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Research article

## A PROSPECTIVE STUDY OF AN EFFECT OF SEPTORHINOPLASTY /RHINOPLASTY ON DEVIATED EXTERNAL NASAL PYRAMID IN KASHMIRI POPULATION

Nazir A khan<sup>1</sup>, AyazRehman<sup>1</sup>, MushtaqSangoo<sup>1</sup>, Sajad Hamid<sup>2</sup>

<sup>1</sup>Department of Otorhinolaryngology, <sup>2</sup>Department of Anatomy, SKIMS Medical College, Bemina

\*Corresponding author email: [drsajadk@rediffmail.com](mailto:drsajadk@rediffmail.com)

### ABSTRACT

Most studies show that objective measures to quantify and determine surgical success in the treatment of External nasal deformity with /without nasal obstruction do not correlate with subjective improvement as reported by patients. **Aim:** To evaluate the subjective & objective improvement in patients undergoing septorhinoplasty or rhinoplasty **Materials and Methods:** It is a prospective study in which we evaluate 100 patients who had to undergone septorhinoplasty /rhinoplasty; various angles of nose & face were evaluated both preoperatively & postoperatively. In cases selected for Septorhinoplasty, the patients answered a questionnaire preoperatively and 2 months after surgery with questions about the main symptoms of nasal obstruction (nasal obstruction, coryza, pruritus, sneezing, facial pain, snoring, sleep disorders, daytime drowsiness), and a score of each. The intensity of symptoms was scored from 1 to 4, as follows: 1 - absence of symptoms; 2 - mild symptoms; 3 - moderate symptoms; 4 - severe symptoms. **Results:** An improvement of all symptoms was observed after surgery, where there was nasal obstruction associated with external nasal deformity i.e; NOSE (Nasal obstructive symptom evaluation) were  $45.0 \pm 10.2$  (preoperatively) &  $10.0 \pm 4.23$  (post-operatively) with p-value < 0.005 whereas NASE (Nasal appearance surgical evaluation) were  $41.8 \pm 11.25$  (pre-operatively) &  $7.8 \pm 5.29$  (post-operatively) with p-value < 0.005 **Conclusions:** The external nasal appearance as well as symptoms of nasal obstruction (in c/o =septorhinoplasty) improved.

**Keywords:** nasal septum, External nasal deformity, NOSE score, NASE

### INTRODUCTION

Patients seeking nasal surgery come for a variety of reasons. Some have trouble breathing through the nose. Others have suffered injuries of some sort, and would like to restore better symmetry and correct the damage. Finally, many are looking to alter the size or shape of the nose to make it more harmonious with their features, to

improve their appearance. The goal of rhinoplasty is to improve the nose aesthetically, creating harmony with the other facial features. Before the nose is altered, a young patient must reach full growth, usually around age fifteen or sixteen. Exceptions are cases in which breathing is severely impaired.

Before deciding on rhinoplasty, additional surgery might be recommended to enhance the appearance of face. Many patients have chin augmentation in conjunction with rhinoplasty to create a better balance of features.

In cases of Nasal obstruction associated with external nasal deformity, the nasal septum deviation is one of its most frequent causes. Other causative conditions are: adenoid hypertrophy; turbinate hypertrophy; nasal tumors; and nasal polyps<sup>1</sup>. Nasal septum corrective surgery (Septoplasty) was started in the 19<sup>th</sup> century, and has been modified and improved since. The techniques have attempted to provide maximum functional and respiratory improvement at the same time preserving other physiologic functions of the nose (filtering, warming, and moisturizing the air) to improve nasal flow.<sup>2</sup>

