

## Comparative Study between Endoscopic Aided Septoplasty with Two Handed Technique using Endoholder and Conventional Septoplasty

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### ABSTRACT

**Background:** Deviated nasal septum is one of the most common causes for the nasal obstruction. The objective of this study is to compare the surgical outcomes in patients undergoing conventional septoplasty and endoscopic septoplasty in the management of deviated nasal septum.

**Methods:** A comparative study was conducted on 60 patients who presented to the Department of ENT, College of Medical sciences, during a period of one year. The severity of the symptoms was subjectively assessed using NOSE score and objectively assessed using modified Gertner plate.

**Results:** There was significant improvement in functional outcome like NOSE Score and area over the Gertner plate among patients who underwent endoscopic septoplasty. Significant difference in incidence of post-operative nasal synechae and haemorrhage was seen in conventional group compared to endoscopic group.

**Conclusions:** Endoscopic surgery is an evolutionary step towards solving the problems related to deviated nasal septum. It is safe, effective and conservative, alternative to conventional septal surgery.

**Keywords:** endoholder; septoplasty; endoscope.

### INTRODUCTION

Nasal obstruction is one of the most common complaints that otorhinolaryngologists face in their day to day practice.<sup>1</sup> In traditional nasal septal surgery there is often over exposure, unnecessary manipulation of the septal anatomy and more resection.<sup>2</sup>

Endoscopic technology greatly enhances visualization during septoplasty.<sup>3</sup> Various studies have been done to compare the efficacy of these techniques. The result and conclusion are variable, majority pointing towards increased effectiveness of endoscopic septoplasty. In our setting, both techniques are in frequent practice for the management of symptomatic deviated nasal septum. Since these techniques differ in intraoperative stability and postoperative outcomes, we conducted this study to gain confidence of one technique being more efficient compared to the other which are in frequent practice.

Therefore, the present study was conducted to compare the surgical outcomes in patients undergoing conventional septoplasty and endoscopic septoplasty in the surgical management of deviated nasal septum and to evaluate the

advantages and disadvantages of both conventional and endoscopic septoplasty in terms of relief of symptoms and complication rate.

### METHODS

This comparative study was carried out in the Department of Otorhinolaryngology and Head and Neck Surgery from 1<sup>st</sup> April, 2018 to 30<sup>th</sup> March, 2020. Approval from the Institutional review committee was taken. Sixty patients presenting with symptomatic deviated nasal septum were included in the study. Patients aged 18-55 years were included in the study. Patients with asymptomatic deviated nasal septum, acute and chronic rhinosinusitis, allergic rhinitis, granulomatous diseases of nose and septal perforation were excluded from the study.

The patients were evaluated by brief history taking and thorough clinical examination. Each patient was thoroughly examined with nasal endoscopy (with or without nasal decongestant to enable correct identification of contact areas and turbinate pathology) and findings were recorded. Karl Storz Rigid fiberoptic nasal endoscope of 0 and 30 degrees with Karl Storz light source was used for

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diagnostic nasal endoscopy. When necessary, computed tomography scans with coronal and axial cuts of the osteomeatal complexes were done to rule out sinus pathology.

All patients were explained about the two different types of surgical procedures. Written informed consent was taken from all patients. Patients planned for septoplasty were divided into two groups randomly with closed envelope technique. 60 envelopes with written leaflets containing 30 chits marked as endoscopic septoplasty and 30 marked as conventional septoplasty. Envelope was chosen blindly by the patient and the patients were grouped according to the finding of the envelope.

The surgery in both groups was performed under general anaesthesia by single surgeon experienced in both type of surgeries. In the conventional group, headlight was used for the procedure. Conventional septoplasty was done by Cottle maxilla-premaxilla approach.<sup>4</sup> The endoscopic septoplasty was done by two handed technique using Khan's Endoscope Holder.<sup>5,6</sup> (Figure 1)



Figure 1. Endoscopic septoplasty by two handed technique using Endoholder.

In both groups, nasal cavities were packed with antibiotic impregnated pack for 48 hours. All patients were under antibiotic cover for one week along with analgesics, antihistamines and decongestants.

The severity of the symptoms of the patients was scored using a NOSE score which was compared post operatively to subjectively evaluate the efficacy of either surgery. The NOSE score was utilized to assess the subjective sensation of nasal obstruction. The NOSE, a standardized quality of life questionnaire, contained five items:

- i) nasal congestion or stuffiness
- ii) nasal blockage or obstruction
- iii) trouble breathing through the nose
- iv) trouble sleeping
- v) unable to get enough air through the nose during exercise.

