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Comparison of Outcome of Septoplasty and Septoplasty Combined with Inferior Turbinoplasty in Cases of Deviated Nasal Septum with Inferior Turbinate Hypertrophy

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A B S T R A C T

Background: Nasal obstruction caused by inferior turbinate hypertrophy (ITH) and a deviated nasal septum (DNS) is a common otolaryngologic problem. Even after septoplasty, persistent turbinate hypertrophy may limit symptom alleviation. Inferior turbinoplasty with septoplasty can improve surgical outcomes by addressing both anatomical defects at the same time. However, the ideal surgical method remains debatable.

Aim and Objective: To study the outcome of septoplasty and septoplasty combined with inferior turbinoplasty by comparing the symptomatic improvement, pre-op and post-op DNE findings and the postoperative incidence of complications.

Methods: This prospective, double-blind, randomized controlled trial included 50 persons with DNS and ITH between the ages of 20 and 45. Twenty-five patients were randomly allocated to get septoplasty alone or septoplasty with inferior turbinoplasty. Nasal airway patency was determined by DNE first-pass success, and preoperative and six-month postoperative symptom levels were assessed using a modified SNOT-20 questionnaire. Complications following surgery were reported. Statistical analyses were conducted using independent t-tests and chi-square tests, with a p-value of less than 0.05 indicating significance.

Results: The gender distribution and preoperative symptom levels were comparable in both groups ($p > 0.05$). Compared to septoplasty alone, septoplasty with turbinoplasty significantly improved postoperative nasal obstruction, facial pain, sleep difficulty, decreased concentration, and overall symptom scores (mean total score: 8.6 ± 1.19 vs. 11.16 ± 1.11; $p < 0.001$). In contrast to 56% in the septoplasty-only group, DNE demonstrated 100% good first-pass airway patency in the combined group. Complication rates were similar across groups and low. The subgroups undergoing unilateral and bilateral turbinoplasty showed no significant differences.

Conclusion: In patients with DNS and ITH, septoplasty + inferior turbinoplasty provides more symptomatic alleviation and objective nasal airway improvement than septoplasty alone. By addressing the structural and mucosal reasons for nasal blockage, this combined surgical approach improves airway patency and reduces residual symptoms while lowering the risk of complications. In appropriate circumstances, inferior turbinoplasty should be performed in conjunction with septoplasty to maximize surgical outcomes.

Key words: Septoplasty with turbinoplasty, Inferior turbinoplasty, Septoplasty, Microdebrider turbinoplasty

INTRODUCTION:

Nasal obstruction is a common problem in otolaryngology, caused mostly by a deviated nasal septum (DNS) and inferior turbinate hypertrophy. Septoplasty remains the most essential operation for DNS, but inferior turbinate enlargement can still be a major cause of restricted airflow, making it difficult to feel better following surgery [1]. As a result, combining septoplasty with inferior turbinoplasty may improve surgical outcomes by addressing both anatomical defects at the same

time. Even though both treatments are routinely used, there is ongoing disagreement over which is superior: septoplasty or septoplasty with inferior turbinoplasty [2]. This is especially true in cases where turbinate hypertrophy is present. A thorough examination of these operations is critical to improve patient care, prevent surgical complications, and achieve long-term symptomatic [3]. The current study compares the effects of septoplasty and septoplasty combined with inferior turbinoplasty by evaluating symptomatic improvement, differences in preoperative and postoperative diagnostic nasal endoscopy (DNE) results, and the occurrence of postoperative complications. This comparison will help to determine the best surgical method for managing DNS and inferior turbinate hypertrophy in patients, informing clinical decision-making and patient counselling.

AIMS AND OBJECTIVES:

To study the outcome of septoplasty and septoplasty combined with inferior turbinoplasty by comparing the symptomatic improvement, pre-op and post-op DNE findings and the postoperative incidence of complications.

REVIEW OF LITERATURE:

Nasal septal deviation (DNS) is a common cause of nasal obstruction, which is frequently associated with inferior turbinate hypertrophy. The most common surgical procedure for DNS repair is septoplasty. The purpose is to free up the nasal passage and alleviate symptoms. The persistence of turbinate hypertrophy may have a detrimental effect on post-surgical outcomes, necessitating the use of supplementary inferior turbinoplasty [4].

