these results can inform the surgical resource allocation and the planning in the tertiary ENT centers optimizing the patient care and the managing the high demand (27). The overall outcome based evidence reinforces the SD as the effective patient centered intervention for the structural nasal obstruction.

The future research should expand upon this study by conducting the multicenter investigations with the larger and the more diverse populations to enhance the generalizability (28). The extended follow up periods of the 6–12 months or the longer are needed to evaluate the durability of the symptom relief and capture the late outcomes such as the revision surgery rates (29). The comparative trials assessing the different surgical techniques including the endoscopic versus the open SD and the variations in the turbinate management alongside the objective airflow measurements like the rhinomanometry would clarify the optimal approaches. Additionally the studies examining the cost effectiveness and the broader patient reported quality of the life metrics beyond the NOSE and the VAS scores would provide the valuable evidence for the healthcare planning and the policy particularly in the low and the middle income countries (30).

Finally, these findings highlight the importance of the using the standardized patient reported outcome measures such as the NOSE and the VAS scores in the routine clinical practice. The regular application of these tools allows the clinicians to objectively monitor the patient progress, the tailor the postoperative care and the involve the patients in the shared decision making regarding the treatment (31). The study demonstrates that the SD when performed for the appropriate indications and with the proper surgical technique provides the significant relief of the nasal obstruction with the minimal complications (32). These results reinforce the SD as the key intervention for the adults with the symptomatic DNS particularly in the tertiary care settings supporting the evidence based clinical practice and the optimal allocation of the surgical resources (33).

CONCLUSION

This study confirms that the SD is the effective and the safe intervention for the adults with the symptomatic DNS. The patients experienced the significant improvement in the nasal airflow and the reduced obstruction as reflected in the NOSE and the VAS scores. The effectiveness was the greatest in the those with the more severe baseline symptoms. The minor complications were infrequent and the resolved quickly. The standardized outcome measures are the valuable for the monitoring and the guiding the care in the routine clinical practice (1–3).

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REFERENCES

- Carrie S, O'Hara J, Fouweather T, Homer T, Rousseau N, Rooshenas L, et al. **Clinical Effectiveness of Septoplasty Versus Medical Management for Nasal Airway Obstruction: Multicentre, Open Label, Randomised Controlled Trial.** *BMJ.* 2023;383: e075445. DOI:10.1136/bmj. e075445. DOI: 10.3310/MVFR4028