All five items were scored using a 5-point Likert scale (0 = not a problem, 1 = a very mild problem, 2 = a moderate problem, 3 = a fairly bad problem and 4 = a severe problem). A subjective sensation of nasal obstruction was defined as a NOSE score  $\geq 10$ .<sup>7</sup>

The objective assessment was done by nasal endoscopy and modified Glatzel mirror test. Nasal patency was objectively assessed by calculating the air blast in  $\text{mm}^2$  by the cold spatula (modified Glatzel Mirror) for complaint of nasal blockage, before and after definitive treatment. The patients were asked to remain seated in the test environment for 5 minutes. Patients were then asked to breathe on the modified Glatzel Mirror (GM). Modified GM is a cold metallic spatula with shiny surface. This mirror was marked with a calibrated millimeter scale of 5 mm. Mirror measurements were done with seated subjects and the head in the orthostatic position. The mirror was placed horizontally under the nostrils of participants with the mirror's zero point at a mid-distance from a point under the columella and philtrum. Participants were asked to breathe in a



Figure 2. Objective assessment of nasal obstruction using Glatzel mirror test.

natural spontaneous manner through both nostrils with no extra inspiratory or expiratory effort and keep the mouth and eyes closed. The condensation of air blast was marked with an overhead transparency-marking pen on the mirror. The condensation contour was measured along the greater and lesser axes, on the left and right sides separately. The greater axis was obtained starting from the central point (zero mark) until the longest dimension (within the contour). The lesser axis was also selected at  $90^\circ$  to longer axis. From the greater

and lesser axes, area of air blast was calculated in mm<sup>2</sup>. Finally, the condensation area was calculated by using the mathematical formula for the ellipse (S=π×a×b) proposed by Gertner et al.<sup>8</sup> The sum of right and left nasal fossa values was calculated for the final assessment.

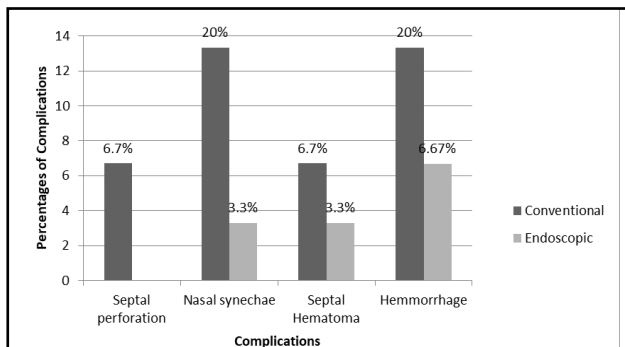
**RESULTS**

The mean age at presentation in conventional group was 31.72 (SD ±7.53) years and in endoscopic group was 28.47 (SD ±8.79) years. The demographic details and patients findings in both the groups are given in Table 1.

**Table 1. Table showing demographic details and patient findings.**

	Conventional Group (n=30)	Endoscopic Group (n=30)
Mean age (±SD) years	31.72 (SD ±7.53)	28.47 (SD ±8.79)
Male:Female Ratio	2:1	1.8:1
Site of nasal obstruction	Anterior Deviation	43.3%
	Posterior Deviation	36.7%
	Spur	20%
Operative time	46.13±9.67 min	51.20±8.54 min

Post-operative complications were commonly seen in the conventional group. The incidence of nasal synechae, hemorrhage, septal hematoma and septal perforation were more common in conventional septoplasty group (Figure 3).



**Figure 3. Bar diagram showing comparison of complication in Conventional Septoplasty Group and Endoscopic Septoplasty Group.**

Subjective evaluation of nasal obstruction was done using NOSE score before and after surgery. In both groups, improvement in NOSE score was seen after surgery with significant p-value (Table 2). However, when post operative NOSE scores were compared in between conventional septoplasty group and endoscopic septoplasty group, improvement in nasal obstruction was more in endoscopic septoplasty group. This improvement in NOSE score was statistically significant, p<0.001,

**Table 2. Table showing improvement in NOSE score post septoplasty surgery.**

	Mean Pre-operative NOSE score	Mean Postoperative NOSE score	p-value
Conventional Septoplasty	17.50 (±1.196)	10.20 (±1.669)	<0.001
Endoscopic Septoplasty	17.20 (±1.424)	5.93 (±2.132)	<0.001

CI<sub>95%</sub> = (3.28, 5.26). Objective assessment of the patients after surgery was done by rigid endoscopy. It revealed higher prevalence of persistence of septal deviation, synechiae formation, flap tear and septal perforation in conventional septoplasty group as seen in Table 3.

