



ISSN:2456-9739

Available Online at <http://www.bjbmr.org>

BRITISH JOURNAL OF BIO-MEDICAL RESEARCH

Cross Ref DOI: <https://doi.org/10.24942/bjbmr.2022.927> Volume 06, Issue 01, Jan - February 2022

Research Article

A Study Of Management Of Various Nasal Deformities Using Closed Rhinoplasty Technique

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ARTICLE INFO

Article History:

Received on 04th Jan 2022
Peer Reviewed on 18th Jan 2022
Revised on 14th February 2022
Published on 28th February 2022

Keywords:

Closed Rhinoplasty; Nasal Deformities

ABSTRACT

INTRODUCTION: Rhinoplasty is the cosmetic surgeries for correcting and reconstructing the form, restoring the functions, and aesthetically enhancing the nose. The various causes for deformed nose are 1. congenital abnormalities 2. Acquired abnormalities Rhinoplasties can be approached by two techniques: 1. the open technique 2. closed technique. The closed rhinoplasty can be performed in three ways (a) Augmentation (b) Reduction (c) Both augmentation and reduction. There are two types of rhinoplasty: 1. primary rhinoplasty. 2. Secondary rhinoplasty. However, a rhinologist should know the principles and procedures of both “open” and “closed” approaches, together with the respective pros and cons, and select the surgical approach based on each case.

MATERIALS AND METHODS: Total of 30 cases satisfying the inclusion criteria were enrolled in study. Detail history including history of trauma and previous nasal surgery was taken. Detailed examination of nose and facial analysis was done. Each patient was investigated as per study parameters like nasal air blast, NOSE scale, nasofrontal and nasolabial angles, photographs. In our study, we have done an observational analytical retrospective cum prospective study on management of various nasal deformities using closed rhinoplasty. Patients selection was done after considering both inclusion and exclusion criteria. Potentially problematic patients, as high risk patients were identified.

CONCLUSION: Closed rhinoplasty gives as good result as open rhinoplasty. In our study, it was noted that irrespective of types of closed rhinoplasty executed, there was not much differences in the results in both aesthetic and functional aspects. As per our study, there are certain advantages of closed rhinoplasty over open rhinoplasty.

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INTRODUCTION

Rhinoplasty commonly known as nose job is one of the most commonly performed cosmetic surgeries for correcting and reconstructing the form, restoring the functions, and aesthetically enhancing the nose. It is usually performed after 17 years of age, since by this time, nose and face becomes fully mature.

In 600 B.C., Sushruta described the rhinoplasty techniques for the first time in the ancient Indian text Sushrutasamhita, where a nose is reconstructed by using a flap of skin from the cheek. Jacques Joseph is considered as the founder of modern rhinoplasty.

Modern Rhinoplasties can be approached by two techniques: the open technique or the closed technique. The term "closed" suggests that the surgeon cannot see or access vital areas of the nose during surgery and no columellar incision. The closed rhinoplasty can be performed in three ways (a) Augmentation: material which we utilize as graft is septal cartilage, costal cartilage, conchal cartilage, tragal cartilage and silicone implant. (b) Reduction: we do internal osteotomies. (c) Both augmentation and reduction.

There are two types of rhinoplasty: 1. primary **rhinoplasty** denotes a first-time reconstructive, functional, or aesthetic corrective procedure. 2. **Secondary rhinoplasty** denotes the revision of a failed rhinoplasty. Most revision surgery is more technically complicated because the nasal support structures either were deformed or destroyed in the primary rhinoplasty.

The ideal surgical approach for rhinoplasty continues to be debated amongst surgeons. Each technique has its merits. The advantages of open approach are full visualization of the operative field, ability to create minute changes to the tip and a rarely visible columellar incision line on the other hand it is more destructive hence more chance of secondary defects. However, modern surgery is continuously searching for minimally invasive without visible scars, reduced surgical time, reduced post-operative edema, no columellar incision, quicker post-operative healing, preservation of the natural anatomy and

aesthetic appearance and restoration of the physiologic elasticity of the operated structures. Based on these principles, "closed" rhinoplasty seems extremely modern. However, a complete rhinologist should know the principles and procedures of both "open" and "closed" approaches, together with the respective pros and cons, and select the surgical approach based on each case.

Nasal deformities can be quite different from patient to patient, and that there is no one method that can be used for every nasal deformity. Correction requires a complete understanding of the pathology and nasal analysis.

Thorough knowledge of anatomy, pathology and physiology of the nose, enables the optimal correction and reconstruction.

The various causes for deformed nose are

1. Congenital abnormalities

- Cleft lip and palate
- Congenital nasal abnormalities
- Genetically derived ethnic- nose abnormalities

2. Acquired abnormalities

- Trauma: Non- reduced fractured nasal bone, septal hematoma
- After nasal surgery: septoplasty, Submucous resection, rhinoplasty
- Infection: Syphilis, septal abscess, leprosy, tuberculosis
- Inflammatory conditions: Wegener' granulomatosis, sarcoidosis, relapsing polychondritis
- Tumors: Malignant and benign tumors
- Autoimmune systemic diseases
- Toxins: Chemical damage by inspired substances- e.g. cocaine, aerosol antihistamine medications etc

AESTHETIC OF THE NOSE- NASAL SUBUNITS AND SEGMENTS

To plan, map, and execute the surgical correction of a nasal defect or deformity, the structure of the external nose is divided into nine aesthetic nasal subunits, and six aesthetic

nasal segments. The surgical nose as nine aesthetic nasal subunits (Fig.1)

1. tip subunit
2. columellar subunit
3. right alar base subunit
4. right alar wall subunit
5. left alar wall subunit
6. left alar base subunit
7. dorsal subunit
8. right dorsal wall subunit
9. left dorsal wall subunit

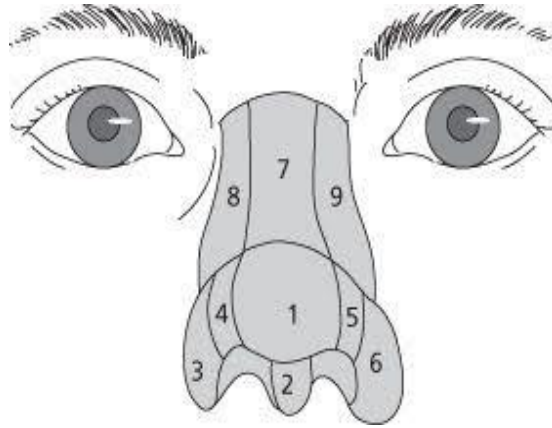


Fig. 1

The surgical nose as six aesthetic nasal segments

1. the dorsal nasal segment
2. the lateral nasal-wall segments
3. the hemi-lobule segment
4. the soft-tissue triangle segments
5. the alar segments
6. the columellar segment

PREOPERATIVE ASSESSMENT

The proper planning is essential before surgery; hence systemic approach is needed to completely assess the patients.

Assessment includes:

- Patient Analysis
- Analysis of the face
- Analysis of the nose
- Examination of the nose
- Photography

PATIENT ANALYSIS

The complete medical and physical examination of the patient is essential to determine patient's physical fitness to undergo surgery.