Submucosal resection (SMR) was first defined by Freer in 1902, as the resection of quadrangular cartilage, the perpendicular lamina of ethmoid bone and total resection of the vomer. The era of modern septal surgery began in 1940s with Cottle, Goldman, and Smith who recognised the disadvantages of submucous resection.<sup>3</sup> The inadequate surgery for nasal obstruction is still a dilemma. The surgery specified to the obstructive pathology should be emphasized. The surgical correction of nasal septum does not always guarantee a successful outcome. The literature supports a reevaluation of surgical paradigms in patients with the physical findings of both a septal deviation and turbinate hypertrophy.<sup>2,4</sup>

The corrective nasal valve surgery results in significant improvement in disease specific quality of life and the high satisfaction level.<sup>5</sup>

Some other studies have been performed to assess the impact of the surgery for nasal blockage on the quality of life of the patient.<sup>6,7</sup>

Objective measures to quantify and establish the success of surgery have been a challenge. Several methods have been proposed; the two most common are rhinomanometry and acoustic rhinometry. Rhinomanometry measures nasal

flow resistance during breathing. Acoustic rhinometry measures nasal permeability and quantifies the cross-sectional area of the nostrils up to the nasopharynx, as well as the nasal cavity volume between any two chosen cross-sections<sup>6</sup>. Most studies have shown that these methods do not correlate with the patient's reported subjective improvement<sup>6,7</sup>. A few studies have shown, however, that septoplasty is generally effective for treating nasal obstruction, and that most patients show improvements in nasal symptoms<sup>3,4,7-11</sup>. The aim of this study is to evaluate the surgery of External nasal deformity with/ without nasal obstruction in the patient's perception, and exhibit our results. We used the Nasal Obstructive Symptom Evaluation (NOSE) score and NASE (Nasal angle Surgical Evaluation) to indicate the impact of surgery.<sup>8-10</sup>

## MATERIAL AND METHODS

After approval by the ethics committee of our hospital, the study was performed prospectively between 2012 June – 2013 July in a tertiary hospital. SKIMS Medical college/hospital all enrolled patients gave signed informed consent. This study included 100 patients which met the inclusion criteria as follows: Indications that are covered:

- 1) For cosmetic purposes
- 2) Medically indicated as in
  - A) When it is being performed to correct a nasal deformity secondary to congenital cleft lip and/or palate for patients 18 years of age and younger.
  - B) To correct chronic non-septal nasal airway obstruction from vestibular stenosis (collapsed internal valves) due to trauma, disease, or congenital defect, when all of the following criteria are met:
    1. Prolonged, persistent obstructed nasal breathing; *and*
    2. Physical examination confirming moderate to severe vestibular obstruction; *and*

3. Airway obstruction will not respond to Septoplasty and turbinectomy alone; *and*
4. Nasal airway obstruction is causing significant symptoms (e.g., chronic rhinosinusitis, difficulty breathing); *and*
5. Obstructive symptoms persist despite conservative management for 3 months or greater, which includes, where appropriate, nasal steroids or immunotherapy; *and*
6. Photographs demonstrate an external nasal deformity; *and*
7. There is an average 50 % or greater obstruction of nares (e.g., 50 % obstruction of both nares, or 75 % obstruction of one nare and 25 % obstruction of other nare, or 100 % obstruction of one nare), documented by nasal endoscopy, computed tomography (CT) scan or other appropriate imaging modality.

C) When rhinoplasty for nasal airway obstruction is performed as an integral part of a medically necessary septoplasty and there is documentation of gross nasal obstruction on the same side as the septal deviation.

Revision cases: Patients who have any of the following conditions or met any of the following criteria are excluded from the study: The history of allergy, Adenoid hypertrophy, Undergoing concurrent endoscopic sinus surgery, polypectomy, With a main preoperative complaint other than nasal obstruction (e.g. snoring, facial pain, nasal discharge, postnasal drip syndrome, sinonasal malignancy etc.), nasosinusal tumors, head and neck radiotherapy, nasal septum; insufficient nasal valve, nasosinusal granulomatous disease, hyperplastic pharyngeal tonsils, snoring surgery, craniofacial malformation, pregnancy.