According to research, septoplasty is a successful treatment for relieving symptoms in both adults and children, resulting in improved nasal blockage, headache, and other associated symptoms. Paediatric septoplasty had previously been studied for its potential impact on facial growth; nonetheless, it has shown significant reductions in nasal obstruction and a low revision rate, confirming its safety and effectiveness. Isolated septoplasty can reduce inferior turbinate hypertrophy as the mucosa adjusts to changes in airflow dynamics; however, the reversal may be variable and incomplete in certain cases [5].

Randomized trials and meta-analyses found considerable and long-lasting relief of nasal obstruction in individuals having combination surgery, as measured by validated scales such as NOSE and SNOT-20 [6]. The average decrease in nasal obstruction has consistently been larger in the combination group than in septoplasty alone. Long-term studies show that symptomatic alleviation from septoplasty alone may decrease over time, but combination operations show ongoing improvement for up to four years postoperatively. Both endoscopic and traditional approaches demonstrate that addressing the hypertrophied inferior turbinate during surgery is beneficial. This resulted in fewer modifications and improved first-pass diagnostic nasal endoscopy (DNE) outcomes [7].

Although inferior turbinoplasty improves symptoms overall, it may be associated with a slightly higher risk of complications such as adhesions or bleeding. However, when contrasted to the improvements in patient-reported outcomes, the hazards remain low and generally tolerable [7]. In general, the evidence indicates that inferior turbinoplasty combined with septoplasty improves nasal obstruction in patients with DNS and inferior turbinate hypertrophy more efficiently and sustainably than septoplasty alone. For the best surgical outcomes, the diagnostic and treatment plan should be tailored to the preoperative examination and the presence of significant turbinate hypertrophy [8].

MATERIALS AND METHODS:

Study design & setting: This prospective, double-blind, randomized controlled study was conducted from November 2012 to October 2013, in upgraded Institute of Otorhinolaryngology, Rajiv Gandhi Government General Hospital, Chennai. The Institutional Ethics Committee approval obtained.

Study population: The study comprised participants adults aged between 20 to 45 years with radiological and clinical evidence of inferior turbinate hypertrophy (ITH) and a deviated nasal septum (DNS). We chose patients who showed no evidence of vasomotor rhinitis, allergies, or other symptoms.

Inclusion criteria: Both sexes aged between 20 and 45 years. Clinical and CT paranasal sinus exams revealed inferior turbinate hypertrophy and a deviated nasal septum. There are no history or symptoms of vasomotor or allergic rhinitis.

Exclusion criteria: Patients over the age of 45 or younger than 20 years old. The presence of symptoms linked with allergic rhinitis. People who have serious medical diseases, such as diabetes, coronary artery disease, or other concomitant systemic ailments.

Sample size: The study included a minimum sample size of 50 patients: 25 had only undergone septoplasty into one group, and the remaining 25 had undergone inferior turbinoplasty into another group.

Study sampling and Randomization: Sequential enrolments of patients who met the eligibility requirements were made. The even-odd numbering system is used in conjunction with randomization. Even-numbered individuals underwent septoplasty and inferior turbinoplasty. Only septoplasty was done on patients with odd numbers. The type of surgical intervention was kept hidden from both the patients and the evaluators completing postoperative assessments.

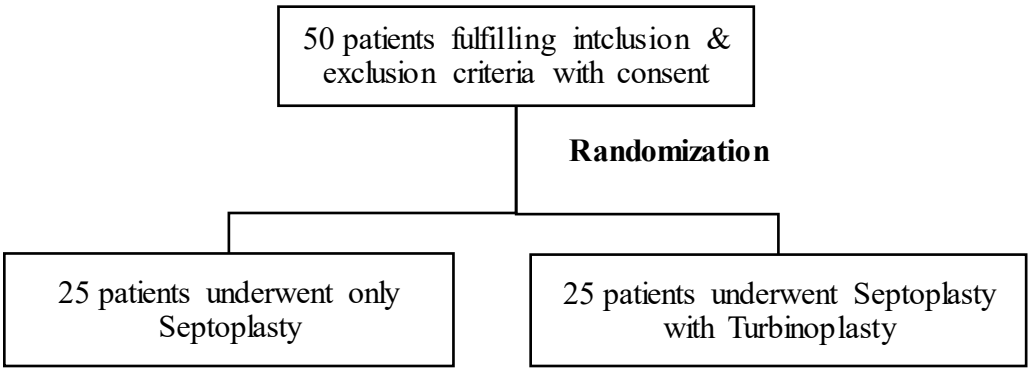

Figure 1: Flow diagram of Randomisation of study participants into two groups:

Preoperative evaluation: Each patient underwent a complete history and clinical examination, with a focus on nasal symptoms. A 0-degree, 4 mm Hopkins rod lens endoscope was used for diagnostic nasal endoscopy (DNE). To confirm turbinate hypertrophy and septal deviation, a CT scan of the paranasal sinuses is conducted. Routine laboratory testing includes kidney function and full blood counts. A modified version of the SNOT-20 score was used to deliver a preoperative symptom questionnaire to measure five key symptoms: irritation, nasal obstruction, facial pain, difficulty falling asleep, and decreased job concentration.

The surgical procedure: Depending on the patient's preferences and clinical concerns, the procedure was performed under either local or general anaesthesia. To provide local anaesthetic, 3-5 ml of 2% lignocaine and 1:100,000 adrenaline was infused into the sub mucoperichondrial plane of the nasal septum as well as the submucosa of both inferior turbinates. Cotton patties soaked in 4% lignocaine plus adrenaline were used to provide topical anaesthetic and decongest. Topical decongestants were used prior to the incision, and general anaesthesia was administered with 1:100,000 adrenaline to decrease intraoperative blood loss.

Septoplasty: Without first decongesting cotton patties, a Freer's incision was done on the septal deviation side. The deviated side showed higher mucoperiosteal and mucoperichondrial flaps. The contralateral mucoperiosteal flap was elevated to facilitate mobilization of the bony-cartilaginous junction. Any septal spurs and a deviated bony septum were removed. To straighten the septum, a 5 mm strip of inferior septal cartilage was excised after scoring the anterior septal cartilage. The flaps were sutured and repositioned.

Septoplasty with Inferior Turbinoplasty: Only individuals randomly randomized to combination surgery had inferior turbinoplasty. A 5 mm vertical incision was made at the anterior end of the inferior turbinate after a local anaesthetic was administered. Submucosal soft tissues on the medial aspect of the turbinate were methodically debrided with a 2.9 mm turbinoplasty blade attached to a microdebrider (Figure 2). Submucosal tunnelling is used to reduce bleeding while preserving mucosa. The hypertrophied turbinate side underwent the same procedure again (Figure 3). Cotton patties were employed to compress the patient to establish haemostasis, and Merocel or medicated gauze was used to pack the nose 48 hours later (Figure 4).

Postoperative Monitoring and Evaluation: Patients were monitored on a regular basis for up to six months following surgery. The modified SNOT-20 questionnaire was used to assess postoperative symptom improvement. A second diagnostic nasal endoscopy was done six months later to assess nasal airway patency and document the efficacy of the "first pass"—the capacity to advance the endoscope to the choana without the use of decongestants. It was observed how frequently surgical problems such as haemorrhage, infection, synechiae development, and septal perforation occurred.