IDENTIFYING HIGH RISK PATIENTS

Example: Body dysmorphic disorder (BDD)

ANALYSIS OF THE FACE

An asymmetrical face can lead to dissatisfaction post-surgery. Symmetry is assessed using midline facial landmarks.

Facial analysis involves analysis of facial proportions and inspection of skin type. Facial proportion analysis using the '**rule of thirds**' and the '**rule of fifths**'.

Horizontal facial thirds should be approximately equal; the landmarks defining each third are the trichion to glabella, glabella to subnasale and the subnasale to soft-tissue menton.

The **rule of fifths** describes the ideal transverse proportions of the face vertically divided into equal fifths, each fifth approximately equal to the width of one eye; the alar base is equal to the intercanthal distance. The nose ideally occupies one-third of the length of the face and one-fifth of its width. It is also important to see the position of the lips and protrusion of the chin.

Terminology of facial landmarks (Fig.2 & 3)

- Trichion: Anterior hairline in the midline
- Glabella: Most prominent point of forehead in mid-sagittal plane

- Nasion: Deepest point of frontonasal angle
- Rhinion: Midline point of junction of nasal bones and upper lateral cartilages
- Pogonion: Deepest point on outer cortex of mandible
- Gnathion: Most inferior/posterior point of mandible
- Menton: Lowest point of mandibular symphysis
- Subnasale: Junction of columella and upper lip in mid-sagittal plane

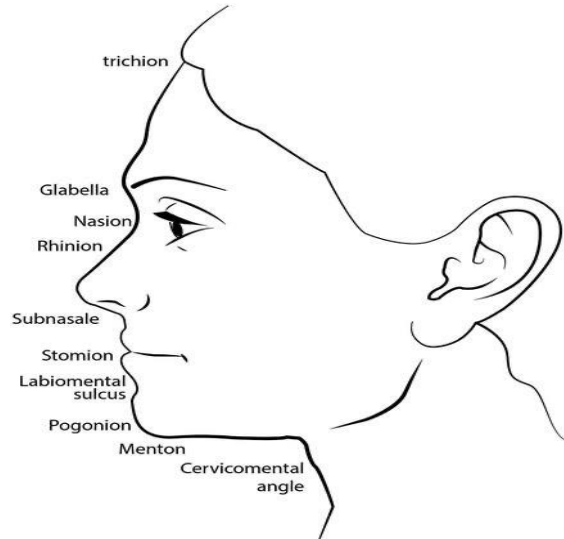


Fig 2: Different facial landmarks

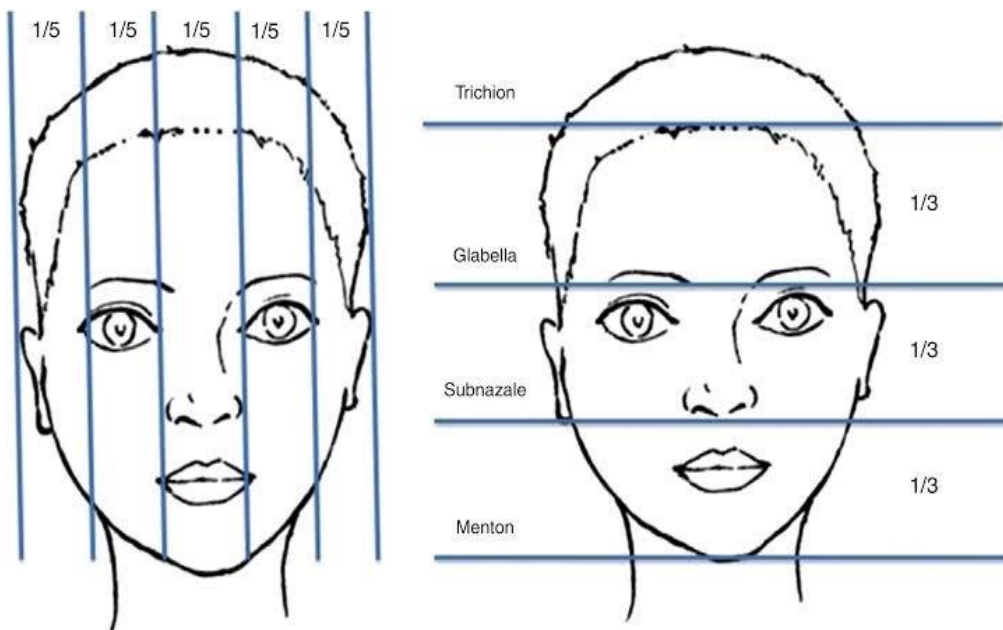


Fig 3: The concept of dividing the symmetric face into thirds and fifths

Several angles are important in assessing the nose.

Powell and Humphrey describes the ideal angles of the facial aesthetic triangle. A useful method of quantifying the relationship between

the forehead, nose, lips, chin and neck (**Fig 4**). The dimensions of each of the facial angles are:

- Nasofrontal angle (115 – 135 degree)
- Nasofacial angle (30 – 40 degree)
- Nasomental angle (120 – 132 degree)
- Mentocervical angle (80 – 95 degree)

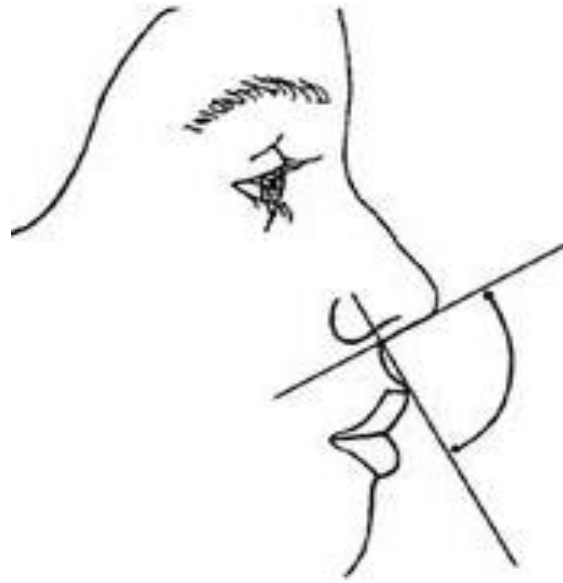


Fig 4: Nasolabial angle (90-120 degrees)

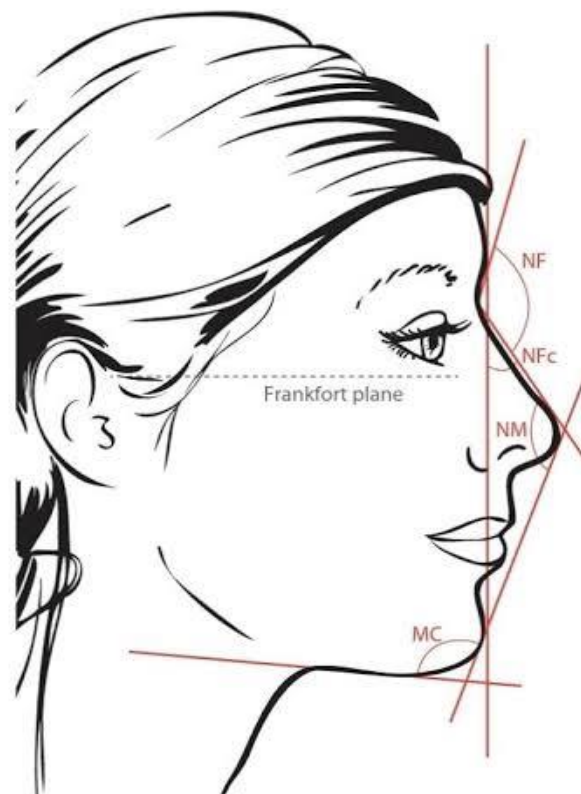


Fig 5: Triangles of Powell and Humphrey.

