

## Original Article

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# Key Considerations in Practices and Principles of Endoscopic Septoplasty: Lessons, Mistakes and Future

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### Abstract

**Background:** Conventional surgeries of the nasal septum improve the nasal airway but recent development and advancement of the knowledge about the endoscopic septoplasty has significantly changed the treatment modality and had brought focus over several aspects of possible advantages. This study aims to see the advantages, complications and limitations of endoscopic septoplasty.

**Methods:** It was an observational prospective study conducted over 90 patients of symptomatic deviated nasal septum. It evaluated symptoms, anterior rhinoscopy and nasal endoscopy findings, objective and subjective improvement of symptoms using the nasal obstruction symptom evaluation (NOSE) score, post-operative pain using the visual analogue scale (VAS) and complication following the surgery.

**Results:** Deviated nasal septum (DNS) either left or right side was the most common examination finding 97.78%. Post-operatively there was a good symptom relief and significant subjective improvement in NOSE scores with average decline in the score by 96.26%. Objective assessment of all patients showed improved airway. The complication rate was minimum 7.78%.

**Conclusion:** Endoscopic septoplasty (ES) was found to have distinct advantages with good subjective and objective improvement of symptoms and lesser rate of complications. It should be an option offered to all patients requiring septoplasty. We also found that it helps in improving the learning curve and surgical skill of the trainees.

**Keywords :** Deviated nasal septum, Endoscopic septoplasty, subjective improvement, Nasal obstruction

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## Introduction

Septum surgery has come a long way since its outset. They have evolved from primitive intrusive procedures to procedures with better outcome and fewer complications. Over the decades, technique has changed from forcible fractures and splinting to submucous resection, classical septoplasty to endoscopic septoplasty (ES)<sup>1,2</sup>.

In 1991, Lanza<sup>3</sup> and Stammberger<sup>4</sup> initially introduced a minimal invasive technique named endoscopic septoplasty. Since then it is rapidly evolving and gaining popularity in rhinological practice. It permits accurate identification of septal pathology and associated lateral wall abnormalities. It is a conservative procedure which provides adequate visualization, room for instrumentation, access to paranasal sinuses, visualization and stoppage of post nasal bleeds and also provides scope for revision surgeries<sup>5-8</sup>.

The present study was undertaken to assess the advantages, limitations and outcomes of ES in terms of relief of symptoms, anatomical correction, post-operative morbidity. And also to assess its utility as a learning tool for teaching purpose.

## Materials & Methods

This observational prospective study was conducted at a tertiary care center over a period of 2 years from January 2019 to December 2020 amongst 90 patients of symptomatic DNS who attended the outpatient department of Otorhinolaryngology and Head & Neck Surgery after taking consent from the patient.

**Inclusion criteria-** Patients with symptomatic DNS (nasal obstruction, nasal discharge, hyposmia, headache, post nasal drip, sneezing, nasal bleeding, snoring, dry mouth, hyposmia, and dry mouth), septal spur, and refractory to conservative treatment

were included in the study. All the patients in whom ES was performed as a preliminary step of another nasal surgery like functional endoscopic sinus surgery (FESS), dacryocystorhinostomy (DCR) were also included in this study.

**Exclusion criteria-** Patients who were medically unfit for surgery, age less than 10 years, acute rhinosinusitis, nasal polyps, malignancy, grossly deviated septum, upper respiratory tract infection and revision cases were excluded from the study.

At the first visit, the patient was subjected to a detailed clinical history. Anterior rhinoscopy was done. Diagnostic nasal endoscopy was performed. Patients symptoms were assessed and recorded using a validated Nasal Obstruction Symptom Evaluation (NOSE) score<sup>9</sup>. The patients were subjected to X ray paranasal sinuses to rule out sinus pathology.

## Technique for endoscopic septoplasty

The procedure was performed under general anaesthesia. The septum was injected with 1% xylocaine in 1:20,000 adrenaline on both the sides of septum using 0-degree rigid endoscope. After giving hemi-transfixation incision, sub-mucoperichondrial flap was raised using a Freer's elevator under direct visualization with an endoscope, exposing the underlying bone, and further removing the most deviated part of septum including both the bony and cartilaginous septum. Later, the flap was repositioned, hemostasis was ensured and edges of the incision were just approximated with absorbable sutures. For isolated septal spur, ipsilateral incision was given on the apex of spur just parallel to the floor of the nose. Superior and inferior flaps were elevated to expose the septal spur, which was then removed. The nasal packing was done with Meroceel. Post-operative pain for all patients was assessed using the VAS<sup>10</sup>. Difference between pre-operative and post-

operative NOSE score was compared using paired T-test and p-value less than 0.05 was considered as significant.