After selecting, the patients were assessed preoperatively and on the 7<sup>th</sup>, 14<sup>th</sup>, 30<sup>th</sup>, and 60<sup>th</sup> postoperative day. This evaluation consisted of an otorhinolaryngologica examination, measurement of NASE (Nasal appearance

surgical evaluation) & NOSE SCORE (Nasal obstructive symptom evaluation) in cases of those who underwent septorhinoplasty whereby, a questionnaire with questions about the main symptoms of nasal obstruction (nasal obstruction, coryza, pruritus, sneezing, facial pain, snoring, sleep disorders, daytime drowsiness), were asked and a score given for each answer. The intensity of symptoms was scored from 1 to 4, as follows: 1 - absence of symptoms; 2 - mild symptoms; 3 - moderate symptoms; 4 - severe symptoms. Data were gathered on sex, age, and the degree of septal deviation. Also, the patient factors are to be taken into consideration. During assessing a patient for potential rhinoplasty, a full concentration was given on the patient's expectations prior to performing the comprehensive facial analysis. Although there are different methods for integrating the patient in the surgical process. The computer imaging of the face was done as it provides an excellent way to gain a realistic understanding of the anticipated outcome these images were combined with standardized anterior, lateral, oblique, and basal photographs. Nonsteroidal anti-inflammatory agents and certain herbal supplements may increase bleeding complications after surgery and should be discontinued at least 7–10 days before a rhinoplasty. Furthermore, patients are instructed to avoid consumption of salicylic derivatives for 3 weeks prior and 1 week following surgery.

A critical facial analysis was also done in order to preserve nasofacial harmony & any natural facial asymmetries was pointed out so that the patient gains a better understanding of what is present before any operative intervention.<sup>12,13</sup>

Prior to surgery we convert our operative plan into a graphic representation to assist us in the operating room. Modifications to the plan are documented intraoperatively, transposed to the graphic depictions postoperatively, and placed in the patient's chart for future reference. Cefazolin 1 g was administered intravenously as a

perioperative antibiotic. We prefer general anesthesia for our patients, though local anesthesia with intravenous sedation is a viable alternative. After the administration of anesthetic, the nasal vibrissae are clipped and the nares are prepared with povidone iodine solution. The anticipated incision approach is marked and injected with approximately 10 ml of 1% lidocaine with 1: 100 000 epinephrine into the nasal mucosa, along the septum and the soft tissue envelope. Next, the mucosa is treated with cottonoidpledgets soaked in oxymetolazone

**Operative approach:** We select the two basic incisional approaches to rhinoplasty: 1. The open technique 2. The closed (endonasal) technique. Each has its advocates who use them successfully in the practice of rhinoplasty.

The open approach involves a transcolumellar incision, which can assume varying geometries, depending on surgeon choice. Our preference is a stair step configuration, which facilitates reapproximation while breaking up the scar and preventing contracture deformities. The open approach also involves skeletonizing the underlying osseocartilaginous framework, which gains enormous exposure for the manipulation and correction of deformities. The closed (or endonasal) technique can be performed using a cartilage-delivery approach or a nondelivery approach.

**Osteotomy techniques:** Osteotomies are a powerful technique in rhinoplasty.<sup>14-16</sup> The indications to perform osteotomies, regardless of technique are: 1. To narrow the lateral wall of nose 2. To close an open roof deformity (after dorsal hump reduction) 3. To create symmetry by straightening the nasal bony framework

**Contraindications:** 1. Patients with short nasal bones 2. Elderly patients with thin fragile nasal bones 3. Patients with heavily eye glasses

There are several osteotomy techniques, including medial, lateral, transverse, or a combination of these. Furthermore, they can be performed through either an external or internal approach<sup>17-19</sup>

**Closure:** After hemostasis was achieved and any excess debris removed, the skin envelope was redropped. If the patient has thick skin, and especially if the patient is a woman, we choose to place a single 5-0 Vicryl suture from the dermis (underside of the skin envelope) to the underlying cartilaginous framework in an attempt to recreate a supratip break.