Angles of the aesthetic triangle: nasofrontal (NF) = 115 – 135 *, nasofacial (NFC) =30-40*,

nasomenal (NM) = 120- 132*, mentocervical (MC) =80-95*

NASAL ANALYSIS AND EXAMINATION

It comprises of:

- Inspection of the external nose: skin/deviation/nasal length/tip projection/lip-chin relationship/height of dorsum/columellar show/caudal deviation/basal view
- Inspection of the internal nose: septal deviation/spurs/perforation /Lateral nasal wall and turbinates/Internal nasal valve/Alar collapse
- Palpation: Skin texture and elasticity/Irregularity/Nasal bones/Spine and septum/Alar cartilage

CLINICAL PHOTOGRAPHS

Pre-operative standardized photographs are essential for surgical planning, for comparison with post-operative results and as an intra-operative reference. The standard photographic views obtained for rhinoplasty are frontal, left and right lateral, left and right oblique and basal. Some other views which can be used are the close-up frontal view, superior view, base-radix view and bird's-eye view. Photographic Images Of Participants

Fig 6 .Preoperative Images (Hump Nose)



Fig.7 Postoperative Images



Fig 8. Preoperative images (saddle nose)



Fig 9. Postoperative Images

MATERIALS & METHODS

Study Design: An Observational Analytical Retrospective Cum Prospectivestudy

Study Participants: Patients of age group more than 17 years and less than 70 years, who presented to ENT OPD with nasal deformities, on examination having external nasal framework deformities with decrease air blast on either sides or with DNS to either sides & who have given consent for undergoing closed Rhinoplasty.

Study period: June 2017 to 2019

Sample Size: 30

Sample Size:

N= Sample Size;

$Z_{\alpha} = Z_{0.1/2} = Z_{0.05} = 2.58$ — From Z table at type I error of 1% i.e. At 99% Confidence Interval

$Z_{\beta} = Z_{0.90} = 1.24$ — at 90% power

σ_1 = Standard Deviation of nasolabial angle preoperative = 9.7° [2]

σ_2 = Standard Deviation of nasolabial angle Postoperative = 7.5° [2]

μ_1 = Mean nasolabial angle Preoperative = 99° [2]

μ_2 = Mean nasolabial angle Post Op = 107.6° [2]

$$N = \frac{(Z_{\alpha} + Z_{\beta})^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_1 - \mu_2)^2}$$

$$N = \frac{(2.58 + 1.24)^2 (9.7^2 + 7.5^2)}{(107.6 - 99)^2}$$

$$N = \frac{(3.82)^2 (94.09 + 56.25)}{(107.6 - 99)^2}$$

$$N = \frac{14.59 \times 150.34}{73.96}$$

$$N = 29.66$$

$$N \cong 30$$

Parameters

1. Preoperative photograph of right lateral left lateral, right oblique, left oblique, profile and basal views and postoperative follow-up and photograph
2. Nasal air blasts
3. NOSE scale (Nasal Obstruction Symptoms Evaluation Scale)
4. Postoperative Complications
5. Nasofrontal (normal-115-130 degrees) and nasolabial (95-105 degrees for female, 90-95 degrees for males) angles

ID# _____

Date _____

Nasal Obstructive Symptoms Evaluation Scale

➔ To the Patient: Please help us to better understand the impact of nasal obstruction on your quality of life by completing the following survey. Thank you!

Over the past 1 month, how much of a problem were the following conditions for you?

Please Circle the Most Correct Response

| | Not a Problem | Very Mild Problem | Moderate Problem | Fairly Bad Problem | Severe Problem |
|---|---------------|-------------------|------------------|--------------------|----------------|
| 1. Nasal congestion or stuffiness | 0 | 1 | 2 | 3 | 4 |
| 2. Nasal blockage or obstruction | 0 | 1 | 2 | 3 | 4 |
| 3. Trouble breathing through my nose | 0 | 1 | 2 | 3 | 4 |
| 4. Trouble sleeping | 0 | 1 | 2 | 3 | 4 |
| 5. Unable to get enough air through my nose during exercise or exertion | 0 | 1 | 2 | 3 | 4 |

6. Please mark on this line how troublesome is your difficulty in breathing through your nose:



INCLUSION CRITERIA:

Patients of age group more than 17 years and less than 70 years, both male and female presenting to ENT OPD with complaint of nasal deformities like hump nose, parrotbeak, saddle nose, post-traumatic, iatrogenic, developmental, deviated bridge of nose, supratip deformity and giving consent for surgery.

EXCLUSION CRITERIA:

1. Patients age less than 17 years and more than 70 years
2. Facial fractures comminuted involving extending into the cranial cavity
3. Systemic bleeding disorders
4. Revision rhinoplasty.
5. Granulomatous diseases of nose- TB, Leprosy, Rhino derma, syphilis Wegener's disease
6. Patient with Atrophic rhinitis

7. Patient who refuses to undergo surgical interventions and who did not give the consent.

METHODOLOGY

An observational analytical retrospective cum prospective study was done to analyse the cosmetic result of closed Rhinoplasty and post-operative complications and its aesthetic effects. This observational study & in done 30 patients per the availability of the cases. For every individual consenting to participate in the study, a case record form was filled.

Preoperative photographic record of all patients was done. Preoperative nasofrontal and nasolabial angles were recorded using measuring calliper. There are many aesthetic angles which can be used but in this study, we have chosen only two to make it simple and easy to understand. Nasal vibrissae were trimmed. Preoperatively complete blood investigations including Complete blood haemogram, bleeding and clotting times, PT-

INR, serum electrolytes, HIV, HbsAg, HCV, liver function test, renal function test, x- ray chest, x- ray nasal bone, CT PNS (if require), electrocardiogram, blood group was done.

Pre-anaesthetic fitness was done. All patients were given general anaesthesia. On the day of admission patients (guardian or parents in case of minor) were questioned about any current acute illness, any blood disease in family, any known allergies, ongoing menstrual cycle in female patients. Pre-operative plastic cast were prepared.

Patients were kept nil by mouth 6 to 8 hrs before surgery.

All patients were given perioperative antibiotic and nasal decongestant nasal drops.

Postoperatively, antibiotic, analgesic and anti-inflammatory was given. Patient and relatives were explained about possibility of swelling around eyes and cheek

, oozing of blood stained nasal secretion, dryness of throat and was told to keep head high to 30 degree. Post-operative post nasal bleeding, extra-ocular movement and vision were checked. Post-operative anterior nasal pack removed on 2 days.

Plaster cast removed on postoperative day 14th. Patients were reviewed in the ENTOPD on 7th day, 15th day, 1 month, 3 month and on 6 month postoperative.

