"A ONE YEAR OBSERVATIONAL STUDY OF OUTCOME OF SEPTOPLASTY BY USING NOSE AND SNOT-22 QUESTIONNAIRE IN KLE'S DR. PRABHAKAR KORE HOSPITAL, BELAGAVI"

BY

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BELAGAVI, KARNATAKA

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Sub: Acceptance Letter

Sir/Madam,

The softcopy of thesis entitled " A one year observational study of outcome of septoplasty by using NOSE & SNOT-22 questionnaire in KLE's Dr. Prabhakar Kore Hospital, Belagavi" has been submitted for Anti-Plagiarism check through Turnitin software. The scan has been carried out and the scanned output reveals a match percentage of 6% (Six percentage) which is within the acceptable limits of 10% as per the guidelines given by UGC.

Thanking you,

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ABSTRACT

BACKGROUND-

The nose is the most prominent and important organ of the body which carries great emotional and social significance. The integrity of the septum is an important factor for the nasal function and shape. A nasal septal deformity can significantly alter one's facial appearances and has been categorized as "Functional or Cosmetic". A Functional deformity of nose may result in nasal blockage, noisy breathing, altered perception of smell/taste, nose bleeds and sinusitis. . Septoplasty should be considered for both functional correction of deviated nasal septal deformity for improving quality of life of the patient. There are various factors like patient's psychosocial and subjective satisfaction that will be influenced by the outcome of septoplasty

Quality of life (QOL) instrument should be advocated in order to evaluate the outcome of septoplasty in the patients with deviated nasal septal deformity.

OBJECTIVE-

To evaluate the outcome of Septoplasty in Deviated Nasal Septum in relieving nasal symptoms using Nasal Obstructive Symptoms Evaluation (NOSE) scale and Sinonasal Outcome Test(SNOT-22).

MATERIALS AND METHODS-

This observational study was conducted in the department of Otorhinolaryngology and Head and Neck Surgery of KAHER, Jawaharlal Nehru Medical College and KLES Dr.Prabhakar Kore Hospital and Medical Research Center, Belagavi from January 2018 to December 2018.

30 patients were evaluated and comparisons were made for NOSE score and SNOT-22 questionnaire preoperatively and postoperatively. Most common population affected as per the age distribution, sex distribution, type of deviated nasal septum among the patients were evaluated. Comparison of decrease in NOSE score and SNOT-22 questionnaire was done and correlation was done. The statistical significance (p value) was calculated using Kolmogorov Smirnov test, Wilcoxon matched pair test and parametric dependent t test.

RESULT-

Out of 30 patients, 22 were male and 8 were female. The commonest age of presentation was 21-30yrs. NOSE score preoperatively and postoperatively was statistically significant with p= 0.0001. SNOT -22 questionnaire showed statistically significant preoperative and postoperative values with p= 0.0001. As such correlation between the nasal sypmtoms of SNOT-22 questionnaire and total NOSE score was done but no comparable difference between the two scoring systems could be found , both having p=0.0001.

CONCLUSION-

The outcome of septoplasty has been validated using NOSE score and SNOT-22 questionnaire and has been proven to be effective in improving the nasal symptoms and quality of life of the patients post surgery. The quality of life measure is a useful tool to evaluate the subjective relief and success of surgery in patients undergoing septoplasty.

Keywords-

Septoplasty, NOSE score, SNOT-22 questionnaire, Deviated nasal deformity, Nasal obstruction, Quality of life.

LIST OF ABBREVIATIONS

• NOSE	Nasal obstruction symptom evaluation
• SNOT	Sinonasal outcome test
• QOL	Quality of life
• DNS	Deviated nasal septum
• CSS	Chronic sinusitis survey
• RSDI	Rhinosinusitis disability index
• RQLQ	Rhino-conjunctivitis Quality of Life Questionnaire
• AOS	Allergy outcome survey
• DNE	Diagnostic nasal endoscopy

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INTRODUCTION

The nose has been used to represent person's manner and behavior. As quoted by Dr. Maurice H Cottle - "As goes the septum, so goes the nose", there is a pivotal role of nasal septum in the framework of nose.[1] The nose is the most prominent and important organ of the body which carries great emotional and social significance. The integrity of septum is an important factor for the nasal function and shape.

The septum is the anatomical structure of the nose and divides the nasal cavity into two parts. Due to this factor, septum was considered as causal factor to the nasal structure but as such not having any obvious role in the function.[2] The deviations of septum are most common and often may lead to nasal deformity and affect the facial aesthetics and synchrony. A deformity of the nasal septum can significantly result in nasal complaints and affect the quality of life.

Nasal obstruction resulting from deviated nasal septum can be Congenital deformity or Acquired deformity .In congenital deformities, Gray[2,23] has said that the etiology is indicated by the nature or position of the deviation. In the anterior deformity of the cartilaginous part of septum, most of the times the cause is due to direct trauma or pressure. However, in cases where there is combination of deformities involving almost all the septal components , the cause is taken to be compression forces acting over the maxilla due to moulding pressures which occurs during gestation or parturition.[2,24] Moulding pressures will differ depending on the mode of delivery and with normal delivery having a higher incidence of deviation of nasal septum. At an early stage of foetal development , some nasal septal deformities are also present. In the study done by Ruano-Gil et[2,25] al., they found out that the nasal septal deformities had incidence of 4% in the 50 foetuses and embryos studied

before the age of action of compressive or traumatic forces, stating more likely etiology to be hereditary factor.

Nasal obstruction is one of the main symptoms in an ENT specialist's practice; nasal septum deviation is one of its most frequent cause. The common complications associated with septal deviation include chronic nasal obstruction, frequent nasal crusts formation, nasal discharge, recurrent pressure or pain in the sinuses, posterior nasal drip, nasal bleed, headache, snoring and sleep apnoea.[3,4] Nasal obstruction resulting from deviated nasal septum have great implications on the Quality of Life of the patients. These deformities have great implications on both subjective feeling of nasal breathing quality and objective findings. They have strong influence on the nasothoracal reflex, responsible for the real depth of nasopulmonary breathing.[5]

There are two methods to evaluate results after functional nasal surgery: objective and subjective measures. The nasal obstruction symptom evaluation (NOSE) scale is as a subjective method. NOSE scale is used for nasal obstruction and is a quality of life instrument which is disease specific that measures the efficiency of functional septoplasty techniques and Sinonasal outcome test (SNOT-22) which was originally designed for rhinosinusitis can also be a useful measure in nasal septal surgery, as it combines specific nasal as well as general health related questions[4,6.] The NOSE scale and SNOT-22 can also be used in day to day clinical practice to measure the outcome and to highlight the nasal disease impact in each patient and the effectiveness of the surgical intervention.

According to Goldman[1], following criteria should be fulfilled following the the septal surgery.

- The normal function should be restored.
- No saddling deformity of nose.
- Prevention of drooping tip.
- It should avoid columella retraction.
- There should be no flaccidity of the septum.
- There should be no need for usage of free graft insertion for support.
- It should lessen the subsequent traumatic vulnerability.

This criteria can be fulfilled by septoplasty or septal reconstruction.

Hence, this current study is done to evaluate the outcome of surgery in deviated nasal septal deformity by doing septoplasty. This study aims at relevance of outcome of relieving nasal obstruction using the Nasal Obstructive Symptoms Evaluation (NOSE) scale and Sinonasal outcome test (SNOT-22) by septoplasty in a Tertiary care centre (KLE's DR.PRABHAKAR KORE HOSPITAL & MRC, Belagavi).

OBJECTIVE

The objective of the study is to evaluate the outcome of Septoplasty in Deviated Nasal Septum in relieving nasal symptoms using Nasal Obstructive Symptoms Evaluation (NOSE) scale and Sinonasal Outcome Test(SNOT-22).