- National Institute for Health and Care Research (NIHR). **Effectiveness of Septoplasty Compared to Medical Management in Adults with Obstruction Associated with A Deviated Nasal Septum: The NAIROS RCT.** *Health Technol Assess.* 2023;28(10):1–350. DOI: <https://doi.org/10.3310/MVFR4028>
- van Egmond MMHT, Rovers MM, Tillema AHJ, Hendriks CTM, van Heerbeek N. **Septoplasty for Nasal Obstruction Due to A Deviated Nasal Septum in Adults: A Multicenter Prospective Study.** *Rhinology.* 2023;61(4):320–8. URL: <https://www.rhinologyjournal.com/>
- Shafaq Z, Niazi SA, Maqbool S, Khalid A, Riaz Y, Sulman M. **Improvement of Nasal Obstruction Symptoms After Septoplasty with or Without Turbinoplasty.** *Pak Armed Forces Med J.* 2023;73(6):1804–7. DOI: <https://doi.org/10.51253/pafmj.v73i6.10505>
- Feng Z, Yang L, Li J, et al. **Efficacy of Septoplasty for Nasal Obstruction: A Systematic Review and Meta-Analysis of Randomized Controlled Trials.** *Laryngoscope Investig Otolaryngol.* 2025;10(2):450–62. DOI: 10.1002/lio2.70141
- Alessandri Bonetti M, Costantino A, Cottone G, Cardone F, Persichetti P, Vaianti L. **Efficacy of Septoplasty in Patients with Nasal Obstruction: A Systematic Review and Meta-Analysis.** *Laryngoscope Investig Otolaryngol.* 2023;133(12):3237–46. DOI:10.1002/lary.30684
- Rajput MI, Mahar GS, Ansari NA, Khaskhili MS, Irfan R, Meraj M. **Analyze and Compare Pain Level and Complications of Septoplasty with and Without Splints and Packing.** *J Pharm Res Int.* 2022;34(39A):80–5. DOI:10.9734/JPRI/2022/v34i39A36321
- Stewart MG, Smith TL, Weaver EM, et al. **Outcomes After Nasal Septoplasty: Results from The Nasal Obstruction Septoplasty Effectiveness (NOSE) Study.** *Otolaryngol Head Neck Surg.* 2004;130(3):283–90. DOI: 10.1016/j.otohns.2003.12.004
- Aboul Hosn R, Cooper F, Wong Ah See K, Vallamkondu V. **Septoplasty Waiting List Validation Using the Nasal Obstruction Symptom Evaluation Score: A Quality Improvement Project.** *Scott Med J.* 2025; Online ahead of print. DOI:10.1177/00369330251394181
- Yaqoob N, Yousuf S, Lakhari AA, Ali A, Kumar A, Khan F. **Septoplasty in Focus: Clinical Outcomes and Complication Patterns in A Pakistani Cohort.** *Pakistan J Health Sci.* 2025;6(7):263–7. DOI:10.54393/pjhs. v6i7.3343
- Majumder AS, Hossen MI, Mahmud Z, Choudhury MA. **Clinical Evaluation of Septoplasty with and Without Additional Nasal Procedures.** *Int Surg J.* 2025;12(6):920–5. DOI: <https://doi.org/10.18203/2349-2902.isj20251531>
- Carrie S, O'Hara J, Fouweather T, Homer T, Rousseau N, Rooshenas L, et al. **Clinical Effectiveness of Septoplasty Versus Medical Management for Nasal Airways Obstruction: Multicentre, Open Label, Randomised Controlled Trial.** *BMJ.* 2023 Oct 18;383: e075445. DOI: 10.1136/bmj-2023-075445.
- Ubaidullah, Mansoor Alam, Tahir Muhammad, Muhammad Usman, Shafiq Ahmad, Zakirullah. **Effectiveness of Septoplasty in Relieving Nasal Obstruction in Patients with Deviated Nasal Septum.** *J Saidu Med Coll.* 2022;12(2):71–4. DOI: <https://doi.org/10.52206/jsmc.2022.12.2.663>