Parameters noted during follow up were:

- Photography
- Air blasts
- NOSE scale
- Nasofrontal and nasolabial angles
- Postoperative complications

RESULTS

1: Mean age and standard deviation of patients

Mean age is 24 with standard deviation of 6.868 with minimum age of 17 years and maximum age is 50 years.

2: Age distribution of patients

Out of 30 participants, 20 participants were less than 25 years of age with 66.7 %, of which 15

are male with 65.2% and 5 are female with 71.4% and rest (10 cases) of participants are either less or equal to 25 years with 33.3%, of which 8 are male with 34.8% and 2 are female with 28.6%.

3: sex distribution of patients

Out of 30 participants, 23 are male (76.7%) and 7 are female (23.3%). Majority of participants are male.

4: Chief complaints (cc) frequency distribution

It showed that most common chief complaint was external nasal deformity with nasal obstruction (16 cases with 53.3%) followed by external nasal deformity only (10 cases with 33.3%) and external nasal deformity with nasal obstruction with epistaxis (1 case with 3.3%).

5: Chief complaints duration

Most participants, 21 cases (70.0%) had chief complaint duration more than 2 years where as 5 cases (16.7%) had duration between 6 months to 2 years and 4 cases (13.3 %) had duration less than 6 months

6: History of trauma to nose

Out of 30 cases, 16 had previous history of trauma to nose with 53.3% whereas 14 with 46.7% did not have any trauma history.

Out of 16 cases (53.3%) with external deformity with nasal obstruction, 8 cases (50.0%) had history of trauma whereas other 8 cases (57.1%) did not had any trauma history. 1 case (6.3%) with external deformity with nasal obstruction and intermittent epistaxis had previous history of nasal trauma.

Out of 30 cases, 2 cases (6.7%) had previous history of septoplasty whereas 28 cases (93.3%) did not have any previous nasal surgery history.

7: History of systemic disease

Out of 30 cases, only 1 case (3.3%) had history of hypertension and rest 29 cases (96.7%) did not have any history of systemic diseases.

8: Comparison between preoperative air blasts vs. postoperative air blast

Out of 30 cases, 12 cases (40.0%) had decreased nasal air blast on left side and 8 cases (26.7%) had decreased air blast on right

side preoperative which got corrected after surgery i.e. nasal air blast became equal on both sides. 10 cases (33.3%) had same result both preoperative and postoperative.

9: Distribution of patients having DNS preoperative

15 cases (50.0%) had DNS to left whereas 11 cases (36.7%) had DNS to right side. 4 cases (13.3%) did not had any DNS.

10: Frequency distribution of patients with nasal deformity

It was observed that most common nasal deformity was C shaped nasal dorsal deformity with 20.0 % followed by saddle nose 16.7%, supratip depression with 10.0 %, parrot beak with 6.7%, open book deformity with 6.7%, deviated nasal dorsal deformity to left with supratip depression with 6.7% and deviated nasal dorsal deformity to right with 6.7%.

11: Mean and standard deviation of nasofrontal angle

The mean angle of preoperative nasofrontal angle is 97.207 with standard deviation of 3.6440 whereas mean angle of postoperative nasofrontal angle is 117.163 with standard deviation of 3.3724.

In all 30 cases, it was observed that nasofrontal angles was increased after surgery as compare with preoperative angles but desire angle was achieved in 22 cases only and 8 cases did not achieve desire angle. (Chart 1)

All 30 cases showed positive ranks which mean all 30 cases shows improvement in nasofrontal angles postoperative with mean rank of 15.50 and z value of -4.783 using Wilcoxon Signed Ranks test. There are no negative ranks means no deterioration in nasofrontal angles observed postoperative. The P value is less than 0.05 which is significance. (Chart 2)

12: Mean and standard deviation for nasolabial angle in male participants

Out of 30 cases, 23 cases were male participants and 7 cases were female participants. The mean preoperative nasolabial angle in male is 88.404 with standard deviation of 3.2542 and mean postoperative

nasolabial angle in male is 91.248 with standard deviation of 1.8742.

Out of 23 cases, 15 cases showed positive ranks which means desire level of nasolabial angles postoperative was achieved with mean rank of 08.00 and z value of -3.408 as showed in Wilcoxon Signed Ranks test. There are ties seen in 8 cases which mean no improvement in angles observed. There are no negative ranks means no deterioration in nasolabial angles observed postoperative. The P value is less than 0.05 which is significance.

9 female participants out of 30 showed mean preoperative nasolabial angle of 89.629 with standard deviation of 3.2201 and mean postoperative nasolabial angle of 96.500 with standard deviation of 3.2985.

13: Comparison of Preoperative Nasolabial angle with Postoperative Nasolabial Angle at 6 months in female using Wilcoxon Signed Ranks Test (Chart 3)

All the 7 female participants showed positive ranks which means desire level of nasolabial angles postoperative was achieved with mean rank of 04.00 and z value of -2.366 using Wilcoxon Signed Ranks test. There are no negative ranks means no deterioration in nasolabial angles observed postoperative. The P value is less than 0.05 which is significance. Out of 23 participants, 17 participants with 70.8% have achieved the desire nasolabial angles postoperative whereas 6 participants with 100.0 % did not achieved the desire angles postoperative though there was increase in angles as compare with preoperative angles. 7 participants with 29.2% had normal angles level preoperative so there was no change in angles level postoperative.

14: Frequency distribution of patients with postoperative complications

It was observed that most common postoperative complication seen was subconjunctival hemorrhage with periorbital ecchymosis with edema with 36.7% followed by skin discoloration with 10.0%, adhesion and change in skin sensation with 6.7%, pinched dorsum with periorbital swelling with periorbital ecchymosis with 6.7%,

subconjunctival hemorrhage with periorbital ecchymosis with edema with columellar retraction with 6.7%.

It was observed that complications seen more in male cases than female cases & Postoperative complications seen more in younger age group of less than 25 years.

15: Comparison of preoperative nasal congestion or stuffiness with postoperative nasal congestion or stuffiness at 6 months

Base on NOSE scale both preoperative and postoperative nasal congestion or stuffiness scores were recorded. Out of 30 cases, 4 cases did not have any problem with the nasal congestion both preoperative and postoperative, out of 7 cases with very mild problem preoperative, 3 cases had same problem postoperative whereas 4 cases did not have any problem. Out of 13 cases with moderate problem preoperative, 6 cases had very mild problem and 7 cases did not have any problem postoperative. Out of 6 cases with fairly bad problem preoperative, 3 cases had very mild problem whereas other 3 cases did not have any problem with nasal congestion postoperative.

Base on Wilcoxon Signed ranks test, out of 30 cases, 23 cases had negative ranks postoperative which means 23 cases showed improvement in nasal congestion or stuffiness problem with mean rank of 12.00, z value of -4.281 and p value less than 0.05 which is significance. However 7 cases had tie which means nasal congestion or stuffiness problem score was same both preoperative and postoperative.