REVIEW OF LITERATURE

In ancient literature the nose has been used to represent person's character and behaviour. Holy Bible depicts that the race of mankind itself was created through nose. "Legend goes that God made man from dust of ground and breathed into his nostrils the breath of life and then man became living soul".[1] The nose is the prominent and important organ of the body which carries great emotional and social significance. The nose due to its prominence on the face contains several comic epigrams. A nasal septal deformity can significantly alter one's facial appearances and has been categorized as "Functional or Cosmetic". A Functional deformity of nose may result in nasal blockage, noisy breathing, altered perception of smell/taste, nose bleeds and sinusitis. A cosmetic deformity may be secondary to a crooked septum, asymmetrical nasal bones, scar tissue, collapse/weakening of nasal structures or specific subunit of nose being disproportionate to the remainder of nose and face.[5]

The septum helps to preserve the geometry of the internal nose. The nasal septum plays an important part in the growth and development of the nose as a whole, midface and the maxilla. The septum also provides support to the dorsum, the columella and tip of the nose and hence contributes to cosmesis. The septal integrity plays a key role in nasal function and shape.[1]

Negus[2,26] proposed the anatomical and structural component for the septum and stated that "the nasal septum divides the nasal passage into two fossae; its presence adds to the surface available for warming and moistening air, for olfaction and for ciliary action."

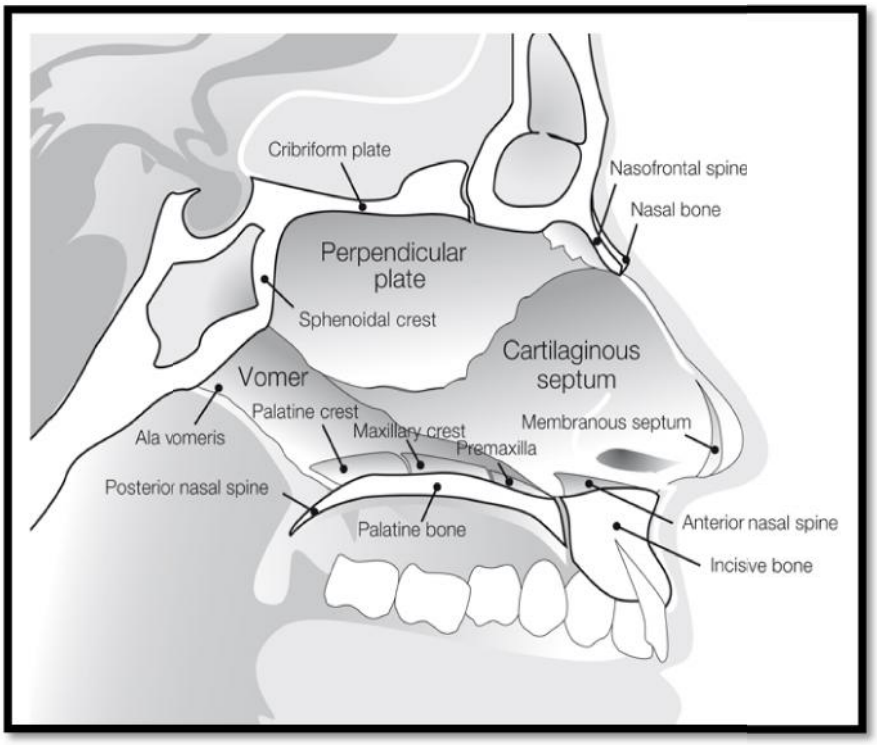


Figure 1. Normal anatomy of septum

Proetz[2,27] , in his textbook based on the applied physiology of nose gave the idea that septum forms two different nasal compartment and he stated that "the existence of a septum is of some speculative interest. It suggests the advantage in a duplication of air tubes and stated that the two tubes of a given combined capacity are preferable and equal to one with that of equal capacity." Proetz had rejected the importance of the septum for helping in supporting the nasal cavity and also questioned its role in the regulation of nasal airflow thereby stating: "it is scarcely likely that the septum adds any great mechanical strength to the nose and, in some animals, it undoubtedly does not". The nose being the only prime structure in the body as it reveals reciprocal and spontaneous changes in activity which is associated with the "nasal cycle".[2,28,29] Instead of a single airway ,the need of these two separate airways is to provide some supreme advantage for humidification of air and defence for respiratory system .

The evolutionary development of man has led to septal deformity and has been considered as being an unavoidable condition that results from forces acting on the growth of septal cartilage. This is thus factual that nasal septal deformity was present in 37% of higher apes but did not occur in lower animals.[2,22,23] Other factors, which are causing septal deviation are permanent incisor tooth erruption, irregularity of growth of maxillary bone, uneven development of the maxillary sinuses, tongue pressure habits and thumb-sucking . During the later life, the most common cause of acquired nasal septal deformity is trauma. This can occur during the "toddler stage" of life, or later due to road traffic accidents, assaults and injuries which are related to work or sporting.[2,22,30] These causes in fact state that nasal septal deviation keeps on increasing with age and male population is more commonly affected.[30]

Septal deformity of nose can be classified as 1) Spurs 2) Deviation 3) Dislocation.[1,3]

SPUR-

Spur is a sharp angulation which occurrs at the point where the vomer below meets with the septal cartilage and / or the ethmoid bone . It is result of compression forces acting vertically on the nasal septum.

During traumatic/ spontaneous trauma to the nose, fractures occurring through nasal septum may also produce sharp angulations.

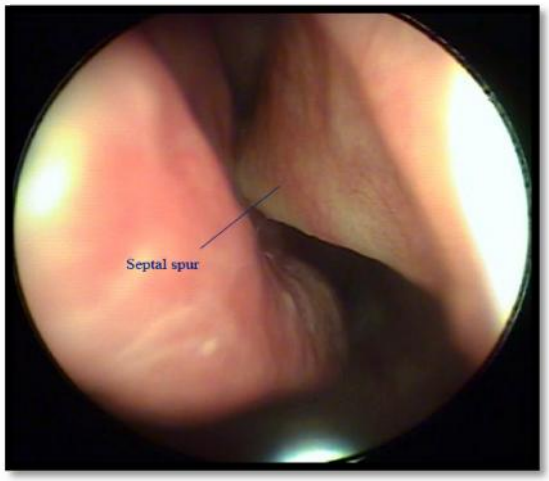


Figure 2: Spur

DEVIATION-

Can involve cartilage or bone.

Can occur in either of the plane: vertical or horizontal plane.

Can be

- Cartilaginous deviation
- C shaped deviation
- S shaped deviation.

1) Cartilaginous deviation- In this type of deviation, there is a deviation/ dislocation of the septal cartilage and vault but the bony pyramid and the upper bony part of the septum are central.

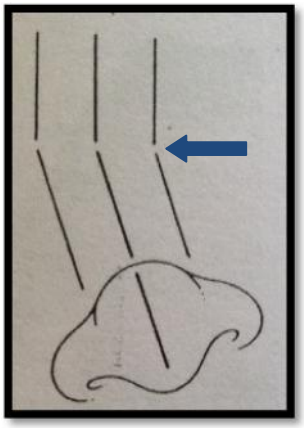


Figure 3: Cartilaginous deviation

2) C-shaped deviation- In this, displacement/ deviation of the upper bony part of the septum and the bony pyramid is to the same side and the whole of the septal cartilage and vault to the contralateral side.

