ORIGINAL RESEARCH

A Comparative Study on Septoplasty Techniques: Endoscopic-Assisted versus Traditional Approaches Assessed by the NOSE Scale

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ABSTRACT
Background: Nasal obstruction due to deviated nasal septum (DNS) significantly affects quality of life and is a common indication for septoplasty. Traditional septoplasty has been the standard approach, but endoscopic-assisted septoplasty offers improved visualization and potentially superior outcomes. Objective comparison of these two techniques using patient-reported outcomes is essential.**Aim:** To evaluate and compare the functional outcomes of endoscopic-assisted septoplasty and traditional septoplasty in patients with DNS using the Nasal Obstruction Symptom Evaluation (NOSE) scale.**Material and Methods:** This prospective, comparative study included 50 adult patients (25 in each group) with symptomatic DNS. Group A underwent endoscopic-assisted septoplasty, while Group B received traditional septoplasty. All patients were assessed preoperatively and at 1 and 3 months postoperatively using the NOSE scale. Statistical analysis was performed using paired and unpaired t-tests, with $p < 0.05$ considered significant.**Results:** Baseline demographic and clinical parameters were comparable between groups. Both groups showed significant symptomatic improvement postoperatively ($p < 0.001$). At 1 and 3 months, Group A showed significantly lower mean NOSE scores (26.40 ± 7.90 and 18.80 ± 6.70) compared to Group B (33.20 ± 8.40 and 26.00 ± 7.20), with p-values of 0.017 and 0.003, respectively. Over 70% improvement in NOSE scores was achieved in 80.00% of Group A and 56.00% of Group B patients. Complication rates were lower in the endoscopic-assisted group.**Conclusion:** Endoscopic-assisted septoplasty offers superior functional outcomes, better symptom relief, and fewer complications compared to traditional septoplasty. It should be considered the preferred surgical approach for DNS correction.

Keywords: Deviated nasal septum, Endoscopic-assisted septoplasty, Traditional septoplasty, Nasal obstruction, NOSE scale.

INTRODUCTION

Nasal obstruction is a common complaint in otolaryngology practice, affecting patients' quality of life by interfering with breathing, sleep, and physical activity. Deviated nasal septum (DNS) remains one of the most frequent causes of chronic nasal obstruction worldwide. It has been estimated that DNS affects up to 80% of the population to some degree, with varying degrees of symptomatic presentation ranging from mild airflow disturbance to severe nasal blockage requiring surgical

intervention.[1]Septoplasty, the surgical correction of DNS, remains the most frequently performed surgical procedure of the nasal cavity. The primary aim of septoplasty is to improve nasal airflow and alleviate obstructive symptoms, restoring normal nasal physiology and patient comfort.[2]

Traditional septoplasty, first described over a century ago, has undergone many modifications. It is conventionally performed through a direct nasal approach using a headlight and nasal speculum for visualization. Although effective, this technique has some inherent limitations, including restricted field of view, increased mucosal trauma, and a relatively higher incidence of postoperative complications such as bleeding, synechiae formation, and residual deviation.[3] Moreover, the blind nature of certain surgical maneuvers may lead to incomplete correction of posterior deviations, which can cause persistent symptoms even after surgery.[4]

In the past two decades, technological advancements and the incorporation of endoscopic techniques have revolutionized the approach to nasal septal surgery. Endoscopic-assisted septoplasty utilizes rigid nasal endoscopes (0°, 30°, or 45°) to provide superior illumination and magnification of the nasal cavity, allowing for more accurate identification and correction of septal deviations, particularly those located posteriorly or in difficult-to-visualize areas.[5]This enhanced visualization potentially minimizes mucosal trauma, reduces intraoperative complications, and leads to faster recovery and superior patient-reported outcomes.[6] Additionally, endoscopic assistance facilitates better assessment of coexisting intranasal pathologies such as turbinate hypertrophy or sinus ostial obstruction, which can be addressed concurrently.[7]