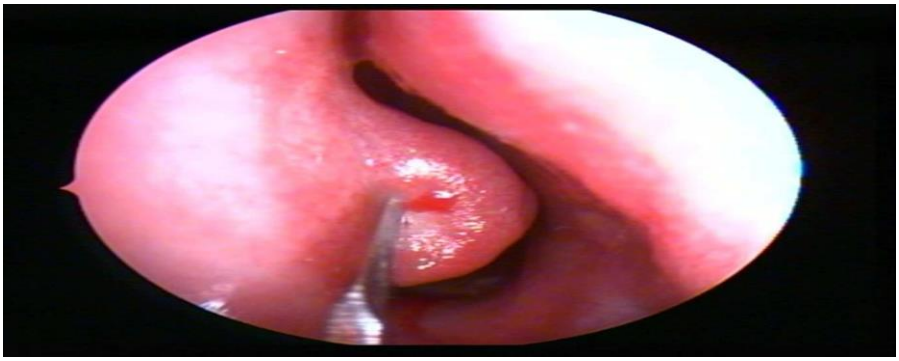

Figure 2: Incision made in the anterior head of hypertrophied inferior turbinate

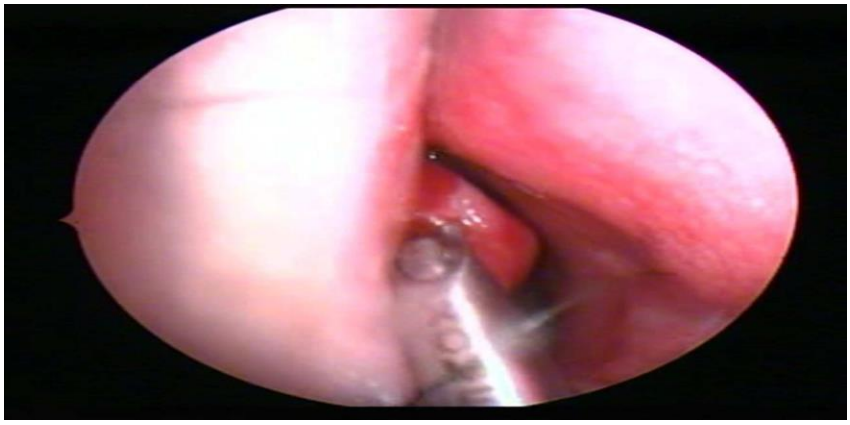

Figure 3: Submucosal tunnelling of inferior turbinate using microdebrider

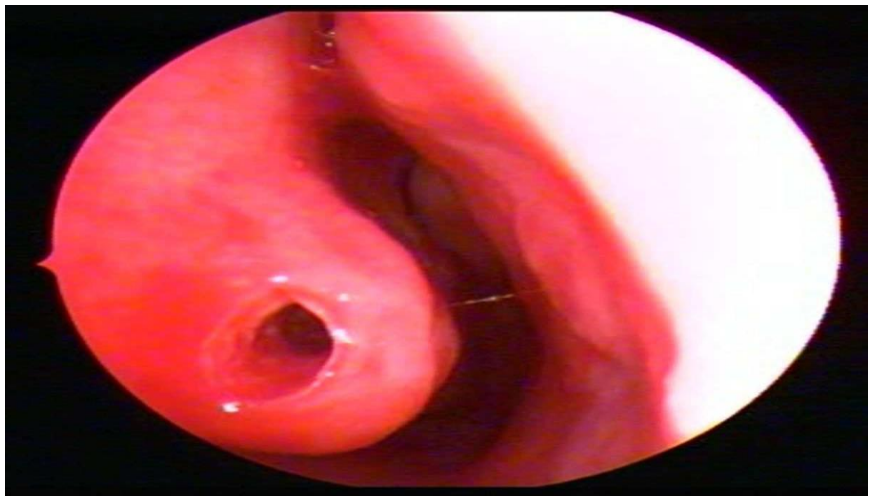

Figure 4: Intra-op picture of inferior turbinoplasty

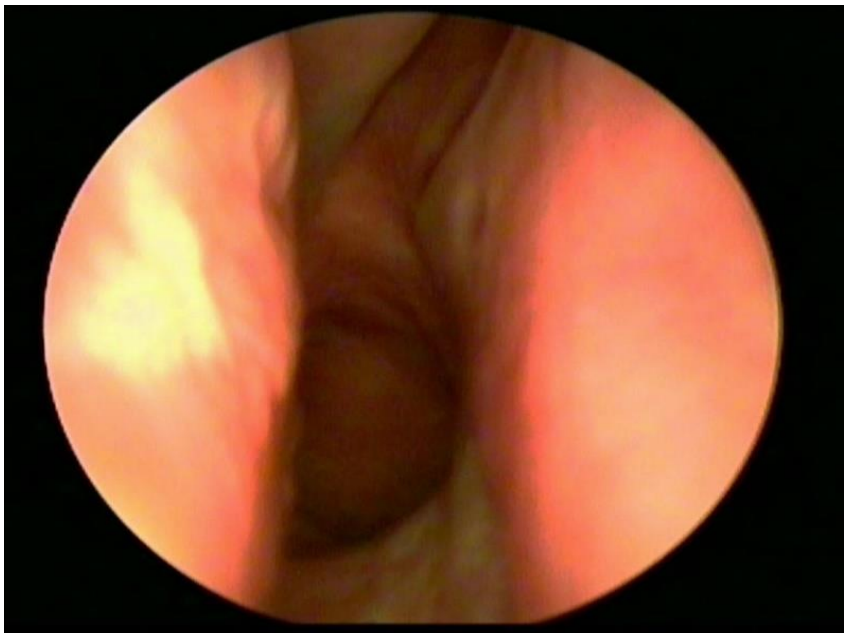

Figure 5: Post op DNE right side showing adequate first pass, patient who have undergone inferior turbinoplasty

Figure 6: Post op DNE left side showing adequate first pass, patient who have not undergone inferior turbinoplasty

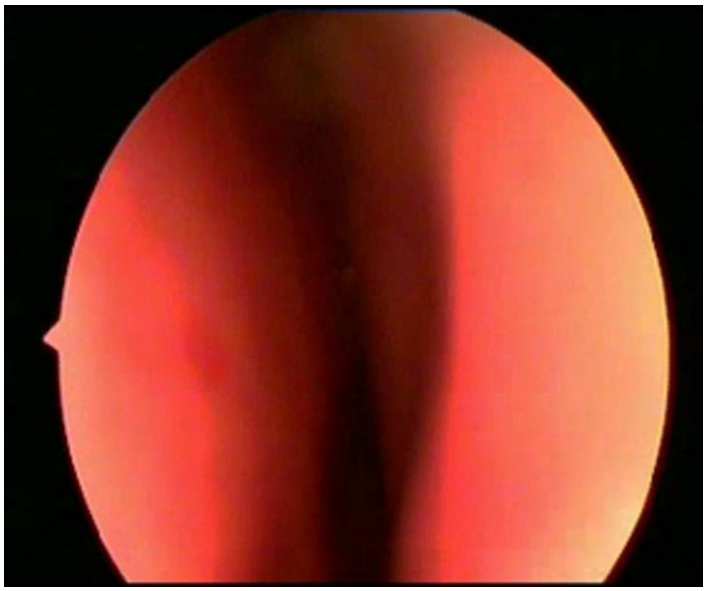

Figure 7: Post op DNE on left side showing inadequate first pass, in patient who have not undergone turbinoplasty

Data collection: Symptom scores from surveys, clinical and endoscopic data, and other information were compiled and collated for analysis. The groups that underwent septoplasty alone and those who got septoplasty plus inferior turbinoplasty were statistically evaluated in terms of postoperative complications, objective nasal patency (DNE results), and symptom relief.

Data Analysis:
Data entered using Microsoft Excel. Data was analysed using the Statistical Package for the Social Sciences (SPSS) version 16.0. Continuous variables were expressed as mean ± SD. The normality of the distribution was assessed using the Kolmogorov-Smirnov test. The independent samples t-test was used to compare two groups of continuous variables with a normal distribution. Gender and other categorical factors were evaluated using Pearson's chi-square test. The p-value of less than 0.05 was considered statistically significant.

RESULTS:
Among the 25 participants undergoing septoplasty only, 20 (80%) were males and 5 (20%) were females. Among the 25 participants in the septoplasty with turbinoplasty group, 16 (64%) were males and 9 (36%) were females. There was no statistically significant difference in gender distribution between two groups (p value 0.21) (Table 1)

Table 1: Gender distribution between two groups: (N = 25 in each group)

	Group		Chi square	p value
	Septoplasty only (N = 25)	Septoplasty with Turbinoplasty (N = 25)		
Male (36)	20 (80%)	16 (64%)	1.59	0.21
Female (14)	5 (20%)	9 (36%)		

Table 2: Comparison of scores in Pre-Op & Post-Op between two groups (N = 25 in each group)