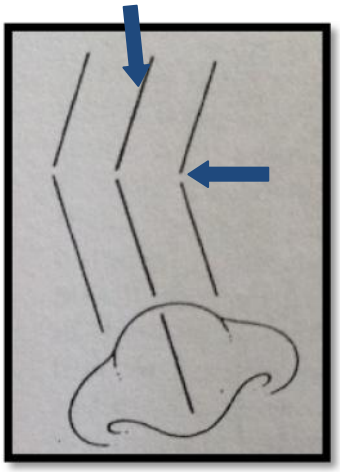


Figure 4: C-shaped deviation

3) S-shaped deviation- In this, there is deviation of the middle third part of the septum while the upper cartilaginous vault and associated septum is deviated contralateral side.

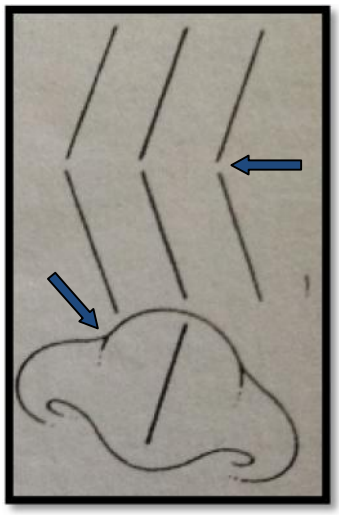


Figure 5: S-shaped deviation

DISLOCATION

Lower border of the septal cartilage is displaced from its position attaching to the anterior nasal spine inferiorly and is projected into one of the nostrils.

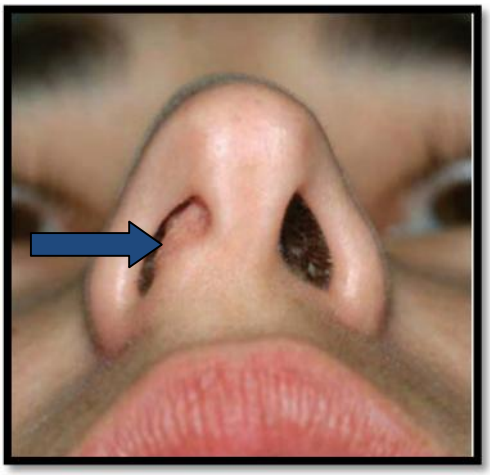


Figure 6: Dislocation

Morphologically, septal deviations were classified into three types according to Cottle's classification:

1) Simple deviation(commonest)
2) Obstruction
3) Impaction.

SIMPLE DEVIATION- Commonest.

Mild deviation of septum

No nasal obstruction

No treatment required.

OBSTRUCTION- It is more severe form of deviation of the nasal septum, that touches the lateral nasal wall but on vasoconstriction, there is not much deviation as turbinates shrink away.

May or may not require surgery.

IMPACTION- In this there is obvious deviation of the nasal septum along with a spur which touches the lateral wall of nose.

There is no improvement even on usage of vasoconstrictors. Surgery is the treatment of choice in these patients.

The history of septal surgery dates back to 1875, when Adams described moving the septum from midline by fracturing it. Asch (1890) described about fracturing, cutting and repositioning of septum. In 1904, Killian described submucous resection by placing incision 1cm behind the caudal border of septum at mucocutaneous junction and leaving behind caudal strut of cartilage. Freer (1905) advocated incision at the caudal margin of septum for submucous resection and preserving the dorsal strut of cartilage behind. Metzenbaum (1929) reduced the dislocated end of caudal septum by swinging door technique which formed basis for septoplasty. The main admirers of septoplasty are - Converse (1950), Becker (1951) followed by Goldman (1956) and Cottle (1958) who also contributed for the same. Cottle (1948) described the technique of raising the mucoperichondrial and mucoperiosteal flaps before joining the chondro-osseous junction and hence named it maxilla and premaxilla approach. Fry (1967) has stated that if a cartilage is cut partially or scored on one side, it tends to bend to opposite side. Maran (1974) described technique through bilateral intercartilagenous and transfixion incisions.[1]

Septoplasty is a procedure defined as surgery done on the nasal septum with the aim of centralizing and straightening it. Cottle and Van Dishoeck in 1963, in Leiden gave a basic course upon nasal surgery which laid the foundation for existing nasal surgery in 8Western Europe.[1] The idea basically of this surgery compared to previous procedure was to recreate instead of resect and to deal with the function as well as cosmesis in a single procedure. In this surgical procedure, there are six basic

steps (1) to access the septum; (2) to correct the pathology (3) to remove the pathology; (4) reshaping of the removed cartilage and bone;(5) reconstructing the septum; and (6) stabilizing the septum[1]. Septoplasty helps the internal forces of the nose to come into equilibrium and to eliminate their pull on external structures of the nose. Patients who undergo septoplasty have complaints that include both functional and aesthetic characteristics of the nose. The primary goal in these patients is surgical management to focus on functional problems inturn leading to improvement in the quality of life (QOL) of the patients. Subjective improvement in QOL after septoplasty has been evaluated in only few studies since it is challenging to measure a patients' subjective and psychosocial satisfaction precisely.

Stewart et al[4,] has established the Nasal Obstruction Symptom Evaluation (NOSE) Scale within the constraint of a multicenter study. An expert crew was formed and they formed an α-version of the instrument which included 10 of the obstruction-symptom specific parameters and they used a 5-point Likert scale to score it. The measure was thus authorized by assessing and calculating the reliability, validity (construct and content validity; concurrent and discrimination validity) and sensitivity of response. During this process, 10 parameters were decreased to 5 parameters which are as follows: nasal blockage/ obstruction, nasal congestion/ stuffiness, difficulty in nasal breathing, difficulty in sleeping, not able to get sufficient air through the nose while exercising or exertion.

NOSE (Nasal Obstructive Symptoms Evaluation) Scale

	NO	VERY MILD	MODERATE	MODERATE-SEVERE	SEVERE
1.Nasal Congestion Or Stuffiness	0	1	2	3	4
2.Nasal Blockage/ Obstruction	0	1	2	3	4
3.Trouble Breathing Through Nose	0	1	2	3	4
4.Trouble Sleeping	0	1	2	3	4
5.Unable To Get Air Through My Nose During Exercise/ Exertion	0	1	2	3	4

Table 1-

In study by Islam et al [5,10], concluded that mean NOSE score was 58.4 preoperatively and 15.7 postoperatively and found good correlation between patients' NOSE scores.

Stewart et al [4,5,10] studied NOSE scores in patients undergoing septoplasty and concluded that there was improvement in NOSE score preoperatively and postoperatively (67.5 vs. 23; $P<0.01$) significantly and an excellent outcome measure tool.

Rhee et al [6], used NOSE scale in 20 patients after nasal surgery to evaluate the quality of life. There was a very improvement in NOSE score significantly at 1 month after nasal surgery and patients also revealed significant decrease in medication use (nasal steroids, antihistaminic and / or oral decongestants) at 1 month after surgery.