**Table 3. Endoscopic assessment in postoperative cases.**

	Conventional Septoplasty Group		Endoscopic Septoplasty Group		p-value (chi-square test)
	Yes	No	No	No	
Persistent Deviation	8(26.67%)	22 (73.33%)	2(6.67%)	28 (93.33%)	0.037
Perforation	2(6.67%)	28 (93.33%)	0	30 (100%)	
Synechia	6(20%)	24(80%)	1(3.33%)	29 (96.67%)	0.045
Flap Tear	3(10%)	27(90%)	1(3.33%)	29 (96.67%)	0.300

In the Glatzel mirror test, the area of the air blast over the mirror was measured both pre- and post-operatively. In both groups, increased area of air blast over the Glatzel mirror was seen after surgery with significant p-value (Table 4). However, when post operative area scores were compared in between conventional septoplasty group and endoscopic septoplasty group, improvement in nasal obstruction was more in endoscopic septoplasty group. This improvement in the score was statistically significant, p<0.001, CI<sub>95%</sub> = (38.59, 91.19).

**Table 4. Table showing improvement in NOSE score post septoplasty surgery**

	Mean pre-operative Mirror area score	Mean post-operative mirror area score	p-value
Conventional Septoplasty	91.53 (±29.54)	146.58 (±37.46)	<0.001
Endoscopic Septoplasty	89.85 (±35.66)	211.47 (±61.44)	<0.001

**DISCUSSION**

Now-a-days, the Hopkin Rod Lens System has encompassed almost all domains of ENT surgeries. The era of endoscope first started in the surgery of paranasal sinuses. But now, septal surgeries are also done using endoscopes. The first reported endoscopic surgery was done by Lanza and Stammberger in 1991.<sup>9,10</sup> Endoscopic septoplasty



started as a single handed technique where the non-dominant hand is used for the holding the endoscope and the dominant hand for surgical instrumentation and manipulation. However when endoscope holder was used, both hands can be used for surgery facilitating simultaneous use of operative instruments and suction, thereby keeping surgical field clearer.<sup>5</sup> Khan's Endoscope Holder has been used in nasal surgeries like septoplasty. This Endoholder assisted endoscopic septoplasty increases the effectiveness of the routine single handed endoscopic surgery by providing a two handed approach.<sup>11</sup>

In our study, both subjective improvement using NOSE score and objective improvement of nasal obstruction using Gertner plate were seen in both groups. However the improvement was more significant in endoscopy group. In a study done by Paradis et al, there were subjective postoperative improvements in the NOSE scores among all patients and within both groups. However no significant difference was observed when the post-operative NOSE scores between two groups were compared.<sup>12</sup> In a similar study done by Sathyaki et al in 2014 on 50 patients with nasal obstruction, post operative objective assessment of nasal patency was done by using Gertner-Podoshin plate at first follow up on 10th day and later at 1st and 3rd month. No significant difference was observed between the conventional and endoscopic septoplasty group.<sup>13</sup>

In our study, better anatomic visualization allowed fewer post-operative complications like decrease mucosal damage, less synechia formation,

decrease residual septal deformity, decrease septal hematoma, decrease septal perforation and decrease hemorrhage in endoscopic septoplasty. Similar findings were reported in other studies as well.<sup>14-16</sup> Endoscopic septoplasty has advantage of a targeted approach in the area of specific septal deformity. There is no excessive bone and cartilage exposure resulting in early healing time and less tissue trauma. As there is less dissection and instrumentation than in conventional septoplasty, hospital stay is also decreased.<sup>16</sup>

Both conventional and endoscopic septoplasty techniques are acceptable for relief of nasal obstruction caused by deviated nasal septum. Significant improvement was noticed in both groups when compared with preoperative levels in our study. However, when conventional septoplasty was compared with endoscopic septoplasty better outcome was noticed in endoscopic septoplasty group. Significant reduction in the incidence of post-operative complications was seen in endoscopic group.

## CONCLUSIONS

The Endoholder used for endoscopic septoplasty is developed with an idea that both hands can be used for surgery. With continuous practice, the endoscope holder can be used routinely for most of otorhinolaryngology surgeries. Endoscope holder is a valuable adjunct to conventional endoscopic surgeries due to its obvious advantages. The technique has a learning curve. Once the surgeon is familiar with this instrument, the surgical outcomes, as seen with two handed endoscopic septoplasty, are very good.

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