Variables		Mean ± S. D		t value	p value
		Septoplasty (N = 25)	Septoplasty with Turbinoplasty (N = 25)		
Nasal Obstruction	Pre-Op	3.4 ± 0.65	3.7 ± 0.48	1.745	0.09
	Post-Op	2.6 ± 0.5	1.7 ± 0.48	6.663	**<0.001**
Facial Pain	Pre-Op	3 ± 0.58	3.2 ± 0.44	-1.659	0.1
	Post-Op	2.1 ± 0.49	1.6 ± 0.51	3.677	**0.001**
Difficulty in Sleep	Pre-Op	3.2 ± 0.65	3.2 ± 0.6	-0.227	0.82
	Post-Op	2.5 ± 0.51	1.8 ± 0.44	5.367	**<0.001**
Reduced Concentration	Pre-Op	2.7 ± 0.61	2.9 ± 0.64	-1.127	0.27
	Post-Op	1.96 ± 0.46	1.56 ± 0.51	2.938	**0.005**
Irritability	Pre-Op	2.7 ± 0.61	3.2 ± 0.55	-2.661	0.24
	Post-Op	2.04 ± 0.35	2.04 ± 0.46	0.000	1.0
Total Score	Pre-Op	15.04 ± 1.84	16.24 ± 1.39	-2.603	0.34
	Post-Op	11.16 ± 1.11	8.6 ± 1.19	7.878	**<0.001**

The preoperative mean total score of the participants who underwent only septoplasty (25) and that of septoplasty with turbinoplasty (25) were 15.04 ± 1.84 and 16.24 ± 1.39, with no statistically significant difference between the two groups (p-value 0.34) preoperatively. The participants undergoing septoplasty-only and septoplasty with inferior turbinoplasty did not differ in any of the symptom scores prior to surgery, indicating that the two groups were identical before intervention. The postoperative mean total score of the participants who underwent only septoplasty (25) and that of septoplasty with turbinoplasty (25) was 11.16 ± 1.11 and 8.6 ± 1.19, with a statistically significant difference between the two groups (p value <0.001). The participants who underwent septoplasty with turbinoplasty showed more statistical and clinical significance following the procedure than those who underwent only septoplasty. They also showed considerably larger improvements in nasal blockage, facial pain, difficulty sleeping, decreased focus, and overall symptom severity. Notably, the two groups had identical pre- and postoperative irritation scores. Overall, results suggest that inferior turbinoplasty combined with septoplasty provides much more symptomatic alleviation for the majority of nasal-related symptoms than septoplasty alone. (Table 2).

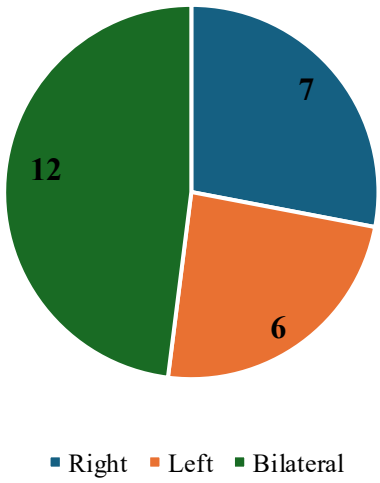

Figure 8: Cases undergone Septoplasty with Turbinoplasty (N = 25)

In the septoplasty with turbinoplasty group of 25 participants, 7 underwent right turbinoplasty, 6 underwent left turbinoplasty, and 12 underwent bilateral turbinoplasty, all in combination with septoplasty (Figure 2). The mean total score among the 25 participants who underwent septoplasty with turbinoplasty exhibit a noticeable drop from pre-op to post-op, demonstrating that surgery was effective. Prior to surgery (p=0.71) and after surgery (p=0.84), there is no statistically significant difference between the right, left, and bilateral instances. (Table 3).

Table 3: Comparison of mean total score among participants undergone Septoplasty with Turbinoplasty group: (N = 25)

Variable		n	Mean	S. D	t value	p value
Pre-Op	Right	7	16.71	1.293	-2.603	0.71
	Left	6	16.66	1.326		
	Bilateral	12	15.75	1.731		
Post-Op	Right	7	9.0	1.012	7.878	0.84
	Left	6	7.83	1.293		
	Bilateral	12	8.41	1.213		

Using a 0-degree 4 mm Hopkins rod lens endoscope, all 25 patients (100%) who underwent combined septoplasty and inferior turbinoplasty had excellent first passes in diagnostic nasal endoscopy (DNE), with no deficiency on either side. In contrast, only 5 patients on the right side and 9 participants on the left had a satisfactory first pass in the septoplasty-only group (56%). Furthermore, there were significant first-pass deficits in the septoplasty-only group: 9 patients on the right side, 5 on the left, and 11 bilateral. This comparison clearly shows that adding inferior turbinoplasty to septoplasty results in a much greater rate of sufficient nasal airway patency as measured by DNE first pass, implying better surgical outcomes in terms of airway adequacy.