- Elfallah B. **The Efficiency of Septoplasty in Improving Nasal Symptoms Caused by Deviated Nasal Septum in Benghazi, Libya.** *Int J Otorhinolaryngol Head Neck Surg.* 2025;11(3):201–6. DOI:10.18203/issn.2454-5929.ijohns20251497
- Haye R, Døsen LK, TarAngen M, Gay C, Pripp AH, Shiryayeva O. **Septoplasty: Defining A Desirable Clinical Outcome According to Baseline Symptom Scores.** *Front Surg.* 2025; 12:1471526. DOI:10.3389/fsurg.2025.1471526
- Merino-Galvez E, Gómez-Hervás J. **Evaluation of Nasal Obstruction Following Septoturbinoplasty Using The VAS and NOSE Scale.** *Iran J Otorhinolaryngol.* 2024;36(1):335–42. DOI: 10.22038/IJORL.2023.75824.3541
- Sai Shree PV, Nagarathna HK, Saritha HM, Udayabhanu HN. **Septoplasty Outcomes On Chronic Nasal Obstruction and Quality of Life Using NOSE and VAS Questionnaire.** *Int J Sci Res.* 2025 Aug. DOI:10.36106/ijsr/1813995
- Srinivasan DG, Hegde J, Ramasamy K, Raja K, Rajaa S, Ganesan S, et al. **Comparison of The Efficacy of Septoplasty with Nonsurgical Management in Improving Nasal Obstruction in Patients with Deviated Nasal Septum – A Randomized Clinical Trial.** *Int Arch Otorhinolaryngol.* 2022;26(2): e226–32. DOI: 10.1055/s-0041-1730993
- Jerath V, Kumar D, Swami H, Singh SK, Gupta V, Chugh R, et al. **Evaluation of Septoplasty Based On Acoustic Rhinometry Parameters in Indian Population.** *J Mar Med Soc.* 2025;27(3):334–8. DOI: 10.4103/jmms.jmms_180_24
- Green A, Wei EX, Kandathil CK, Youn GM, Shah JP, Most SP. **Evaluating The Effectiveness of Septoplasty for Nasal Valve Collapse: A Retrospective Study.** *Facial Plast Surg Aesthet Med.* 2024;26(5):613–4. DOI:10.1089/fpsam.2023.0218
- Wu Y, Yu T, Zhang Z, Wang X, Gao S. **The Benefits of Septoplasty for Patients with Deviated Nasal Septum and Allergic Rhinitis: A Meta-Analysis.** *Sci Rep.* 2024; 14:28855. DOI:10.1038/s41598-024-28855
- Pedersen LA, Dølvik S, Holmberg K, Emanuelsson CA, Johansson H, Schiöler L, Hellgren J, Steinsvåg S. **Surgery to Relieve Nasal Obstruction: Outcome for 366 Patients Operated On by One Senior Surgeon.** *Eur Arch Otorhinolaryngol.* 2021;278(10):3867–75. DOI:10.1007/s00405-021-06696-7
- Fearington FW, Awadallah AS, Hamilton GS 3rd, Olson MD, Dey JK. **Long-Term Outcomes of Septoplasty with or Without Turbinoplasty: A Systematic Review.** *Laryngoscope.* 2024;134(6):2525–37. DOI:10.1002/lary.31193
- Kayani SS, Sheikh MM, Riaz M, Nazir A. **Comparative Study of Outcome in Septoplasty with and Without Postoperative Intranasal Plastic Splints.** *IJBR.* 2025;3(4):401–7
- Gandomi B, Bayat A, Kazemi T. **Outcomes of Septoplasty in Young Adults: The Nasal Obstruction Septoplasty Effectiveness Study.** *Am J Otolaryngol.* 2009;31(3):189–92. DOI: 10.1016/j.amjoto.2009.02.023
- Haque M, Mukhopadhyay S. **Objective and Subjective Analysis for Efficaciousness of Nasal Airway in Patients Undergoing Conventional and Endoscopic Septoplasty: A Comparative Study.** *Indian J Otolaryngol Head Neck Surg.* 2022;74(Suppl 3):4816–23. doi:10.1007/s12070-022-03120-2
- Green A, Wei EX, Kandathil CK, Youn GM, Shah JP, Most SP. **Evaluating The Effectiveness of Septoplasty for Nasal Valve Collapse: A Retrospective Study.** *Facial Plast Surg Aesthet Med.* 2024;26(5):613-614. DOI:10.1089/fpsam.2023.0218
- Wu Y, Yu T, Zhang Z, Wang X, Gao S. **The Benefits of Septoplasty for Patients with Deviated Nasal Septum and Allergic Rhinitis: A Meta-Analysis.** *Sci Rep.* 2024; 14:28855. doi:10.1038/s41598-024-28855
- Pedersen LA, Dølvik S, Holmberg K, Emanuelsson CA, Johansson H, Schiöler L, Hellgren J, Steinsvåg S. **Surgery to Relieve Nasal Obstruction: Outcome for 366 Patients Operated On by One Senior Surgeon.** *Eur Arch Otorhinolaryngol.* 2021;278(10):3867-3875. DOI:10.1007/s00405-021-06696-7

- Fearington FW, Awadallah AS, Hamilton GS 3rd, Olson MD, Dey JK. **Long-Term Outcomes of Septoplasty with Or Without Turbinoplasty: A Systematic Review.** Laryngoscope. 2024;134(6):2525-2537. DOI:10.1002/lary.31193
- Kayani SS, Sheikh MM, Riaz M, Nazir A. **Comparative Study of Outcome in Septoplasty with and Without Postoperative Intranasal Plastic Splints.** IJBR. 2025;3(4):401-407
- Haque M, Mukhopadhyay S. **Objective and Subjective Analysis for Efficaciousness of Nasal Airway in Patients Undergoing Conventional and Endoscopic Septoplasty: A Comparative Study.** Indian J Otolaryngol Head Neck Surg. 2022;74(Suppl 3):4816-4823. DOI:10.1007/s12070-022-03120-2
- Elfallah B. **The Efficiency of Septoplasty in Improving Nasal Symptoms Caused by Deviated Nasal Septum in Benghazi, Libya.** Int J Otorhinolaryngol Head Neck Surg. 2025;11(3):201–6. DOI:10.18203/issn.2454-5929.ijohns20251497