The SNOT score is a questionnaire that was originally developed as a rhinosinusitis specific, health related questionnaire and it combines both- nasal symptoms and general health. The usage of SNOT score to evaluate the result after surgery is a novel approach, as preceding other studies have used other tools for evaluation of change in nasal as well as non-nasal symptoms. It is a questionnaire which can be used on a regular basis and can easily be completed by the patient in an out-patient setting. It is efficiently a quality of life measurement, the numbers that are generated are useful to assess the outcome. In this questionnaire, the number of questions can be decreased or increased as per the need; formerly the scoring was based on 16 questions. A more recent pattern has total 20 questions but the two questions i.e. nasal obstruction and absence of perception of smell/ taste can be omitted , so these were included later finally giving a total of 22.[6,9]

SNOT-22(SINONASAL OUTCOME TEST):

	NO PROBLEM	VERY MILD PROBLEM	MILD OR SLIGHT PROBLEM	MODERAE PROBLEM	SEVERE PROBLEM	PROBLEM AS BAD AS IT CAN BE
1)NEED TO BLOW NOSE	0	1	2	3	4	5
2)SNEEZING	0	1	2	3	4	5
3)RUNNY NOSE	0	1	2	3	4	5
4)NASAL OBSTRUCTION	0	1	2	3	4	5
5)LOSS OF SMELL OR TASTE	0	1	2	3	4	5
6)COUGH	0	1	2	3	4	5
7)POST NASAL DISCHARGE	0	1	2	3	4	5
8)THICK NASAL DISCHARGE	0	1	2	3	4	5
9)EAR FULLNESS	0	1	2	3	4	5
10)DIZZINESS	0	1	2	3	4	5
11)EAR PAIN	0	1	2	3	4	5
12)FACIAL PAIN/PRESSURE	0	1	2	3	4	5
13)DIFFICULTY FALLING ASLEEP	0	1	2	3	4	5
14)WAKE UP AT NIGHT	0	1	2	3	4	5
15)LACK OF GOOD NIGHTS SLEEP	0	1	2	3	4	5
16)WAKE UP TIRED	0	1	2	3	4	5
17)FATIGUE	0	1	2	3	4	5
18)REDUCED PRODUCTIVITY	0	1	2	3	4	5
19)REDUCED CONCENTRATION	0	1	2	3	4	5
20)FRUSTRATED/RESTLESS/IRRITATED	0	1	2	3	4	5
21)SAD	0	1	2	3	4	5
22)EMBARRASED	0	1	2	3	4	5

Table 2-

Correction of major septal deformities with the well-known procedure of septoplasty that will lead to correction of certain associated external nasal deformity because of realignment of the septum to midline as Bekhius Dictum – "As the septum goes, so goes the nose".[1,3] Hence, this study is undertaken to assess the outcome of deviated nose deformities post surgically in comparison to preoperative findings using NOSE scale and SNOT-22 score.

MATERIALS AND METHODS

Study design: Observational Study.

Study period: 1 year

Source of Data: All patients who are undergoing septoplasty surgery in KLE's Dr. Prabhakar Kore hospital and MRC, Belagavi.

Sample size**(n)**: A total of 40 patients who met the criteria of inclusion were taken up in this study.

Ethical clearance**:** Ethical clearance for the study was obtained from the Institution's Ethical Clearance Committee.

INCLUSION CRITERIA:

All patients undergoing septoplasty for symptoms due to Deviated Nasal Septum in ENT&HNS department in KLE Dr.Prabhakar Kore charitable hospital.

EXCLUSION CRITERIA:

- Patients of less than 16years of age.
- Patient undergoing any other endonasal surgery along with septoplasty.
- Revision cases.

METHODOLOGY:

• During the study period, the patients presented to ENT department of KLE's Dr. Prabhakar Kore Hospital & MRC with nasal complaints were evaluated. A meticulous history was taken regarding patient symptoms, their duration and severity and any prior investigations or treatment the patient may have taken elsewhere. The patient's symptoms were noted and scored according to NOSE scale prior to Septoplasty which is tabulated below –

Table 3- *NOSE (Nasal Obstructive Symptoms Evaluation) Scale*

	NO	VERY MILD	MODERATE	MODERATE-SEVERE	SEVERE
1.Nasal Congestion Or Stuffiness	0	1	2	3	4
2.Nasal Blockage/ Obstruction	0	1	2	3	4
3.Trouble Breathing Through Nose	0	1	2	3	4
4.Trouble Sleeping	0	1	2	3	4
5.Unable To Get Air Through My Nose During Exercise/ Exertion	0	1	2	3	4

Any other symptoms apart from nose complaints were also noted, like ear fullness, pain or ear discharge. A thorough clinical examination was done for all patients with anterior and posterior rhinoscopy, cold spatula test, Cottle's test and diagnostic nasal endoscopy.

After clinical diagnosis, the cases underwent septoplasty surgery. They will be evaluated for subjective relief in symptoms and objectively by thorough clinical examination after 6 weeks of postoperative period and were scored according to NOSE scale and SNOT-22 questionnaire. Preoperative and postoperative photographic documentation done in all cases prior to surgery and at 6 weeks after surgery.

Table 4- ***SNOT-22(SINONASAL OUTCOME TEST):***

	NO PROBLEM	VERY MILD PROBLEM	MILD OR SLIGHT PROBLEM	MODERAE PROBLEM	SEVERE PROBLEM	PROBLEM AS BAD AS IT CAN BE
1)NEED TO BLOW NOSE	0	1	2	3	4	5
2)SNEEZING	0	1	2	3	4	5
3)RUNNY NOSE	0	1	2	3	4	5
4)NASAL OBSTRUCTION	0	1	2	3	4	5
5)LOSS OF SMELL OR TASTE	0	1	2	3	4	5
6)COUGH	0	1	2	3	4	5
7)POST NASAL DISCHARGE	0	1	2	3	4	5
8)THICK NASAL DISCHARGE	0	1	2	3	4	5
9)EAR FULLNESS	0	1	2	3	4	5
10)DIZZINESS	0	1	2	3	4	5
11)EAR PAIN	0	1	2	3	4	5
12)FACIAL PAIN/PRESSURE	0	1	2	3	4	5
13)DIFFICULTY FALLING ASLEEP	0	1	2	3	4	5
14)WAKE UP AT NIGHT	0	1	2	3	4	5
15)LACK OF GOOD NIGHTS SLEEP	0	1	2	3	4	5
16)WAKE UP TIRED	0	1	2	3	4	5
17)FATIGUE	0	1	2	3	4	5
18)REDUCED PRODUCTIVITY	0	1	2	3	4	5
19)REDUCED CONCENTRATION	0	1	2	3	4	5
20)FRUSTRATED/RESTLESS/IRRITATED	0	1	2	3	4	5
21)SAD	0	1	2	3	4	5
22)EMBARRASED	0	1	2	3	4	5

The total NOSE scores and SNOT-22 score were evaluated and mean, median as well as standard deviation was calculated. Detailed statistical analysis was done using Kolmogorov Smirnov test, Wilcoxon matched pair test and parametric dependent t test.

A preliminary preoperative and postoperative comparison between NOSE scores and SNOT-22 scores of the patients were done and found to be statistically significant.