16: Comparison of Preoperative Nasal blockage or obstruction with Postoperative Nasal blockage or obstruction at 6 months

Base on NOSE scale both preoperative and postoperative nasal blockage or obstruction scores were recorded. Out of 30 cases, 2 cases did not have any problem with the nasal blockage or obstruction both preoperative and postoperative, out of 6 cases with very mild problem preoperative, 1 case had same problem postoperative whereas 5 cases did not have any problem. Out of 8 cases with moderate problem

preoperative, 2 cases had very mild problem and 6 cases did not have any problem postoperative. Out of 13 cases with fairly bad problem preoperative, 8 cases had very mild problem whereas other 5 cases did not have any problem with nasal blockage or obstruction postoperative. 1 case with severe problem preoperative converts into very mild problem postoperative.

17: Wilcoxon Signed Ranks Test for nasal blockage before and after surgery

Base on Wilcoxon Signed ranks test, out of 30 cases, 27 cases had negative ranks postoperative which means 23 cases showed improvement in nasal blockage or obstruction problem with mean rank of 14.00, z value of -4.633 and p value less than 0.05 which is significance. However 3 cases had tie which means nasal blockage or obstruction problem score was same both preoperative and postoperative.

18: Comparison of preoperative trouble breathing through nose with postoperative trouble breathing through nose at 6 months

Base on NOSE scale both preoperative and postoperative trouble breathing through nose scores was recorded. Out of 30 cases, 5 cases did not have any problem with the breathing through both preoperative and postoperative. Out of 9 cases with very mild problem preoperative, 2 cases had same problem postoperative whereas 7 cases did not have any problem. Out of 8 cases with moderate problem preoperative, 4 cases had very mild problem another 4 cases did not have any problem postoperative. Out of 7 cases with fairly bad problem preoperative, 2 cases had very mild problem whereas other 5 cases did not have any problem of trouble nasal breathing postoperative. 1 case with severe problem preoperative did not have any problem with nasal breathing postoperative.

19: Wilcoxon Signed Ranks Test for trouble breathing through nose

Base on Wilcoxon Signed ranks test, out of 30 cases, 23 cases had negative ranks postoperative which means 23 cases showed improvement in nasal blockage or obstruction

problem with mean rank of 12.00, z value of -4.266 and p value less than 0.05 which is significance. However 7 cases had tie which means nasal blockage or obstruction problem score was same both preoperative and postoperative.

20: Comparison of preoperative trouble sleeping with postoperative trouble sleeping at 6 months

Base on NOSE scale both preoperative and postoperative trouble sleeping scores was recorded. Out of 30 cases, 8 cases did not have any trouble sleeping both preoperative and postoperative. Out of 9 cases with very mild problem preoperative, 2 cases had same problem postoperative whereas 7 cases did not have any problem. Out of 8 cases with moderate problem preoperative, 5 cases had very mild problem whereas 4 cases did not have any problem postoperative. Out of 5 cases with fairly bad problem preoperative, 2 cases had very mild problem whereas other 3 cases did not have any problem of trouble sleeping postoperative.

21: Wilcoxon Signed Ranks Test of trouble sleeping

Base on Wilcoxon Signed ranks test, out of 30 cases, 20 cases had negative ranks postoperative which means 20 cases show improvement in trouble sleeping with mean rank of 10.50, z value of -4.030 and p value less than 0.05 which is significance. However, 10 cases had tie which means trouble sleeping problem score was same both preoperative and postoperative.

22: Comparison of Pre-operative “unable to get enough air through nose during exercise or exertion” with Post-operative “unable to get enough air through nose during exercise or exertion”

Base on NOSE scale both preoperative and postoperative unable to get enough air through nose during exertion or exercise scores was recorded. Out of 30 cases, 8 cases with no preoperative problem, and 1 case had mild problem postoperative whereas 7 cases did not had any problem of unable to get enough air through nose during exertion or exercise both

preoperative and postoperative. Out of 8 cases with very mild problem preoperative, 1 case had same problem postoperative whereas 7 cases did not have any problem postoperative. Out of 10 cases with moderate problem preoperative, 3 cases had very mild problem and 7 cases did not have any problem postoperative. Out of 2 cases with fairly bad problem preoperative had very mild problem postoperative. 2 cases with severe problem preoperative did not have any problem of unable to get enough air through nose during exertion or exercise postoperative.

23: Wilcoxon Signed Ranks Test for unable to get enough air through nose during exercise or exertion

Base on Wilcoxon Signed ranks test, out of 30 cases, 21 cases had negative ranks postoperative which means 21 cases show improvement in unable to get enough air through nose during exertion or exercise with mean rank of 11.76, z value of -4.003 and p value less than 0.05 which is significance. However 8 cases had tie which means unable to get enough air through nose during exertion or exercise problem score was same both preoperative and postoperative. 1 case had positive rank which means score shows deterioration as compare with preoperative score.

24: Comparison of Pre-operative overall NOSE scale with Post-operative overall NOSE scale

2 cases had no symptoms both preoperative and postoperative. Out of 11 cases who had mild symptoms preoperative, 2 cases remain the same whereas 9 cases had no symptoms postoperative. Out of another 11 cases with moderate symptoms preoperative, 5 cases had mild symptoms whereas 6 cases had no symptoms postoperative. Out of 6 cases with severe symptoms preoperative, 3 cases had mild symptom whereas another 3 cases had no symptom postoperative. Overall there is improvement in NOSE scale postoperative.

25: Wilcoxon Signed Ranks Test for preoperative NOSE overall scale and postoperative overall NOSE scale

Overall it was noted that 28 cases had showed improvement in the symptoms postoperative out of 30 cases and 2 cases had tie means their symptoms remain same both preoperative and postoperative.

26: Comparison of Preoperative overall NOSE scale and Post-operative overall NOSE scale in different Surgery (Chart 4)

From above table, it is showed that irrespective of surgical procedures, there was no significance difference (p value >0.05) in NOSE scale preoperative and postoperative.

Chart 1: Depicting Pre-operative and Post-operative Nasofrontal angle at 6 months