The transcolumellar incision was closed using 6-0 nylon suture in simple interrupted fashion, making sure the coaptation of the incision margins is precise. The stair stepping of the original incision helps us close this accurately. The infracartilaginous incisions were reapproximated using 5-0 chromic suture in simple interrupted fashion. We take special care to prevent overbiting with the suture, which can create contour irregularities and notching, especially in the soft triangle area. In septal work, we place intranasal silastic splints coated with antibiotic ointment.

**Alar base surgery:** In certain cases Alar base abnormalities were seen & include wide or excessive nostril sills, a wide alar base, asymmetric or malpositioned alar bases, or any combination of these, so alar base surgery was necessary, & was performed after closure of the transcolumellar and infracartilaginous incisions, but before intranasal and external splints are placed.

**Depressor septi translocation:** Some patients had a tension tip (foreshortened upper lip with decreased tip projection), a depressor septi translocation was done

**Postoperative care:** All preoperative and postoperative instructions were given to the patients in writing before and on the day of surgery. Postoperatively, we put them on : Cephalexin 500mg orally, 8 hourly for 3 days, Medrol dose pack for 7 days to minimize postoperative edema, Acetaminophen 500mg every 4-6 hourly for post-operative pain, Normal nasal saline solution for post-operative nasal congestion. The patient is instructed to keep the head of the bed elevated at an angle of 45°

beginning immediately after surgery to help minimize postoperative swelling. Cool compresses are used periorbitally during the day for the first 48 hours. The patient is instructed to change the drip pad under the nose as necessary until the drainage stops, at which time the drip pad and tape can be discontinued. Any manipulation of the nose, including rubbing, blotting, or blowing, is discouraged for the first 3 weeks postoperatively.

### Statistical Analysis

### RESULTS

**Table 1: Showing information regarding various parameters among selected cases**

Parameter		No of patients
Sex distribution	Male	67
	Female	33
Area-wise distribution	Rural areas	70
	Urban areas	30
Types of cases	Primary cases	86
	Revision cases	14
Main indications	Saddle nose deformity	20
	Dorsal hump	55
	Supratip depression	5
	Nasal valve area weakness	20
Type operative procedure	Septorhinoplasty	80
	Rhinoplasty only	20
Type of operative approach	Open	55
	Close	45
Chief complaints	External nasal deformity with nasal obstruction	80
	External nasal deformity	20
Aetiological factors	Post-traumatic	54
	Developmental	40
	Post-operative	5
	Post-infective	1

**Table 2: Shows the type of graft material used**

Graft material used ( only in 45 cases)	
Autologous septal cartilage	35
Autologous Conchal cartilage	5
Autologous iliac crest	1
Autologous septal bone	4

Analyses were conducted in NCSS (Number Cruncher Statistical System) 2007&PASS 2008 Statistical Software (Utah, USA). The predictors of improvement for quantitative data, parameters showing the normal distribution between groups compared with the One-way Anova test. As well as descriptive statistical methods (mean, standard deviation) are used. Parameters which are not showing the normal distribution between groups, Mann-Whitney U test is used. To assess the qualitative data, chi-square test is used. A  $p < 0.05$  is considered as statistically significant.

**Table 3: Shows the different techniques used**

Various surgical techniques used	
Dorsal augmentation	Only graft
Supratip augmentation	Goldhen's tip procedure
Spreader graft	Intra & Inter dermal suturing

**Table 4: Shows evaluation of operation in terms of pre-operative and post-operative nasal angles**

Nasal angles	Pre-operative	Post-operative	p-Value
Nasolabial	94.2 ±7.7°	97.1±6.8°	1.042
Nasofrontal	134.5±7.4°	133.1±6.9	1.058
Nasofacial	32.0 ±5.2°	31.2 ±4.9	1.020