DISCUSSION:

To treat nasal blockage and accompanying symptoms, this study assessed the efficacy of septoplasty alone against septoplasty plus inferior turbinoplasty. Preoperative symptom scores and gender distributions were statistically similar across groups, indicating consistent baseline features and lowering selection bias. According to previous research, patients who underwent inferior turbinoplasty in addition to septoplasty experienced significantly greater postoperative improvement in nasal obstruction, facial pain, difficulty sleeping, decreased concentration, and overall symptom burden than those who underwent septoplasty alone. The combined treatment of septal deviation and turbinate hypertrophy resulted in a considerably reduced postoperative mean total score (8.6 ± 1.19 vs. 11.16 ± 1.11, $p < 0.001$). Numerous investigations back up these findings. Karodpati et al. [9] demonstrated improved nasal breathing and quality of life in the combined intervention group by reporting significantly higher NOSE (Nasal Obstruction Symptom Evaluation) scores after septoplasty plus turbinectomy compared to septoplasty alone. In a similar vein, Samarei et al.'s [7] randomized trial confirmed that combined septoplasty and turbinoplasty generated superior subjective outcomes than septoplasty alone. Although both groups showed postoperative improvement, Majumder et al. [10] randomized controlled trial found no statistically significant difference in objective nasal airflow metrics between septoplasty alone and septoplasty combined with radiofrequency turbinate ablation. This suggests that combination surgery may result in much greater subjective symptom alleviation and patient satisfaction, even if objective airflow parameters indicate less difference. Our cohort's absence of statistically significant variations in symptom scores across the right, left, and bilateral turbinoplasty groups implies that efficient turbinate reduction, regardless of laterality, is the primary driver of symptomatic relief. This finding supports the premise that turbinate hypertrophy repair should be tailored to the patient's anatomy while maintaining outcome efficacy. The combined group had significantly greater airway patency rates, with 100% obtaining excellent first passes, compared to just 56% in the septoplasty-only group, according to objective evaluation by diagnostic nasal endoscopy. This is congruent with the findings of Karodpati et al. [9], who found that combination surgery resulted in much clearer nasal airways than septoplasty alone, based on diagnostic nasal endoscopic examinations. The combined group's better symptom alleviation is most likely due to higher airway patency. Because this simultaneous operation treats both mechanical septal deviation and mucosal obstruction, the data support the clinical practice of conducting inferior turbinoplasty together with septoplasty in patients with turbinate hypertrophy. This collaborative technique improves functional outcomes, reduces residual nasal blockage, and lowers the need for revision procedures.

Study Limitations and Future direction: The relatively short follow-up duration and reliance on subjective symptom ratings are among the shortcomings. To confirm long-term advantages, future study should include objective airflow measurements such as acoustic rhinometry and rhinomanometry, as well as longer-term follow-up. Furthermore, randomized controlled trials comparing various turbinoplasty approaches may improve surgical techniques and produce better results.

Conflict of interest: Nil

CONCLUSION:

The study on patients with septal deviation and turbinate hypertrophy found that combining septoplasty with inferior

turbinoplasty resulted in significantly better symptom reduction and nasal airway patency than septoplasty alone. Regardless of whether the turbinate is involved unilaterally or bilaterally, the combined surgical approach reliably improves diagnostic nasal endoscopy outcomes while also dramatically lowering postoperative symptom scores by addressing both mechanical blockage and mucosal hypertrophy. The findings support evidence that a dual operation improves functional benefits while decreasing rates of persistent nasal obstruction. In order to maximize surgical outcomes and limit the need for revision surgeries, inferior turbinoplasty should be performed on a frequent basis in conjunction with septoplasty in carefully selected patients. More study is needed to validate the long-term advantages and enhance surgical methods, including longer follow-ups and objective airflow measurements.

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