



## To Evaluate the Subjective Outcome of Nasal Obstruction in Microdebrider-Assisted Turbinoplasty Using Medial Flap Technique

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### Abstract

**Objective:** To evaluate the subjective outcome of nasal obstruction in microdebrider-assisted turbinoplasty using medial flap technique.

**Materials and methods:** A retrospective study was conducted on 60 patients with a diagnosis of turbinate hypertrophy from March 2018-20 in the department of ENT, Government Medical College, Amritsar, India. All of these patients had symptoms and signs of nasal obstruction and stuffiness related to congested turbinate mucosa that was not responding to medical treatment for a minimum 4 weeks. All patients enrolled were taken in for microdebrider-assisted turbinoplasty using medial flap technique. Patient-scored nasal obstruction (1 to 5) along with blindly assessed nasal airway patency ratings (1 to 4) was done at 3 and 12 months postoperatively. **Results:** A total of 60 patients were recruited in the study. The mean age was 28.44±3.36 years. Average follow-up period was 11.9±3.3 months. Medial flap technique was highly significant in the subjective outcome with 93.3% of patients were improved nasal obstruction (without /occasional decongestants) and nasal patency were improved in 97.1% (no/mild obstruction) patients. (P < 0.001) with the major complications, like nasal bleeding 7.6% crusting 3.3%, adhesions 1.6%) **Conclusion:** The medial flap inferior turbinoplasty is a straight forward procedure that provides a more effective and satisfactory improvement in nasal obstruction subjectively to the patients, without significant risk of complications.

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### INTRODUCTION

Nasal obstruction secondary to inferior turbinate hypertrophy is the one of the most common problems in patients seeking treatment at an ENT clinic. Turbinate hypertrophy is observed in various conditions, including allergic rhinitis, vasomotor rhinitis,

or chronic hypertrophic rhinitis. Medical treatments such as antihistamines, topical decongestants, and topical corticosteroids are used to relieve obstruction.<sup>[1]</sup>

On the other hand, some patients are refractory to these medical treatments and complain of persistent symptoms. In these cases, surgical reduction of inferior turbinate needs to be

performed. Various surgical techniques are currently being done to reduce the volume of the mucosal and bony tissues of the inferior turbinate. These include cryosurgery, electrocautery, total or partial turbinectomy, turbinoplasty, and submucosal turbinectomy.<sup>[2,3]</sup>

Dispute exists on the long term effectiveness of procedures such as electrocautery and laser reduction.<sup>[4,5]</sup> These techniques rely on tissue ablation to create volume reduction. Predicting the response to thermal injury results in an unpredictability to outcome. In contrast, techniques involving turbinate resection, either partial or total, have more predictable volume reduction.

The ideal surgical reduction should be preserving the mucosa and its physiological function. Such physiological preservation avoids distorted airflow and abnormal perceptions of breathing.

An approach preserving the physiological function may help avoid the phenomenon associated with “empty nose syndrome,” although the role of turbinate resection is still debatable in these patients. The ideal turbinate reduction procedure removes the obstructive portions of the turbinate while preserving the medial physiologic mucosa, thus maintaining the sensory functions and humidification of inspired air. Techniques for turbinate reduction should reliably reduce nasal obstruction while maintaining normal mucosal function and limiting the propensity for complications such as bleeding and crusting.<sup>[6]</sup>

The aim of present study is “To evaluate the subjective outcome of nasal obstruction in

microdebrider-assisted turbinoplasty using medial flap technique”.

## MATERIALS AND METHODS

A retrospective study was conducted on 60 patients with a diagnosis of turbinate hypertrophy from March 2018-20 in the department of ENT, Government Medical College, Amritsar, India. All of these patients had symptoms and signs of nasal obstruction and stuffiness related to hypertrophic turbinate mucosa that was not responding to medical treatment. The nasal obstruction was persistent despite medical therapy that included a minimum 4 week trial of intranasal corticosteroids. All patients enrolled were taken in for microdebrider-assisted turbinoplasty using medial flap technique.

### Inclusion criteria:

1. Age :Patients age more than 18 years and less than 45 years
2. Patients with chronic nasal obstruction due to inferior turbinate hypertrophy not responded to medical treatment.

### Exclusion criteria:

Patients with deviated nasal septum, sinusitis, concha bullosa, collapse of alar cartilage, nasal polyps or tumors of nose or paranasal sinuses, previous history of nasal surgeries and pregnancy were excluded from the study.

After selection a complete history was obtained from each patient along with general physical and systematic examination was done. Computed tomography of nose and paranasal sinuses were done in all patients. Relevant pre-operative investigations and pre anaesthetic

check up was done and requisite clearance was obtained. All cases were thoroughly examined and investigated before taking them up for surgery.