**Table 5: Shows evaluation of operation success by analysing pre-operative & post-operative NOSE score and NASE score<sup>23,24</sup>**

Score	Pre-operative	Post-operative	p- Value
NOSE (Nasal obstructive symptom evaluation)	45.0±10.2	10.0±4.23	< 0.005
NASE (Nasal appearance surgical evaluation)	41.8±11.25	7.8±5.29	< 0.005



**Fig. 1a: Deviated External nose (pre-op.)**



**1b: Corrected deformity (Post-op.)**



**Fig 2a: Deviated External nose (pre-op.)**



**2b: Corrected deformity (Post op.)**





**Fig 3a: Deviated External nose (pre-op.)**



**3b: Corrected deformity (Post op.)**

## DISCUSSION

Owing to its central location on the face, the nose plays an intimate role in all social interactions. Early surgical correction of nasal deformities improves psychosocial development and opportunities for normalized social integration and removes the stigma of an abnormal appearance. Pre and intraoperative planning are essential in order to achieve good results; the surgeon must carefully examine the nose in order to determine which pathological condition there is and which surgical procedure is needed <sup>20</sup>.

In the present study 67% of patients were male vs. 33% female. (Table 1) This agrees with the study for objective evaluation of a deviated septum, Erdem & Ozturan <sup>21</sup> reported that the number of males was more than females, <sup>21</sup> that may be explained because this study dealt only with patients seeking functional correction of deviated septum which is more common in males due to more exposure to trauma. (Table 4) In contrast to females, male patients seem to lack a clear body concept and an in-depth awareness of their physical appearance. As a result, they often have difficulty articulating their objectives for cosmetic surgery.

In the current study there was a statistically significant difference between pre-operative and postoperative measurements for nasofacial, nasolabial & naso frontal angles. (Table 4) This agrees with Okur, et al.<sup>22</sup> who stated that the angle measurement method may be helpful in

evaluating the effectiveness of surgical techniques and the results for correction<sup>22</sup>. In another study by Ozkul & Ozkul et al.,<sup>23</sup> five parameters (nasofrontal, nasomental, nasolabial, nasofacial angles and nasal projection ratio) were used to induce a facial harmony index, which is to generate a score for the patient before and after the rhinoplasty operation so that the improvement due to rhinoplasty operation can be determined objectively<sup>23</sup>.

In the current study, we found that 20% of patients with saddle nose deformity, 55% had dorsal hump, 5% had supratip depression & 20% had nasal valve area v weakness. (Table 1) And excellent results were seen in in post-operative measurements. This agrees with Okur et al. (2004) who found that 66.7% of the patients with crooked noses had good and excellent results after surgery.

Also, Erdem & Ozturan (2008) found that 27.7% of his patients had excellent results and 30.5% had good results after measuring the angle of septal deviation post-operatively<sup>21,22</sup>. The approach for the management were open (55%) & close approach in (45%) (Table 1) with the operative procedure septorhinoplasty done in (80%) cases & rhinoplasty alone in (20%) cases (Table 1) & includes wide exposure through external septorhinoplasty, release of all deforming forces for the septum, straightening of the septum while maintaining an adequate dorsal

and caudal strut, realigning and reinforcing the nasal structures with sutures or grafts, and performing adequate osteotomy.

Although not being necessary for indicating surgery, the classification of patients as being candidates or not to the procedure, may predict results which are more or less satisfactory. Patients with high scores in the pre-op may not be very pleased after the surgery, and they may even have a risk of worsening in their initial situation. This agrees with Izu, et al.<sup>24</sup>

## CONCLUSION

This study along with other studies emphasizes the importance of using the evaluative tools to subjectively and objectively assess patients undergoing septorhinoplasty / rhinoplasty. Both subjective and objective evaluation tools are important for identifying the best candidate for rhinoplasty operation, though most of the surgeons depend on their aesthetic eye only. It should be taken into consideration that the aesthetic eye is a skill that needs a lot of time to be developed.

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