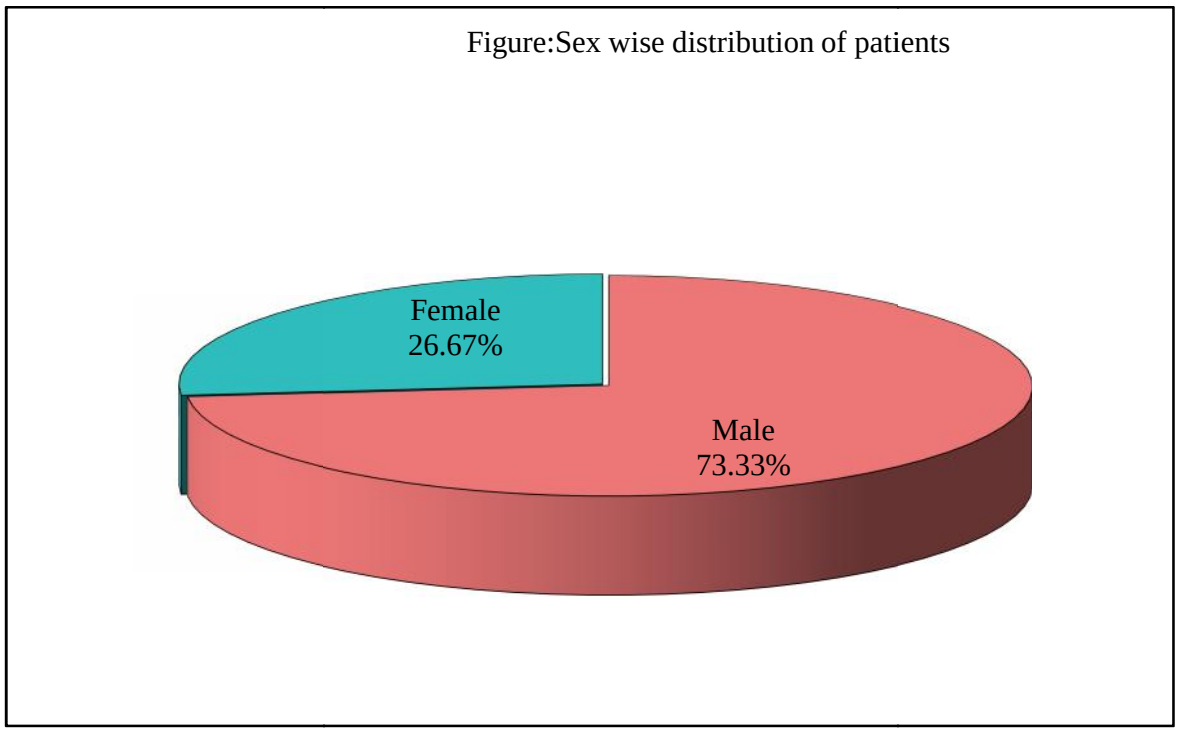
RESULT

A total of 30 patients were evaluated. The sex distribution of the samples were as follows :(Table 5, Graph 1)

Table 5- Sex distribution

Gender	No of patients	% of patients
Male	22	73.33
Female	8	26.67
Total	30	100.00

Graph 1- Sex Distribution



73.33% were males and 26.67% females.

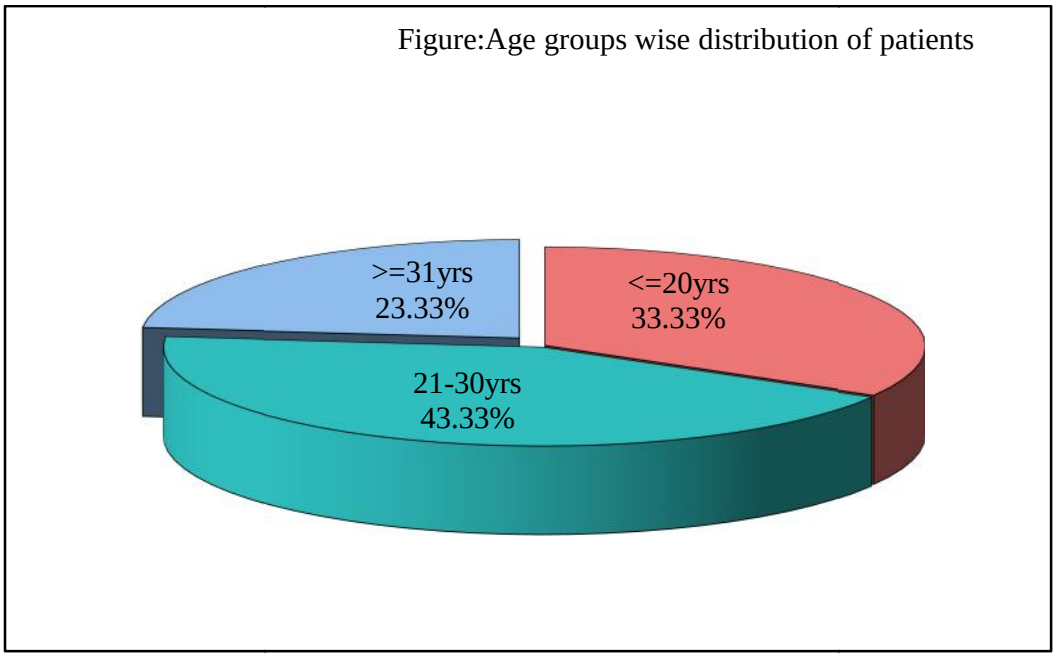
The youngest patient was 17yrs old and oldest patient was 45 years old.

The age distribution of the sample as follows : (Table 6, Graph 2)

Table 6- Age distribution

Age groups	No of patients	% of patients
<=20yrs	10	33.33
21-30yrs	13	43.33
>=31yrs	7	23.33
Total	30	100.00
Mean	24.40	
SD	7.38	

Graph 2- Age Distribution



The mean age of females and males in our study was 28 years and 23 years respectively.

The mean age of the entire sample in our study was 24 years.

The commonest age group of presentation was 21-30years.

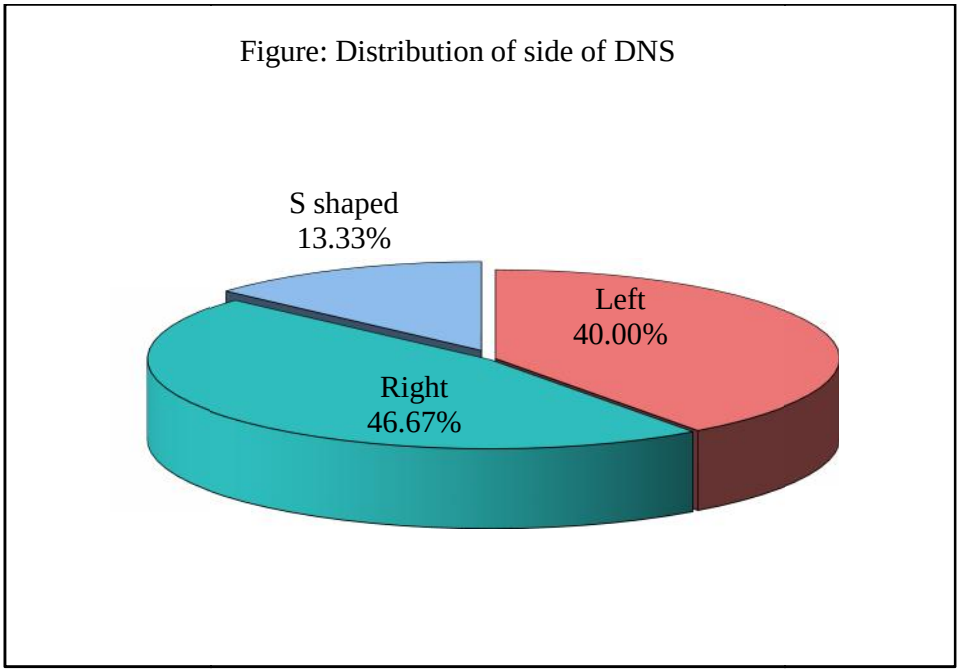
All the patients underwent septoplasty for deviated nasal septum.

Based on clinical examination of the patients, the side of deviated nasal septum was notified.(Table 7, Graph 3)

Table 7- Side of DNS presentation

DNS	No of patients	% of patients
Left	12	40.00
Right	14	46.67
S shaped	4	13.33
Total	30	100.00

Graph 3- Side of DNS presentation



Out of 30 patients, right side deviation was seen in 46.67% and left side in 40% of patients. 13.33% patients presented with S shaped deviation.

Out of all the patients belonging to age group 21- 30 years, 46.15% patients had right side deviation, 46.15% patients had left side deviation and 7% had S shaped deviation.