Despite these perceived advantages, traditional septoplasty remains the most commonly practiced approach in many centres due to its familiarity and cost-effectiveness. A direct comparison of the two techniques is necessary to determine if the additional resources and learning curve associated with endoscopic-assisted septoplasty translate into superior clinical outcomes. Previous comparative studies have reported conflicting results, with some suggesting no significant difference in outcomes and others favouring endoscopic approaches for better patient satisfaction and lower complication rates.[8]

The assessment of nasal obstruction improvement following septoplasty has historically been subjective, based on patient-reported symptom relief. However, the development of validated scoring systems has introduced greater objectivity and consistency in outcome evaluation. The Nasal Obstruction Symptom Evaluation (NOSE) scale has emerged as a simple, reliable, and validated patient-reported questionnaire to assess the severity of nasal obstruction and monitor postoperative outcomes.[9] The NOSE scale consists of five items: nasal congestion or stuffiness, nasal blockage or obstruction, trouble breathing through the nose, trouble sleeping, and difficulty getting enough air during exercise or exertion. Patients rate each item on a five-point scale, which is converted to a 100-point scale to quantify nasal obstruction severity.Given the increasing emphasis on patient-centred care and outcome-based assessments, the NOSE scale provides an ideal tool to compare the effectiveness of surgical interventions for DNS.

AIM AND OBJECTIVES

Aim

To evaluate and compare the efficacy, patient-reported outcomes, and postoperative complications of endoscopic-assisted septoplasty versus traditional septoplasty in patients with symptomatic deviated nasal septum, utilizing the Nasal Obstruction Symptom Evaluation (NOSE) scale as the primary assessment tool.

Objectives

1. Assess Baseline Comparability: Determine whether the two patient groups (endoscopic-assisted and traditional septoplasty) are comparable in terms of demographic and clinical characteristics, including age, gender distribution, preoperative NOSE scores, and duration of symptoms.
2. Evaluate Symptom Improvement: Measure and compare the changes in NOSE scores within each group at preoperative, 1-month postoperative, and 3-month postoperative intervals to assess the degree of symptomatic relief achieved by each surgical technique.
3. Intergroup Comparison of Outcomes: Compare the postoperative NOSE scores between the two groups at each time point to identify any statistically significant differences in patient-reported outcomes between endoscopic-assisted and traditional septoplasty.
4. Analyze Percentage Improvement: Categorize patients based on the percentage

improvement in NOSE scores at 3 months postoperatively (>70%, 50–70%, <50%) to evaluate the proportion of patients achieving significant symptomatic relief in each group.

5. Assess Postoperative Complications: Document and compare the incidence of postoperative complications, such as minor bleeding, septal hematoma, adhesions (synechiae), and septal perforation, between the two surgical techniques to determine the relative safety profiles.
6. Determine Overall Efficacy and Safety: Synthesize the findings to conclude which surgical approach offers superior efficacy in symptom relief and a better safety profile, thereby guiding clinical decision-making for the treatment of deviated nasal septum

MATERIALS AND METHODS

Study Design

This was a prospective, comparative, randomized study conducted to assess and compare the functional outcomes of endoscopic-assisted septoplasty versus traditional septoplasty. The study employed the Nasal Obstruction Symptom Evaluation (NOSE) scale as the primary outcome measure.

Study Setting

The study was conducted in the Department of Otorhinolaryngology (ENT), Katihar Medical College, Katihar, Bihar, India following institutional approval.

Study Duration

The study was carried out over a period of one year and three months, from January 2014 to March 2015., which included preoperative evaluation, surgical intervention, and postoperative follow-up at 1 month and 3 months.

Inclusion Criteria

- Age: 18 to 55 years
- Clinical diagnosis of DNS with symptomatic nasal obstruction, confirmed by anterior rhinoscopy and nasal endoscopy
- Failure of conservative management (e.g., decongestants, antihistamines) for at least 3 months
- Willingness to undergo surgical treatment and commit to regular follow-up

Exclusion Criteria

- Presence of nasal polyps, allergic fungal sinusitis, or chronic rhinosinusitis
- Previous nasal surgery
- Septal perforation
- Coagulopathies or other contraindications to general anaesthesia/surgery
- Non-consenting individuals

Ethical Considerations

Prior to initiation, the study protocol received approval from the Institutional Ethics Committee. All participants provided written informed consent after receiving complete information about the procedures, risks, benefits, and follow-up requirements.