### Results

A total number of 90 patients underwent ES over a period of two years from January 2019 to December 2020. Amongst these, 59 were male and 31 were female. The male:female distribution was 1.9:1. The youngest patient was 12 years old and the oldest one was 59 years old. Most commonly affected age group was 21-30 years (46.67%). (Figure 2) Mean age of the study population is 33.97 years.

During surgical procedure, only ES was done in 51 (56.67%), rest were combination of procedure such as: ES with Inferior turbinate resection in 20 (22.22%) patients, ES with FESS in 11 (12.22%) patients and ES with DCR in 8 (8.89%) patients.

The most common presenting complaint among the study population was nasal obstruction (87.78%) followed by nasal discharge (47.78%), sneezing (37.78%), postnasal drip (32.22%), headache (24.44%). Least common symptoms were snoring and

dry mouth (16.67%), hyposmia (15.55%), epiphora (8.89%) and nasal bleeding (6.67%). The duration of the presenting complaints varied from four months to 5 years. (Table I)

DNS (either left or right side) was the most common finding 97.78%. The next common finding was hypertrophied inferior turbinate 54.44% followed by bony spur 25.55%.

The mean time taken for the surgery was 71.34 minutes. All the patients were assessed for the intra-operative blood loss. Majority of them 86% had minimal blood loss (<45ml) while 14% had >45ml blood loss. When we assessed the post-operative pain, we found that majority of patients 82.3% had mild pain.

Subjective improvement was also assessed by comparing the pre-operative and post-operative NOSE score. All the patients with extreme (n=26) and severe (n=55) nasal obstruction were relieved post-operatively. Moderate and mild nasal obstruction was present in (3 and 11 patients respectively) following the surgery. The average pre-operative and post-operative NOSE score were 65.33 and 2.44 respectively. The average

**Table I :**  
*Distribution of presenting symptoms and symptoms relieved post-operatively*

Symptoms	No. of patients (%)	No of patients in which symptom got relieved post-operatively (%)
a) Nasal obstruction	79 (87.78%)	78
b) Nasal discharge	43 (47.78%)	43
c) Headache	22 (24.44%)	20
d) Postnasal drip	29 (32.22%)	29
e) Sneezing	34 (37.78%)	34
f) Nasal bleeding	6 (6.67%)	6
g) Snoring	15 (16.67%)	11
h) Hyposmia	14 (15.55%)	11
i) Dry mouth	15 (16.67%)	14
j) Epiphora	8 (8.89%)	8

**Table II :**  
*Distribution of complications following ES*

Intra-operative and post-operative complications	No. of patients	Percentage %
a) Haemorrhage from septal branch of superior labial artery	2	2.22%
b) Unilateral flap tear	5	5.55%
c) Synechiae formation in between septum and inferior turbinate	7	7.78%

decline in the score was 62.89 (96.26%). There was significant subjective improvement in NOSE scores post-operatively.

Amongst the complications following surgery, immediate complications occurred in 7(7.78%) patients. Amongst them, unilateral flap tear occurred in 5 patients and hemorrhage from septal branch of superior labial artery occurred in 2 patients. Synechiae formation in between septum and inferior turbinate was seen in 7 patients. Septal perforation, septal hematoma and external deformity were not encountered in any patient. (Table II).

### Discussion

ES is a conservative and precise approach and provides better illumination, visualization, accurate access and complete correction of the deviated part of the septum without causing much complication thus improving the surgical outcome.

In present study, we found male preponderance 65.55% with the most common affected age group being the 2<sup>nd</sup> decade. This was in concordance with studies of Kour B et al<sup>6</sup> and Mandour ZM et al.<sup>8</sup> In our study, isolated ES was done in 56.67% cases, rest of the cases was a combination procedure such as ES with Inferior turbinate resection, ES with FESS and ES with DCR. This is comparable to the study of Islam A et al<sup>11</sup> who noted that isolated septoplasty was done in 49.26% cases. While doing DCR, sometimes it is difficult to

approach the lacrimal sac, so in these cases ES is done as a preliminary surgery to gain easy access to the sac.