NOSE QUESTIONNAIRE ANALYSIS-

Based upon history of the patients, the presenting complaints were noted and scoring was done according to NOSE scale preoperatively and postoperatively.(Table 8, Table 9, Graph 4)

Table 8- Total NOSE score

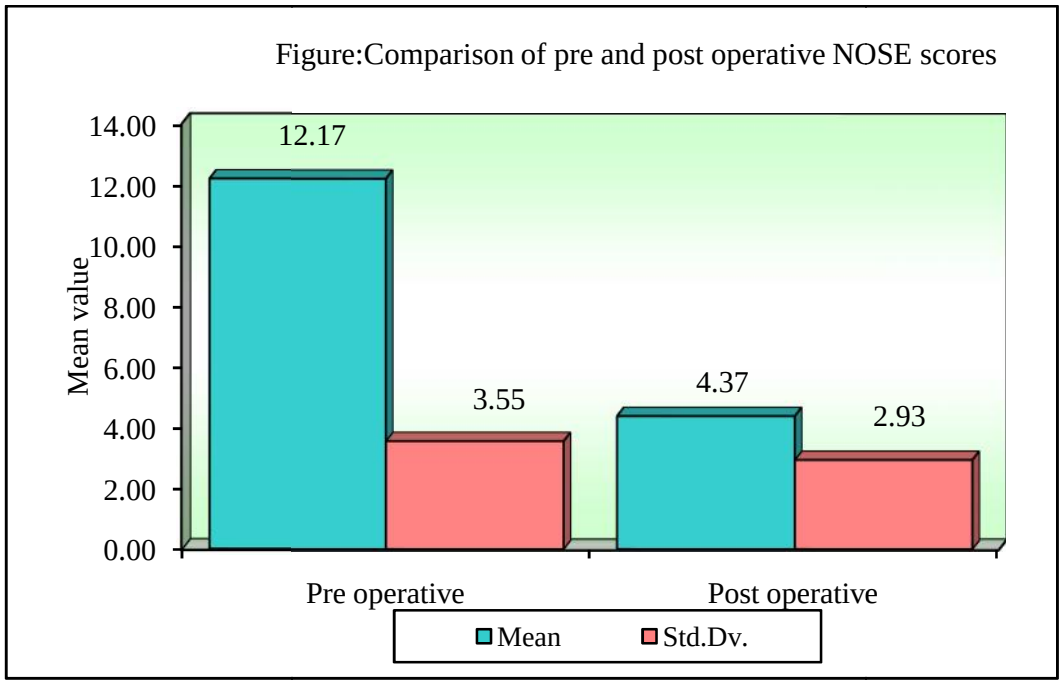
Statistics	Pre operative	Post operative	Difference
N	30	30	30
Mean	12.17	4.37	7.80
SD	3.55	2.93	3.89
SE	0.65	0.53	0.71
Variance	12.63	8.59	15.13
Minimum	2.00	0.00	2.00
Maximum	18.00	12.00	16.00
Range	16.00	12.00	14.00

Comparison of pre operative and post operative NOSE scores by dependent t test: (Table 9, Graph 4)

Table 9- Pre operative and post operative NOSE scores

Time points	Mean	SD.	Mean Difference	SD Difference	% of change	Paired t	p-value
Pre operative	12.17	3.55					
Post operative	4.37	2.93	7.80	3.89	64.11	10.9830	0.0001*

Graph 4- Pre operative and post operative NOSE scores



In this study, the mean total NOSE score pre operatively is 12.17 and post operatively is 4.37 shows their significance in above tables i.e p value < 0.05.

SNOT-22 QUESTIONAIRRE ANALYSIS-

In our study, patients were also evaluated using SNOT-22 questionnaire based on their symptomatology.(Table 10, Table 11, Graph 5)

Table 10- Total SNOT score

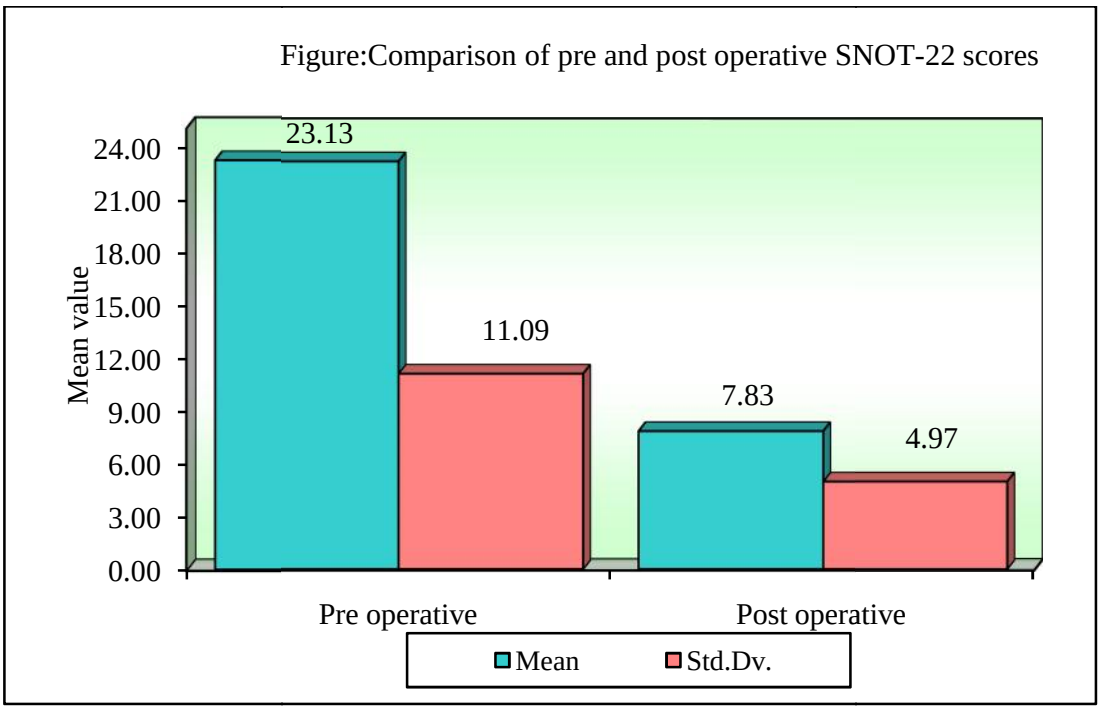
Statistics	Pre operative	Post operative	Difference
N	30	30	30
Mean	23.13	7.83	15.30
SD	11.09	4.97	10.32
SE	2.03	0.91	1.88
Variance	123.09	24.70	106.56
Minimum	6.00	1.00	0.00
Maximum	58.00	25.00	45.00
Range	52.00	24.00	45.00

Comparison of pre and post operative SNOT-22 score by dependent t- test: (Table 11, Graph 5)

Table 11-Pre operative and post operative SNOT-22 scores

Time points	Mean	SD	Mean Difference	SD Difference	% of change	Paired t	p-value
Pre operative	23.13	11.09					
Post operative	7.83	4.97	15.30	10.32	66.14	8.1180	0.0001*

Graph 5- Pre and post operative SNOT-22 score



In this study, the total preoperative SNOT-22 mean score was 23.13 and postoperative mean score was 7.83 with statistically significant results.

In our study, there is significance in decrease of NOSE score and SNOT-22 scores postoperatively.

On comparative correlative analysis of NOSE and nasal symptoms of SNOT-22 questionnaire, as such- there was no significant difference , between the two questionnaires. There was no difference in the efficacy of both the questionnaires.

DISCUSSION

Deviated nasal septal deformity is a common nasal deformity and a challenging problem to correct. Even though there are many methods and ways for correction of nasal septal deviation, but in the end it's the surgeon's apprehension and choice to contemplate on table regarding the most superior technique of surgery. However, the surgeon should not neglect the nasal obstruction as it has multifactorial etiology. Most often, non-surgical etiology of nasal obstruction should be ruled out and treated as a prime modality. A complete understanding of anatomy of nose and dynamics of airflow in the nose are important prior to undertaking a surgical procedure to correct the nose for nasal obstruction.