Study Population

A total of 50 adult patients aged between 18 and 55 years, diagnosed with symptomatic nasal obstruction secondary to deviated nasal septum (DNS) and unresponsive to medical therapy for at least 3 months, were enrolled based on strict inclusion and exclusion criteria.

Patient Allocation

Using a computer-generated random number table, patients were randomized into two equal groups:

- Group A (n = 25): Endoscopic-assisted septoplasty
- Group B (n = 25): Traditional septoplasty

Study Procedure

All patients underwent surgery under general anaesthesia, performed by experienced ENT surgeons.

Preoperative Evaluation:

- Detailed history and physical examination
- Diagnostic nasal endoscopy
- NOSE scale assessment for baseline symptom severity

Postoperative Follow-Up:

- NOSE scale re-evaluation at 1 month and 3 months

Surgical Technique

Group A – Endoscopic-Assisted Septoplasty:

- Performed using 0° or 30° rigid nasal endoscope
- Enhanced visualization allowed for precise correction of deformities with minimal mucosal trauma
- Aimed to reduce complications such as mucosal tears and septal hematoma

Group B – Traditional Septoplasty:

- Performed using Freer's incision and standard mucoperichondrial flap elevation
- Correction of septal deviation done manually without endoscopic guidance

Postoperative Care:

- Nasal packing applied in both groups and removed within 24–48 hours

- Routine antibiotics, analgesics, and saline nasal irrigation prescribed

Outcome Measures

The primary outcome was functional improvement in nasal airflow, assessed using the NOSE scale, a validated, patient-reported symptom evaluation tool. It includes 5 domains:

1. Nasal congestion or stuffiness
2. Nasal blockage or obstruction
3. Difficulty breathing through the nose
4. Trouble sleeping
5. Inability to get enough air during exertion

Each domain was rated from 0 (not a problem) to 4 (severe problem). Total scores were multiplied by 5 to convert to a 100-point scale for standardized comparison.

Statistical Analysis

- Data were analyzed using SPSS version 16.0
- Continuous variables were expressed as mean ± standard deviation (SD)
- Within-group comparison (preoperative vs. postoperative NOSE scores) was done using paired t-tests
- Between-group comparison (Group A vs. Group B) was performed using unpaired t-tests
- A p-value <0.05 was considered statistically significant

RESULTS

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population

Parameter	Group A (Endoscopic-Assisted) (n=25)	Group B (Traditional) (n=25)	p-value
Mean Age (years)	32.80 ± 8.40	33.60 ± 7.90	0.721
Gender (Male/Female)	16/9 (64.00%/36.00%)	15/10 (60.00%/40.00%)	0.774
Mean Preoperative NOSE Score	74.80 ± 8.60	75.20 ± 9.10	0.842
Duration of Symptoms (months)	14.50 ± 5.20	13.80 ± 5.70	0.628

The baseline demographic and clinical characteristics of the study population are presented in Table 1. The mean age of patients in Group A (endoscopic-assisted septoplasty) was 32.80 ± 8.40 years, while it was 33.60 ± 7.90 years in Group B (traditional septoplasty), with no statistically significant difference (p = 0.721). Gender distribution was comparable between the groups, with Group A comprising 64.00% males and 36.00% females, and Group B comprising 60.00% males and 40.00% females (p = 0.774). The mean preoperative NOSE scores were also similar between the groups (74.80 ± 8.60 in Group A vs. 75.20 ± 9.10 in Group B; p = 0.842). The mean duration of symptoms before surgery was 14.50 ± 5.20 months for Group A and 13.80 ± 5.70 months for Group B (p = 0.628), confirming homogeneity between groups at baseline.