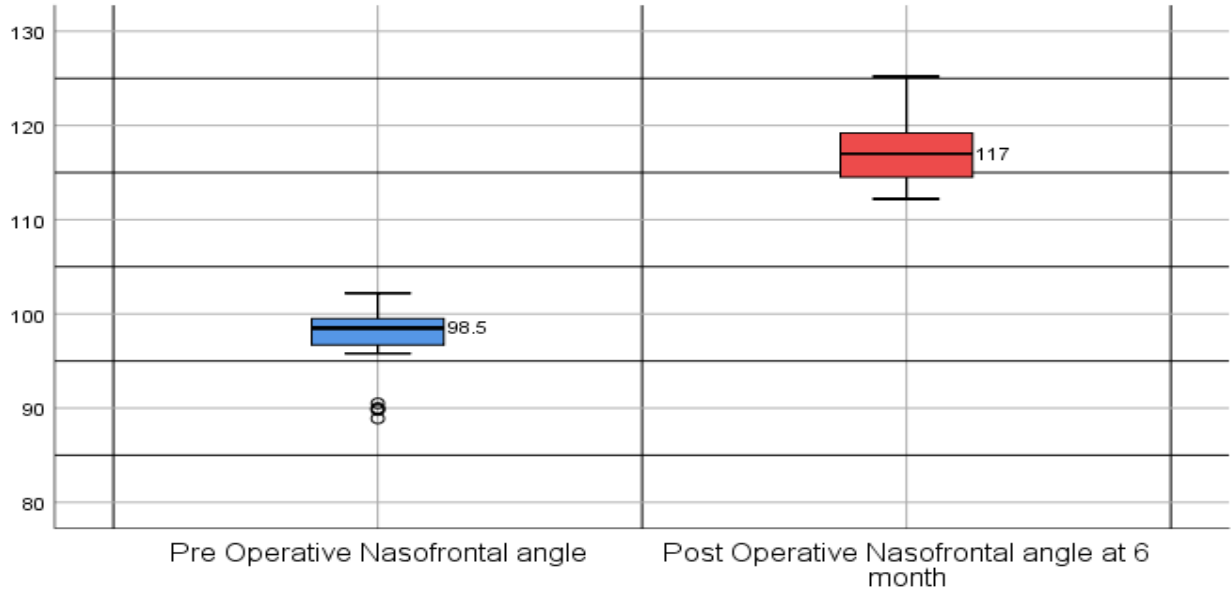


Chart 2: Preoperative and postoperative Nasofrontal angles

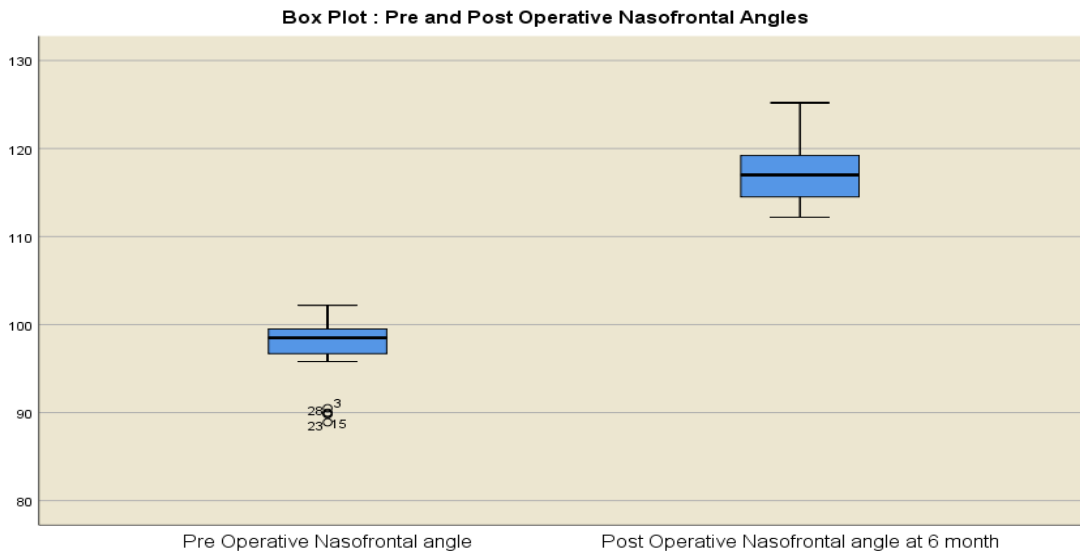


Chart 3: Preoperative and postoperative Nasolabial angles in male and female

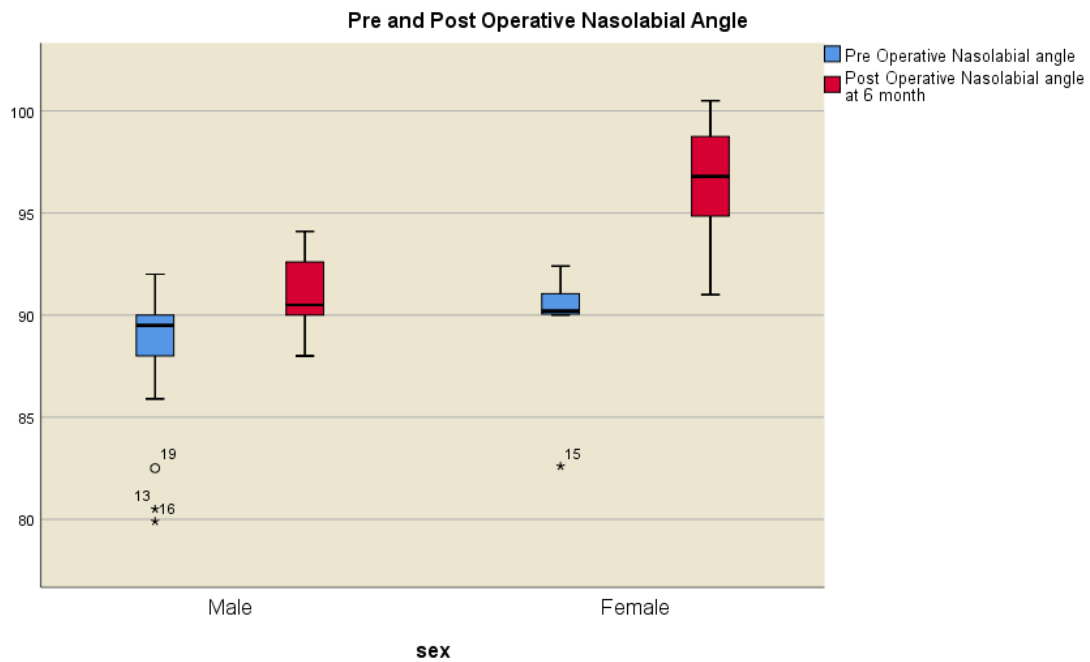
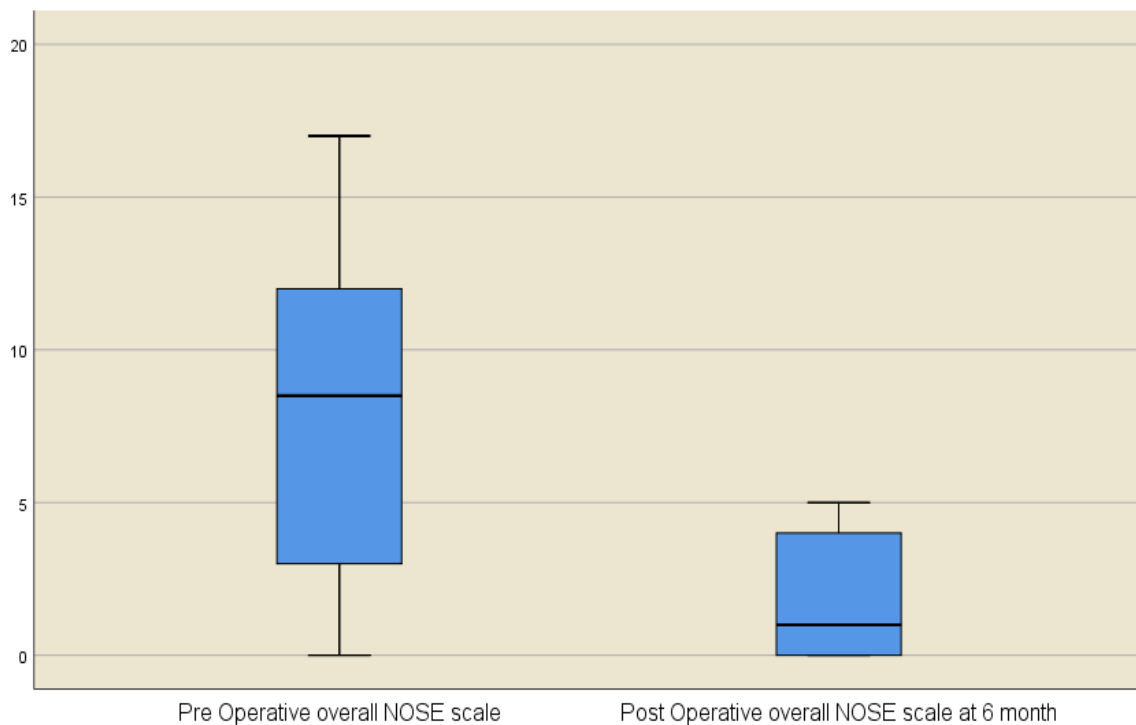