Amongst all the procedures performed in otorhinolaryngology, nasal septal surgery is the commonest procedure done. There is not much evidence to prove if there is any benefit in cosmetic problem of the patient , in such a case-septal surgery might not be of much significance. Surely, it is difficult for the patient to undergo septal surgery who come with spontaneous onset obstruction of nose without any previous history of injury. In this area of septal surgery one of the major problem is that there is no method to objectively measure the symptomatology following septal deviation. Therefore, there is need for a functional measure for the surgeon. As patient satisfaction is one of the most important parameter to evaluate the success rate of surgery, this study is based on that.

In our study, we analyzed 30 cases that underwent septoplasty operation having nasal obstruction as major complaint in all the patients. For all the cases, analysis was done preoperatively and postoperatively using NOSE scale and SNOT-22 questionnaire. When demographically data was analyzed, it displayed that most

commonly affected population and who underwent surgery were males i.e.73.33% and 26.67% were females with maximum number of cases belonging in the third decade.

In the study done by Stewart et al[4], 64.5% were males and 35.5% were females. In the study done by P.S. Arunachalam et al [11], 76.85% were males and 23.14% were females which is almost similar to our study.

In our study, all the patients had nasal obstruction that underwent septoplasty surgery for their functional outcome. The preoperative and postoperative analysis of patients was done using NOSE scale. The mean preoperative score was 12.17 and post operative score was 4.37 with mean difference in the value of 7.80 which was statistically significant with $p < 0.0001$.

In study by Islam et al [5,10], concluded that the mean NOSE score was 58.4 preoperatively and 15.7 postoperatively and found good correlation between patients' NOSE scores.

In the study done by Bezerra et al.[16] , the NOSE questionnaire scores three months post surgery showed statistically significant improvement ($p < 0.001$) and a statistically significant correlation was found between the preoperative and postoperative score with tremendous improvement symptomatically($r = -0.789$, $p < 0.001$).

Stewart et al [4,] studied NOSE scores in patients undergoing septoplasty and concluded that there was improvement significantly in NOSE score preoperatively and postoperatively (67.5 vs. 23; $P<0.01$) and an excellent outcome measure tool just like our study.

After nasal septal surgery, the usage of SNOT score as a mean to evaluate the outcome is a novel approach, as prior studies have used different methods for evaluation of the changes in both nasal as well as non-nasal symptoms. As this is a single questionnaire so it can be used on a regular basis quickly and easily and completed in a single out-patient setting .The figures that were generated was useful to assess the outcome and so it is effectively used to assess the quality-of-life of patients.

In our study we also used SNOT-22 questionnaire to correlate the preoperative and postoperative score following septoplasty. The mean preoperative and postoperative score was 23.13 and 7.83 respectively with mean difference of 15.30 (% of change 66.14) and statistically significant p value of $p<0.0001$.

In the study by Fairley et al. [7,31,] an authorized nasal symptomatology score was used and they defined patient improvement when there was a 1 grade decrease of symptom severity (grade 0- asymptomatic; grade 1- mild; grade 2- moderate; grade 3- severe). The mean score of SNOT-22 questionnaire was 47% and was considered as overall improvement significantly. When the mean scores for nasal obstruction was considered, a marked improvement of two points was seen and found to be significant.

In this study, out of 30 patients, right side deviation was seen in 46.67% and left side in 40% of patients. 13.33% patients presented with S shaped deviation. Out of all the patients belonging to age group 21- 30 years, 46.15% patients had right side deviation , 46.15% patients had left side deviation and 7% had S shaped deviation stating that left deviated nasal septum is most common type of deviation seen in Indian population.

In the study done by Serifoglu et al. [21], there were 107 patients (52.7%) who had nasal septum deviation to the right, and 96 (47.3%) who had deviation to the left which was almost similar to our study.

In our study we also performed the comparative correlative analysis of both the NOSE and nasal symptoms (need to blow nose, sneezing, runny nose, nasal obstruction, loss of smell or taste, post nasal discharge and thick nasal discharge) of SNOT-22 questionnaire wherein no significant difference was found between the two scoring symptoms both of which had p value of 0.0001. Hence it stated that both the questionnaires have same efficacy when compared but SNOT -22 has additional benefit of including QOL questions that helped for better assessment of patients symptomatically in terms of their day to day activities and routine life. As such none of the previous studies have done this analysis. Hence, the SNOT-22 score can be used to assess the functional outcome of patients post septoplasty effectively

There are other disease-specific QOL (Quality of life) questionnaires which are available to assess nasal complaints and are not specific for assessment of nasal obstruction only: "Chronic Sinusitis Survey (CSS)", "Rhinosinusitis Disability Index (RSDI)", "Sino-Nasal Outcome Test (SNOT-20)", "Rhino-conjunctivitis Quality of Life Questionnaire (RQLQ)", and "Allergy Outcome Survey (AOS)". The RSDI, the CSS and the SNOT-20 were used to assess the outcome of chronic rhinosinusitis, as like the RQLQ and AOS scoring system- which was used for allergic rhino-conjunctivitis. [16,32,33,34,35]

The aim of this study was to create a definitive measure to evaluate the disease-specific QOL of patients presenting with nasal obstruction, retaining its unique meaning. As NOSE and SNOT-22 are questionnaire based on the psychological analysis of patient satisfaction and symptomatology, it has been used to evaluate the outcome in patients following septoplasty. No other study have used both this questionnaire to evaluate the patient post septoplasty.

CONCLUSION

Nasal obstruction is the most common symptom in deviated nasal septal deformity. Deviated nasal septal deformity also affects the quality of life of patients by causing nasal blockage, nasal congestion, difficulty in breathing, trouble in sleeping, unable to breathe through the nose and also interferes with day to day activities, quality of life and in toto the patient productivity.

So, after septoplasty it is important to analyze both the improvement in nasal obstruction and improvement in quality of life to have a complete assessment. To conclude, our study assessment enlightens regarding improvement in both the nasal obstruction as well as quality of life after septoplasty.

SUMMARY

This study was done in the Department of Otorhinolaryngology and Head and Neck Surgery, Jawaharlal Nehru Medical College and KLES Dr Prabhakar Kore Hospital from January 2018 to December 2018.The objective was to evaluate the outcome of Septoplasty in Deviated Nasal Septum in relieving nasal symptoms using Nasal Obstructive Symptoms Evaluation (NOSE) scale and Sinonasal Outcome Test(SNOT-22).

Out of 30 patients who underwent septoplasty , 22 were male and 8 were female. The commonest age of presentation was 21-30yrs. The mean age of patient was 24years. The most common symptom was nasal obstruction. The patients were symptomatically evaluated using NOSE score and SNOT-22 questionnaire preoperatively. Patients were subjected for septoplasty and improvement in the nasal symptoms was seen.

The postoperative NOSE score and SNOT-22 questionnaire was calculated and statistical analysis was done at 6weeks. The difference in preoperative and postoperative NOSE and SNOT-22 questionnaire was done and was found to be statistically significant stating that the functional outcome of septoplasty can very easily be evaluated using these questionnaire on out patient basis.

The major limitation in this study was lack of objective assessment of the patients complaints and its assessment. In this era of endoscopes, use of superior methods for disease clearance is an important step to measure the outcome for success of surgical procedure. Hence more advanced techniques and methods can be utilized to improve the quality of life of the patients and make them symptom free.

It is recommended that there is still further scope for analysis on a larger sample size for an even better and robust statistical evaluation and to better appreciate the post-operative efficacy of patients following septoplasty surgery.

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ANNEXURE I- INFORMED CONSENT

"STUDY OF OUTCOME OF SEPTOPLASTY USING NOSE AND SNOT-22 QUESTIONNAIRE"

PRINCIPAL INVESTIGATOR : DR.