Table 2: Comparison of NOSE Scores within Groups (Preoperative vs Postoperative 1 Month and 3 Months)

Time Point	Group A (Endoscopic-Assisted) Mean ± SD	p-value (Group A)	Group B (Traditional) Mean ± SD	p-value (Group B)
Preoperative	74.80 ± 8.60	-	75.20 ± 9.10	-
1 Month Postoperative	26.40 ± 7.90	<0.001	33.20 ± 8.40	<0.001
3 Months Postoperative	18.80 ± 6.70	<0.001	26.00 ± 7.20	<0.001

NOSE=Nasal Obstruction Symptom Evaluation scale.

Table 2 illustrates the changes in NOSE scores within each group over time. Both groups demonstrated significant improvement from their preoperative scores at 1 month and 3 months postoperatively (p < 0.001 for both). In Group A, the mean NOSE score decreased from 74.80 ±

8.60 preoperatively to 26.40 ± 7.90 at 1 month and further to 18.80 ± 6.70 at 3 months. Similarly, in Group B, the NOSE score reduced from 75.20 ± 9.10 preoperatively to 33.20 ± 8.40 at 1 month and to 26.00 ± 7.20 at 3 months. These results highlight that both surgical techniques provided significant symptomatic relief postoperatively.

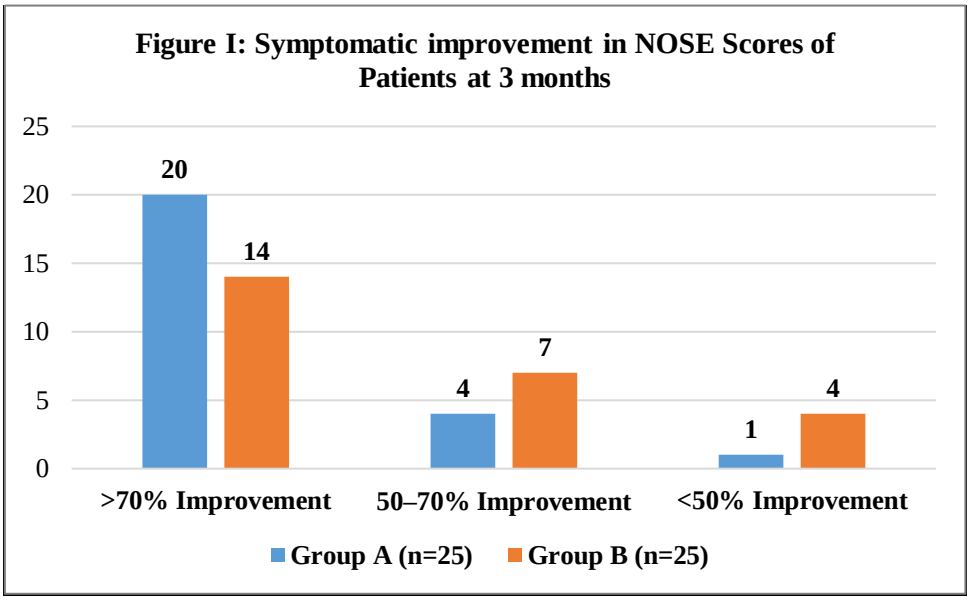
Table 3: Intergroup Comparison of NOSE Scores at Each Time Point

Time Point	Group A (Endoscopic-Assisted) Mean ± SD	Group B (Traditional) Mean ± SD	p-value
Preoperative	74.80 ± 8.60	75.20 ± 9.10	0.842
1 Month Postoperative	26.40 ± 7.90	33.20 ± 8.40	0.017
3 Months Postoperative	18.80 ± 6.70	26.00 ± 7.20	0.003

The comparative analysis between the two groups at each time point is shown in Table 3. There was no significant difference in preoperative NOSE scores (p = 0.842). However, at 1 month postoperatively, Group A had significantly lower NOSE scores (26.40 ± 7.90) compared to Group B (33.20 ± 8.40), with a p-value of 0.017. The difference was even more pronounced at 3 months, where Group A recorded a mean score of 18.80 ± 6.70 against 26.00 ± 7.20 in Group B (p = 0.003). These findings indicate that endoscopic-assisted septoplasty resulted in superior early and sustained symptomatic relief compared to traditional septoplasty.