Nasal obstruction was measured using a subjective symptom score. Patients scored on a 5-point ordinal scale (worse than preoperative, no change from preoperative, improved but requiring regular decongestants, improved but occasional need for decongestants, improved and no need for decongestants). Assessment of each nasal airway was made by anterior rhinoscopy and endoscopy. A 4-point ordinal scale of severe obstruction, moderate obstruction, mild obstruction, or no obstruction was given. This was based on the ability to visualize the nasopharynx without decongestion, the posterior aspect of the turbinate, middle portion of the turbinate, or only the anterior head. Outcomes were assessed postoperatively at 3 months and 12 months.

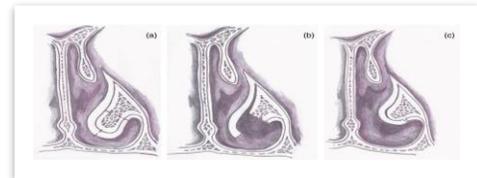
### Techniques:

The anaesthesia preferred was either be local or general anaesthesia. Preparation of the nasal turbinate included injection with 1% xylocaine and 1:100,000 adrenaline.

The medial flap turbinoplasty procedure begin with the creation of a window to the inferior meatus, at the anterior inferior turbinate in the axilla between the inferior turbinate medially and the pyriform aperture laterally. The posterior soft tissue tail was removed with the microdebrider, and a medial flap was created by removal of the inferior border. The remaining mucosal flap was elevated in a subperiosteal plane using Cottle dissector. The

turbinate bone and lateral mucosa were then removed along the vertex of the inferior meatus. The arterial supply, the medial and lateral branches of the inferior turbinate artery, was then identified and cautery was applied using a bayonet bipolar forceps. The medial flap was then rotated laterally onto itself and gelfoam dressing placed to support the flap. Figure No:1

**Figure No: 1** Diagram of the right nose, coronal plane, showing the three consecutive surgical steps: (a) incision (dotted line) ; (b) Medial and lateral mucosal flaps creation and turbinate bone and lateral mucosal flap removed; and (c) Medial mucosal flap repositioning over the turbinate stump.



Nose was then packed with merocel or medicated gauze. During hospital stay of two days, the patient was put on injectable antibiotics, oral anti histamines and analgesics. The pack removal was done after 48 hours. The patient discharged after the pack removal and was prescribed oral antibiotics, anti histamines, analgesics and topical decongestant drops for 7 days. Nasal irrigation was started on postoperative day 3, and the patient follows up for 7 to 10 days postoperatively for removal of any postoperative crusts. The patients were then followed up at 3 and 12 months. Average follow-up period was  $11.9 \pm 3.3$  months ranging from 8 to 15 months.

Statistical analysis was performed using SPSS software. Descriptive data presented as percentages and means  $\pm$  standard deviation (SD). Kendall's tau-B was used for ordinal



values. Chi-squared analysis was used for relationships of nominal variables. Student t test (2-tailed) used for comparisons of parametric data. Results were deemed significant with a p value of  $< 0.05$ .

## RESULTS

A total of 60 patients were recruited in the study. The mean ages were  $28.44 \pm 3.36$  years. Males made up 38 and 63.33% and females 22 and 36.67%, respectively.

Postoperatively, few patients faced problems like nasal bleeding 7.6% crusting 3.3%, adhesions 1.6%) which were managed appropriately by nasal douching, nasal bleeding managed by nasal packing with nasal decongestants soaked cottonoid, synechia formation which were released and nasal pack kept for half a day between two raw surfaces and then removed later, following which nasal douching were advised. 11.6% pain/discomfort, 3.6% discharge were major complications in short term period.



**Table No I:** Short and Long term complications of surgery

Short term (< 3 months)		Long Term (12 months)	
Bleeding (requiring review)	4 (6.7%)	Atrophic Rhinitis	-
Pain / discomfort (additional analgesia)	7 (11.6%)	Adhesions	1 (1.6%)
Crusting (requiring additional debridement)	2 (3.3%)	Anosmia	0 (0 %)
Malodor/ discharge	1 (3.6%)	Ephiphora	0 (0%)
Increased hospital stay (>1day)	4 (6.7%)	Failure of procedure	0 (0%)

The subjective change in nasal patencies after three months were 60% patients with no obstruction, 25% mild, and 15% moderate, no

At three months subjective outcome of nasal obstruction as; worse than preoperatively and No change (0%), Improved with regular decongestants (18.3%), Improved with occasional decongestants (35%) and improved 46.7%.After one year subjective outcome of nasal obstruction is highly significant 93.3% improved (without /occasional decongestants), 6.6.7% improved with regular decongestants. p <0.001 **Table No: II.**