Chart 4: Depicting Pre-operative overall NOSE scale and Post-operative overall NOSE scale



DISCUSSION

A hospital based observational analytical retrospective cum prospective study was done in 30 patients presenting with various external nasal deformities associated with nasal

blockage to ENT OPD. All patients were examined clinically and investigated for routine anaesthesia fitness for surgery.

Age and gender distribution

Out of 30 cases in our study, 23 cases (76.7%)

are male and 7 cases (23.3%) are female with mean age of 24 years and standard deviation of 6.868. Most cases i.e. 20 cases (66.7%) are < 25 years of age and 10 cases (33.3%) are > 25 years of age. Asha Annie Abraham and Sajeev George² done a study on twenty patients of age group 18 - 30 years. Youngest patient was 18 years and eldest 30 years. Out of the 20 patients, 13 were male and 7 were females.

Kyle J Chambers⁶ et al done a study on 40 patients. Of which, 23 (57%) were male and 17 (43%) were female. The mean age was 39.3 years.

DR.D. PRINCE PETER DHAS⁴ done a similar study on 25 patients from age group 17 to 45 years. Among them 12 were within 17 to 25 yrs ie.48%; 9 were within 25 to 35 yrs. ie.36%; and 4 were within 35 to 45 yrs. ie.16%. Out of our 25 patients 20 were males ie.80% and 5 were females ie.20%.

Shirin Loghmani¹ et al done a retrospective study on 470 and 472 patients' during 2005 and 2015 were respectively. In 2005, the age range of patients was 16-51 years. Frequency of patients aged less than 20 years and more than 40 years was 27.1% and 3%, respectively. In 2015, the age range of patients was 16-59 years. Frequency of patients aged less than 20 years and more than 40 years was 12.9% and 5.6%, respectively.

Alisa Yamasaki⁸ et al done a study on 567 patients who underwent SRP with and without ITR (inferior turbinate resection). Out of 567 patients, 391 patients undergoing functional SRP alone (54.0% female; mean age 36.0 years [standard deviation (SD):16.2]) and 176 patients undergoing functional SRP with ITR (50.0% female; mean age 35.6 years [SD: 13.6]).

Sami Alharethy²⁷ et al done a study on 248 patients in a university hospital in Saudi Arabia. 113 were male and 135 were female.

Presenting complaints and duration

In the present study, the most common complaints are external nasal deformity with nasal obstruction (53.3%) followed by external nasal deformity only (33.3%), nasal obstruction

only (10%). Only one case had a history of epistaxis. The external nasal deformity with nasal obstruction seen more in female (57.1%) than male (52.2%).

Symptoms duration: 70.0% cases had duration of > 2 years, 16.7% cases had duration between 6 months to 2 years and 13.3% had duration < 6 months.

Asha Annie Abraham and Sajeev George² done a similar study on twenty patients, of which 15 had complaint of external deformity with septal deviation and 5 patients had external deformity only.

Trauma history

In our study, 16 cases (53.3%) had history of trauma to nose while 14 cases (46.7%) did not have trauma history. Out of 16 cases with presenting complaint of external nasal deformity with nasal obstruction, 8 cases (50.0%) had history of trauma. Out of 10 cases with complaint of external nasal deformity alone, 5 cases (31.3%) had history of trauma to nose.

DR.D. Prince Peter Dhas⁴ done similar study on 25 patients. The most common etiology was congenital (16 patients ie.64%) followed by post traumatic in 5 patients ie.20% & post septal abscess in 4 patients ie.16%. 2 of the 11 patients with crooked nose were of traumatic etiology ie.18.2%; 3 of the 11 patients with saddle nose were of traumatic origin ie.27.3%. 4 of the 11 patients with saddle nose were after an incidence of septal abscess ie.36.4%.

Asha Annie Abraham and Sajeev George² done a study on twenty patients. Of which 9 had pure saddle deformity, 3 with bony hump and supra-tip deformity, 2 had bulbous tip along with saddling, 4 had short columella with saddling and 2 with associated fracture of nasal bone due to trauma.

Previous nasal surgery history

In our study, only 2 cases (6.7%) had previous history of undergoing septoplasty surgery. Dr.D. Prince Peter DHAS⁴ done a study on 25 patients with various external nasal deformities. It was found that post septal

abscess drainage 4 patients ie.16% had developed nasal deformity. 4 of the 11 patients with saddle nose were after an incidence of septal abscess ie.36.4%. None of the participants in our study had history of substance uses. In our study, only 1 case (3.3%) had a history of hypertension.

Nasal air blasts and DNS

In the present study, 12 cases (40.0%) had decreased air blast on left side and 8 cases (26.7%) had decreased air blast on right side which got corrected after surgery. It was observed that DNS to left was seen in 15 cases (50.0%) and DNS to right was seen in 11 cases (36.7%)

Nasal deformity

In our study, the most common nasal deformity encountered was C-shaped nasal dorsal deformity (20.0%) followed by saddle nose (16.7%), supratip depression (10.0%), parrot beak (6.7 %), open book deformity(6.7%), deviated nasal dorsal deformity to left with supratip depression(6.7%) and deviated nasal dorsal deformity to right (6.7%). Other types of deformities such as hump nose, over projection of nasal tip, S-shaped dorsal deformity, columellar collapsed were also seen.

Asha Annie Abraham and Sajeev George² done a study on 20 cases, 9 had pure saddle deformity, 3 with bony hump and supra-tip deformity, 2 had bulbous tip along with saddling, 4 had short columella with saddling and 2 with associated fracture of nasal bone due to trauma.

DR.D. PRINCE PETER DHAS⁴ done a similar study on 25 patients. About 11 patients were having crooked nose ie.44%. Another 11 patients ie.44% were having saddle nose. And 3 were having a hump ie.12%. 3 of the 11 patients with crooked nose were having associated Tip deformity ie.27.2%. 3 of the patients with saddle nose have associated Tip deformity ie.27.2%. 2 of the patients with hump were associated with Tip deformity. Among the 25, 2 were having a bifid tip; 3 had under projected tip; and 3 had a bulbous tip. Sami Alharethy² et al done a study on 248 patients. The most common external nasal

deformity was a broad dorsum (n=163; 65.7%), followed by a bulbous columella (n=154; 62.1%), and deviation (n=150; 60.5%).