Table 4: Distribution of Patients According to Percentage Improvement in NOSE Scores at 3 Months

Percentage Improvement	Group A (n=25)	Group B (n=25)
>70% Improvement	20 (80.00%)	14 (56.00%)
50–70% Improvement	4 (16.00%)	7 (28.00%)
<50% Improvement	1 (4.00%)	4 (16.00%)

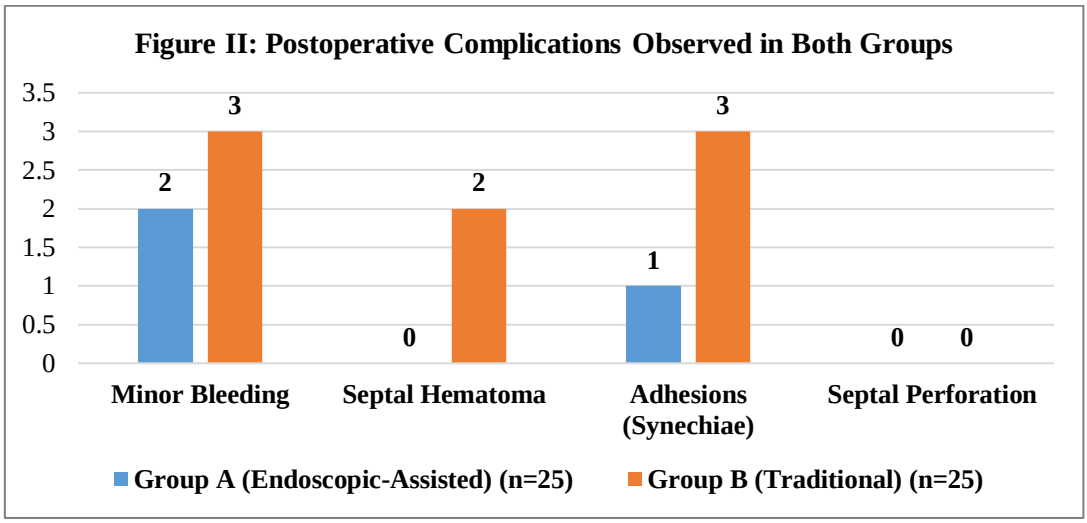


The extent of symptomatic improvement at 3 months postoperatively is detailed in Table 4, figure I. A greater proportion of patients in Group A achieved over 70% improvement in their NOSE scores (80.00%) compared to Group B (56.00%). Additionally, 16.00% of patients in Group A and 28.00% of patients in Group B showed 50–70% improvement. Only 4.00% of Group A patients

experienced less than 50% improvement, in contrast to 16.00% in Group B. These data further underscore the greater efficacy of endoscopic-assisted septoplasty.

Table 5: Postoperative Complications Observed in Both Groups

Complication	Group A (Endoscopic-Assisted) (n=25)	Group B (Traditional) (n=25)	p-value
Minor Bleeding	2 (8.00%)	3 (12.00%)	0.637
Septal Hematoma	0 (0.00%)	2 (8.00%)	0.150
Adhesions (Synechiae)	1 (4.00%)	3 (12.00%)	0.296
Septal Perforation	0 (0.00%)	0 (0.00%)	-



Postoperative complications are summarized in Table 5, figure II. Minor bleeding occurred in 8.00% of patients in Group A and 12.00% of patients in Group B (p = 0.637). Septal hematoma was not observed in Group A but occurred in 8.00% of Group B patients (p = 0.150). Synechiae (adhesions) developed in 4.00% of patients in Group A and in 12.00% of Group B patients (p = 0.296). No septal perforations were reported in either group. Although not statistically significant, the incidence of complications was generally lower in the endoscopic-assisted group.