**Table No II:** Subjective outcome of nasal obstruction at 3<sup>rd</sup> and 12<sup>th</sup> month

Nasal obstruction	3 Months		12 Months	
	0	12 <sup>th</sup> month	3 Months	12 Months
Worse than preoperatively	0		0.0	
No change	0		0.0	0.0
Improved (regular decongestants)	1 (18.3%)	Moderate obstruction	9 (15%)	3.33%
		Mild obstruction	15 (25%)	29.7%
Improved (occasional decongestants)	2 (35.0%)		40.0%	
Improved (no decongestants)	28 (46.6 %)		53.3%	

one with sever nasal obstruction. **Table No: III.** However this reduction was statistically significant in long term after the surgery.Nasal Patency at 12 months, a significant proportion of patients had a better nasal assessment by a blind assessor with 97.1% however 85.0% at 3 months with mild to no obstruction 15.0% moderate to server nasal obstruction. **Table No: III.** There was significant improvement in subjective outcome of nasal obstruction and patency after reducing the inferior turbinate size after 12 months p <0.001.

**Table No III:** Subjective Outcome of nasal patency at

## DISCUSSION

The inferior turbinate is an important structure, playing a vital role in the nasal physiology. It has many functions, including filtration, warming, and humidification of the inspired air, in addition to the regulation of nasal airflow.<sup>[1]</sup> The microdebrider was used since the 1990s in endoscopic rhinosinusual surgery, was introduced into turbinate surgery as a submucosal corridor with the advantage of not altering the function of the nasal mucosa.<sup>[5,6,7,8]</sup>

Furthermore, several studies demonstrated that turbinoplasty technique is a superior technique for the management of inferior turbinate hypertrophy, producing a lasting and adequate decrease in turbinate size with low morbidity.<sup>[9,10]</sup> Crusting, nasal bleeding, discharge, and pain post-operative complications were not found to be significantly associated with described techniques, particularly those with mucosal preserving techniques, submucoal and turbinoplasty, similar to additional reports in the literature.<sup>[6,11]</sup>

In our study, the subjective improvement of nasal obstruction was best achieved with the microdebrider-assisted turbinoplasty using medial flap technique. This was associated with low rates of nasal crusting and troublesome primary hemorrhage. Table No: II. **Barham et al,**<sup>[11]</sup> showed minimizes post-operative side effects and complications such as dryness, infection, bleeding and pain. **Cingi et al,**<sup>[12]</sup> concluded that no crusting was observed post-operatively.

Cingi et al, and Gupta et al, showed the effectiveness of this technique for the recovery of respiration and they noted significant improvement in nasal obstruction at the first post-operative week.<sup>[12,13]</sup> The positive effects of turbinate reduction on the nasal airway, appear equally good. However, nasal breathing begins to improve starting from the first week after the operation. Symptoms of nasal obstruction and congestion regressed significantly on the first evaluations and thereafter stabilized until the 90th postoperative day.

Medial flap technique was highly significant in subjective outcome with 93.3% patients having improved nasal obstruction (without /occasional decongestants) and nasal patency was improved in 97.1% (no/mild obstruction) patients. (P < 0.001). Our results show that resection of turbinate bone, preservation of nasal mucosa, and a controlled volume reduction contributes to a more robust long-term outcome in this technique. Results were compared with other studies. **TableNo: IV**

Study	Technique	Number of patients	Improvement In nasal obstruction	Follow up Period
Our study	Medial flap Inferior Turbinoplasty	60	97.1%	11.9 months
Barham et al	Meidal flap	60	97.5%	60 months

[11]	inferior			
Lee et al [14]	Cobaltion	60	86%	12 months
Van et al.[15]	Endoscopic partial inferior turbinoplasty.	100	93%	36 months
Lee and Chen [16]	Submucosal pocket	29	91%	15.3 months
Dinesh Kumar et al[17]	Partial inferior turbinectomy	60	87.5	6 month
Kassab et al. [18]	Diode laser	20	85%	6 months

therapy used by patients. Included patients were not restricted to avoidance of medical management during the follow up period and only data regarding the use of decongestive therapy was recorded.

### Summary

In this study after the results obtained, we can state that this surgical technique on the inferior turbinate is very effective and solve the pathologic condition while respecting the nasal mucosa and thus the function of the turbinate.

### CONCLUSION

The medial flap inferior turbinoplasty is technically straight forward procedure that provides long term relief of obstructive symptoms without significant risk of complications. The removal of both the lateral mucosa and bone as well as a controlled reduction of the medial mucosa is less likely to lead to re-expansion of the turbinate with the passage of time compared to other technique.

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The principal merit of the medial flap technique is its excellent visualization during the entire procedure. This allows precise elevation of the mucosal flap without unguarded tearing, resection of turbinate bone even at the most posterior end of the inferior turbinate. There is significant improvement in nasal patency with controlled volume reduction contributes to which lasts for a long time. It provides excellent outcomes in a wide variety of patients with minimal complications.

### Limitations

One of the major limitations to this study was exact recording of any additional maintenance



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