On assessing the surgical time, we found that intra-operative time for our study (71.34 minutes) was almost comparable to Singh A et al<sup>12</sup> (76.36 minutes). Further in their study,<sup>12</sup> they found that time taken for ES was more as compared to conventional method. As stabilizing and manipulating the endoscope in the nasal cavity is difficult, it takes more time for the surgery. It is possible that as surgeons gain more experience, the intra-operative time will reduce further. On assessing the blood loss during surgery, we found that majority of patients 86% had minimal blood loss which was similar to the study of Aiyer RG et al<sup>13</sup> who found that 82% had minimal blood loss with ES. This could be because the incision is given only in the most deviated part leading to lesser amount of bleeding. As there is less dissection and resection of tissues in ES, so the perception of pain post-operatively is also less.<sup>14</sup> Majority of our patients experienced mild post-operative pain. Singh A et al<sup>12</sup> and Aiyer RG et al<sup>13</sup> also observed that patients who underwent ES had mild pain (77.3% and 64% respectively).

As ES provides a direct targeted approach to the septal anatomic deformity, allowing a minimally invasive procedure with limited septal mucosal flap dissection and removal of a small cartilaginous and/or bony deformity<sup>12,15</sup> so it helps in relieving the

symptoms effectively. We observed that there was significant relief in symptoms of nasal obstruction, nasal discharge, nasal obstruction, post nasal drip, nasal bleeding, sneezing and dry mouth. This was consistent with the studies of Rajguru R et al<sup>1</sup> and Tukaram KV et al<sup>16</sup> who observed that persistence of symptom was more with conventional septoplasty. In our study, 73.3% patients were relieved of snoring. Persistence of snoring may be due to the pathology associated with nasopharynx, epiglottis or tongue base. Similarly Rajguru R et al<sup>1</sup> also did not get good relief of snoring as only 64% patients were relieved. Virkkula et al<sup>17</sup> observed that operative treatment of structural nasal obstruction did not seem to decrease snoring time, snoring intensity or sleep-disordered breathing.

Since objective evaluation of nasal obstruction by acoustic rhinometry, rhinomanometry does not correlate well with patients' subjective feelings of patency<sup>18</sup>, so physicians focus on patient reported outcome measures to determine treatment efficacy<sup>19</sup>. NOSE score has emerged as a frequently used health related quality of life instrument specific to nasal obstruction in surgical patient<sup>20</sup>. In our study, there was a significant subjective improvement in the NOSE score post-operatively and the decline was 96.26%. Singh A et al<sup>12</sup> compared the NOSE score in conventional as well as ES and they also observed a significant decline (74% and 92.76% respectively).

In this study, immediate per-operative complications occurred in 7.78% patients and they included undue haemorrhage from septal branch of superior labial artery in 2 (2.22%) patients that occurred during removal of maxillary crest and unilateral flap tear in 5(5.55%) patients. Both of these were minor

complications and were managed without any difficulty. In concurrent to our study, Islam A et al<sup>11</sup> also noticed hemorrhage in 1.66% and flap tear in 2.5% patients. We observed synechiae formation in between septum and inferior turbinate in 7 (7.78%) patients. Rajguru R et al<sup>1</sup> and Tukaram KV et al<sup>16</sup> had synechiae in 2% and 1.92% patients respectively whereas Islam A et al<sup>11</sup> did not observed any case of synechiae in their study.

Several studies concluded that ES is beneficial in regards to illumination, avoiding unnecessary tissue handling, flap tear, septal perforations and hematoma<sup>1,8,11</sup>. We found that there are reduced chances of synechiae formation and flap tear which may be due to the limited extent of flap dissection along with limited manipulation and resection of septal framework. In cases of endoscopic removal of spur, sometimes there is no need of suturing of the flap as it gets approximated by itself. Incision is given only in the most deviated part leading to precise repair and lesser amount of blood loss.

We have found it to be a valuable teaching tool which provide excellent opportunity for recording and studying. By direct visualization on the monitors, it helps in improving the learning curve and surgical skill of the trainees<sup>1,8,11,13</sup>.

The limitations of ES which we experienced during our study period were need for frequent cleaning of the tip, loss of binocular vision, inability to use both hands, adequate additional training was required for the procedure, longer surgical time as it is a single handed surgery, anterior and caudal deformities cannot be corrected as there is minimal support for the endoscope in these segments, higher cost of instruments and surgery as it requires endoscope, camera, telescope, monitor.

### Summary

ES is found to have a significant edge in treating a DNS patient as it enables accurate identification of the pathology. The technical advantage of ES is that it is performed with minimal manipulation and resection of pathological area resulting in minimal damage to the tissues, minimal removal of septum and hence precise repair. As it provides better visualization, it is considered to be excellent learning tool for teaching purposes.

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