DISCUSSION

In the present study, both groups were comparable at baseline in terms of age, gender distribution, symptom duration, and preoperative NOSE scores, ensuring an unbiased comparison of surgical outcomes. This observation of demographic homogeneity is similar to the findings reported by **Tastanet al.**[10] (2008), who also documented no significant differences between patients undergoing endoscopic-assisted and traditional septoplasty with regard to preoperative characteristics. Such matching of baseline parameters strengthens the validity of postoperative outcome comparisons.

Significant improvement in NOSE scores was observed in both groups at 1 and 3 months postoperatively, indicating that both surgical techniques effectively alleviate nasal obstruction. In Group A, the NOSE score reduced from 74.80 ± 8.60 preoperatively to 18.80 ± 6.70 at 3 months, whereas in Group B it reduced from 75.20 ± 9.10 to 26.00 ± 7.20. These findings are in concordance with the study by **Harvey et al** (2004), who reported significant postoperative improvement in nasal airflow perception following septoplasty procedures when assessed using validated symptom evaluation scales.[11]

When comparing between groups, patients undergoing endoscopic-assisted septoplasty demonstrated significantly better postoperative NOSE scores at both 1 month (26.40 ± 7.90 vs. 33.20 ± 8.40, p=0.017) and 3 months (18.80 ± 6.70 vs. 26.00 ± 7.20, p=0.003) than those undergoing traditional septoplasty. These results are supported by the findings of **Bhattacharyya et al.** (2006), who showed that endoscopic

guidance during septoplasty resulted in greater patient satisfaction and reduced residual obstruction compared to conventional methods, likely due to enhanced surgical precision and minimized mucosal trauma.[12]

In terms of percentage improvement at 3 months, 80.00% of patients in the endoscopic-assisted group achieved more than 70% improvement in NOSE scores compared to 56.00% in the traditional group. This finding is consistent with the observations made by **Cerkes et al**. (2010), who emphasized that endoscopic visualization allows for correction of subtle septal deviations that are often missed with conventional headlight illumination, leading to better long-term functional outcomes. The higher rate of marked improvement in Group A highlights the clinical advantage of endoscopic-assisted techniques.[13]

The incidence of postoperative complications was generally lower in the endoscopic-assisted group. Minor bleeding was noted in 8.00% and synechiae formation in 4.00% of Group A patients, compared to 12.00% and 12.00%, respectively, in Group B. No septal hematomas or perforations were observed in Group A. These observations are in agreement with the study by **Serpil et al**. (2012), who demonstrated that endoscopic septoplasty was associated with fewer complications due to better visualization and more conservative dissection, minimizing trauma to adjacent mucosal structures.[14]

Overall, our study reinforces the notion that endoscopic-assisted septoplasty provides superior functional outcomes and a lower complication profile compared to traditional septoplasty. These findings are in line with the results of Saeed et al (2013), who concluded that patients undergoing endoscopic septoplasty had better postoperative satisfaction rates and fewer secondary surgeries compared to those undergoing traditional techniques.[15] The current study adds further evidence to support the growing preference for endoscopic-assisted approaches in modern nasal septal surgery.

LIMITATIONS OF THE STUDY

- Small sample size (n = 50) may limit the generalizability of the findings.
- Short follow-up duration (3 months) may not capture long-term surgical outcomes or complications.
- Single-centre study, which may affect external validity.
- The subjective nature of the NOSE scale, despite being validated, can introduce response bias.
- Blinding of outcome assessment was not feasible, possibly influencing patient-reported scores.

CONCLUSION

Author found that both surgical methods are effective, endoscopic-assisted septoplasty provides enhanced symptomatic relief, a higher rate of significant improvement, fewer complications, and greater surgical precision. These findings support the preference for endoscopic-assisted septoplasty as a superior technique for correcting deviated nasal septum.

Endoscopic-assisted septoplasty provides superior functional outcomes and greater symptom relief compared to traditional septoplasty, as demonstrated by significantly lower NOSE scores postoperatively. It also offers a lower complication rate, enhancing patient safety and satisfaction. Both techniques are effective, but endoscopic guidance yields consistently better results. This study supports adopting endoscopic-assisted approaches as the preferred surgical technique for deviated nasal septum correction.

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