Nasofrontal angle and Nasolabial angle

Overall there was increased in both nasofrontal angles and nasolabial angles postoperative in our study with p-value <0.05 which is significance. Rogeria Pasinato³⁵ et al done a study on 37 patients. The nasolabial, nasofrontal, nasomental and nasofacial angles were measured and compared before and after the surgery. An average increase of 8.6° to the nasolabial angle, 8.5° to the nasofrontal angle and decrease of 2.3° to the nasofacial angle. It was note that there was significantly increase in nasolabial and nasofrontal angles after rhinoplasty while nasofacial angle diminishes. Ahmet Uzun and Fikri Ozdemir¹² done a study consisted of 56 males and 59 females. The means of females' nasofrontal, nasal tip, nasolabial, and alar slope angles were 133.16 ± 8.88; 77.91 ± 9.80; 98.91 ± 10.01 and 80.89 ± 8.33 respectively. The means of males' nasofrontal, nasal tip, nasolabial, and alar slope angles were 123.85 ± 13.23; 82.16 ± 9.98; 97.91 ± 8.78 and 85.98 ± 8.72 respectively.

Postoperative complications

Usually there is no serious complications seen in rhinoplasty. In our study, the most common postoperative complications encountered was during early phase such as subconjunctival hemorrhage with periorbital ecchymosis with edema with 36.7% followed by skin discoloration with 10.0%, adhesion and change in skin sensation with 6.7%, pinched dorsum with periorbital swelling with periorbital ecchymosis with 6.7%, subconjunctival hemorrhage with periorbital ecchymosis with edema with columellar retraction with 6.7% etc. There was no delayed complication seen in our study.

The complications seen more in male patients and younger age group (< 25 years) patient. Cameron Heilbronn⁹ et al done a survey of 117 articles. Common complications within the literature included skin problems such as acne (18.3%), numbness (16.7%), hospital revisit

(6.5%), primary source revision rate (5.3%), and dissatisfaction (5.0%). The most commonly covered consent topics included infection (100%), bleeding (95.8%), and scarring (95.8%). Unsatisfactory results and need for revision were only covered in 83.3% and 75.0% of consent forms, respectively.

DR.D. PRINCE PETER DHAS⁴ done a prospective study on 25 patients. About 8 patients developed Periorbital edema in the postoperative period. Another 4 patients complained of nasal obstruction. Asha Annie Abraham and Sajeev George² done a study on 20 patients. The various complications encountered during study are: 1) Edema of nose and face – was encountered in the 3 cases 2) Cellulitis of face and nose – was observed in one case 3) Allergy to adhesive plaster 4) Woody feel of nose – seen in all 3 cases. 5) Graft migration, visibility and dorsal irregularities were not seen in any of our cases.

NOSE Scale

In our study, there is overall improvement in symptoms base on NOSE scale score which was irrespective of surgical procedure. Sara Sena Esteves³ et al done a questionnaires base study on 113 patients Rhinoplasty Evaluation Outcome was done and it showed a significant improvement after 3 and 6 months in both functional and aesthetic questions ($p < 0.01$) using NOSE scale.

Elizabeth Mia Floyd⁵ et al done a study research in 665 articles. Study results were pooled with a random effects model of meta-analysis. Change in NOSE score after surgery was assessed via the mean difference between baseline and postoperative results and the standardized mean difference. Patients in the included studies had moderate to severe nasal obstructive symptoms at baseline. The NOSE scores were substantially improved at 3-6, 6-12, and ≥ 12 months, with absolute reductions of 50 points (95% CI, 45-54), 43 points (95% CI, 36-51), and 49 points (95% CI, 39-58), respectively.

Kyle J Chambers⁶ et al done an Evaluation of Improvement in Nasal Obstruction Following

Nasal Valve Correction in Patients with a History of Failed Septoplasty. Forty patients were included in the study; 23 (57%) were male and 17 (43%) were female. The mean age was 39.3 years. Findings from preoperative nasal examination demonstrated moderate or severe internal nasal valve narrowing in 38 (95%) patients, internal nasal valve collapse in 19 (48%), external nasal valve narrowing in 18 (45%), or external nasal valve collapse in 16 (40%). The most common anatomical cause of obstruction was internal nasal valve narrowing in 38 (95%) patients, dorsal septum deflection in 26 (65%), and narrowed middle vault in 16 (40%). The mean (SD) preoperative NOSE score was 75.7 (20.1). Mean (SD) postoperative NOSE scores at 2, 4, and greater than 6 months were 31.4 (27.2), 34.0 (19.8), and 22.1 (18.8), respectively, with significantly improved NOSE scores at each time point compared with before surgery ($P < .001$).

Deniz Gerecci⁷ et al done a prospective cohort study on Nasal obstruction symptom evaluation (NOSE) score outcomes after septorhinoplasty. Adult patients (≥ 18 years) with nasal obstruction underwent septorhinoplasty. NOSE scores were obtained preoperatively and prospectively. A total of 49 patients met inclusion criteria. Mean NOSE scores significantly.

Alisa Yamasaki⁸ et al done a Prospective cohort study on Improvement in nasal obstruction and quality of life after septorhinoplasty and turbinate surgery. A total of 567 patients underwent SRP with and without ITR were administered the Nasal Obstruction Symptom Evaluation (NOSE) scale to assess severity of nasal obstruction and the EuroQol-5 Dimension Questionnaire Visual Analog Scale (EQ-5D VAS) to assess general health-related QOL preoperatively and at 2, 4, 6, 12, 24, and 36 months postoperatively. Patient demographics, surgical technique, symptom severity, and QOL outcomes were analysed. There was a significant decrease in NOSE and increase in EQ-5D VAS scores at least 24 months postoperatively. Change in NOSE scores was

negatively correlated with change in EQ-5D VAS ($r = -0.38, P < 0.01$). Compared to patients undergoing SRP, patients also undergoing ITR had a statistically but non-clinically significant improvement in NOSE, with similar trends for EQ-5D VAS that were not significant.

CONCLUSION

- After complete analysis, we conclude that closed rhinoplasty gives as good result as open rhinoplasty however; each technique has its own merits and demerits. Nasal deformities can be quite different from person to person depend on race, caste and region and there is no one method that can be used for every nasal deformity
- In our study, it was noted that irrespective of types of closed rhinoplasty executed, there was not much differences in the results in both aesthetic and functional aspects.
- No any major complications were encountered.
- Most of the patients were satisfied with the final outcomes in terms of both aesthetic and functional results.
- As per our study, there are certain advantages of closed rhinoplasty over open rhinoplasty. Closed rhinoplasty being minimally invasive does not give postoperative scars, take lesser surgical time, quicker postoperative healing and minimal tissue handling however it has longer learning curve.

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How to cite this article:

Anjali Taku, Nilam U Sathe, Saad Ahmed, Lal Pek Thangi *A Study Of Management Of Various Nasal Deformities Using Closed Rhinoplasty Technique* **Br J Bio Med Res, Vol.06, Issue 01, Pg.1944 - 1963, January - February 2022. ISSN:2456-9739 Cross Ref DOI : <https://doi.org/10.24942/bjbmr.2022.931>**

Source of Support: Nil

Conflict of Interest: None

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