CO-INVESTIGATOR : DR.

INTRODUCTION AND PURPOSE: The present study is conducted among patients who are undergoing septoplasty in ENT & HNS department in KLE's Dr.Prabhakar Kore Charitable Hospital and Medical Research Centre, Belgaum for symptoms due to deviated nasal septum. I hereby request you to voluntarily participate for the same.

PROCEDURE: If you agree to participate in this study, the relevant data will be collected as per the proforma and the final diagnosis will be confirmed.

After getting inducted in the study, you will be evaluated with NOSE and SNOT-22 questionnare for the symptoms and diagnosis will be made accordingly. Routine blood investigations prior to septoplasty surgery will be done. At the 6 weeks follow up you will be evaluated for symptom relief post septoplasty using NOSE and SNOT-22 questionnaire.

BENEFITS: Patient will not be eligible for any kind of monetary benefits or free services by virtue of your participation in the study.

RISKS: Methods applied to do the study are safe. Intra-operative and post-operative bleeding can occur.

COST OF PARTICIPATION: The cost of the Investigation will be borne by the Study Subject. The other indirect expenses will be borne by the Investigator.

PRIVACY AND CONFIDENTIALITY: The results of the study may be published in journals for scientific purposes. However your identity will not be revealed. All information collected will be coded so that no one other than the investigator will know your identity.

WITHDRAWAL FROM THE STUDY: You can withdraw from the study at any time if you wish to do so.

AUTHORIZATION TO PUBLISH THE RESULTS: The researcher may use the information gathered from this study for presentation in scientific meetings. However your identity will not be revealed.

QUERIES AND CONTACT: If you have any querry about rights as a research participant you can contact Dr.Roopa M Bellad, Professor, Department of Paediatrics and Chairman, Jawaharlal Nehru Medical College Institutional Ethics Committee on human subjects research.

CONSENT SUMMARY: I have been explained all the contents of this consent form in my local language and having understood and clarified all my queries about the study to the best of my knowledge, I hereby give my voluntary consent for participation in the study. I do sign the informed consent form in front of an eyewitness whom I recognize.

Name and Signature/ left thumb impression of the participant:

Name and Signature of the interviewer:

Name and Signature/ left thumb impression of the eyewitness (Relative):

Signature of the guide:

Date:

ANNEXURE II -ETHICAL CLEARANCE CERTIFICATE

K.L.E.UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
(Accredited 'A' Grade by NAAC)

Website: http//www.jnmc.edu
E-Mail : domc@jnmc.edu

Phone: (+ 91-(0)831 Office : 2471350
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ **Date: 22/11/2017**

To,

PG student in ENT&HNS,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"A ONE YEAR OBSERVATIONAL STUDY OF OUTCOME OF SEPTOPLASTY BY USING NOSE AND SNOT-22 QUESTIONNAIRE IN KLE'S DR. PRABHAKAR KORE HOSPITAL, BELAGAVI",** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Arathi Darshan)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE III - PROFORMA FOR DATA COLLECTION

"STUDY OF OUTCOME OF SEPTOPLASTY USING NOSE AND SNOT-22 QUESTIONNAIRE."

Date:

O.P. No: IP No:

Name: Age:

Sex: Occupation:

Address: Phone No:

D.O.A D.O.D:

CLINICAL PROFILE:

Chief Complaint:

History of Present Illness

Past History:

Personal History:

Family History:

Physical Examination:

I) General Physical Examination -

Vital signs:

Pulse-

Blood pressure-

Respiratory Rate-

Pallor

Icterus

Clubbing

Cyanosis

Lymphadenopathy

Oedema

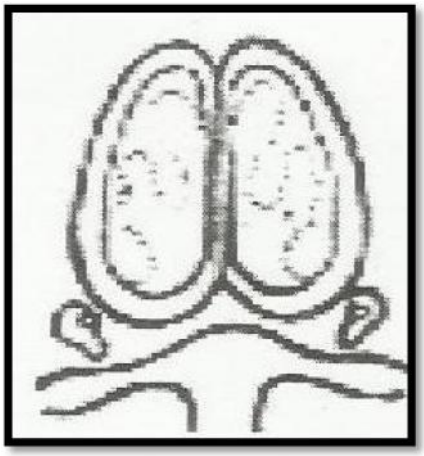
II) ENT Examination

1. NOSE EXAMINATION

External appearance

- Root
- Bridge
- Dorsum

- Alae
- Tip
- Columella
- Cold spatula test
- Cottle's test
- Anterior Rhinoscopy
- Posterior Rhinoscopy



Paranasal Sinus Examination

2. EAR EXAMINATION- **Right ear** **Left ear**

Pinnae

Preauricular area

Post auricular area

External auditory canal

Tympanic membrane

Tuning Fork Test: **Right ear** **Left ear**

Rinne's test: 256hz

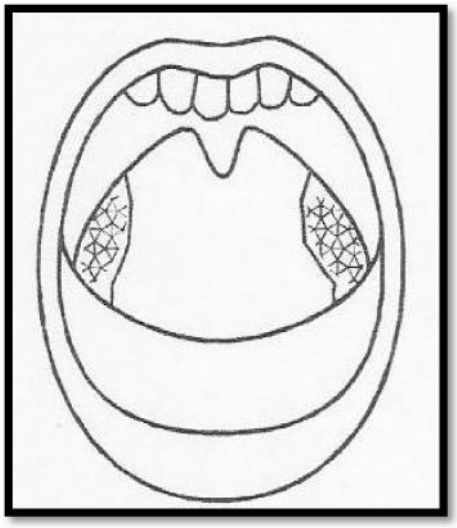
512hz

1024hz

Weber's test:

Absolute Bone Conduction test:

3.1 ORAL CAVITY and OROPHARYNX:



4. NECK EXAMINATION

Diagnosis:

<u>Preoperative</u>:

Preoperative pictures –

Routine tests:

CBC

Serum urea

Serum creatinine

Hiv

Hbsag

Bleeding time

Clotting time

NOSE (NASAL OBSTRUCTION SYMPTOM EVALUATION) SCORE:

SYMPTOMS	NOT A PROBLEM	VERY MILD PROBLEM	MODERATE PROBLEM	FAIRLY BAD	SEV PRO
1)Nasal congestion and stuffiness	0	1	2	3	
2) Nasal blockage or obstruction	0	1	2	3	
3)Trouble breathing through my nose	0	1	2	3	
4)Trouble sleeping	0	1	2	3	
5)Unable to get enough air through my nose	0	1	2	3	

SNOT-22(SINONASAL OUTCOME TEST):

	NO PROBLEM	VERY MILD PROBLEM	MILD OR SLIGHT PROBLEM	MODERATE POBLEM	SEVERE PROBLEM	PROBLEM AS BAD AS IT CAN BE
1)NEED TO BLOW NOSE	0	1	2	3	4	5
2)SNEEZING	0	1	2	3	4	5
3)RUNNY NOSE	0	1	2	3	4	5
4)NASAL OBSTRUCTION	0	1	2	3	4	5
5)LOSS OF SMELL OR TASTE	0	1	2	3	4	5
6)COUGH	0	1	2	3	4	5
7)POST NASAL DISCHARGE	0	1	2	3	4	5
8)THICK NASAL DISCHARGE	0	1	2	3	4	5
9)EAR FULLNESS	0	1	2	3	4	5
10)DIZZINESS	0	1	2	3	4	5
11)EAR PAIN	0	1	2	3	4	5
12)FACIAL PAIN/PRESSURE	0	1	2	3	4	5
13)DIFFICULTY FALLING ASLEEP	0	1	2	3	4	5
14)WAKE UP AT NIGHT	0	1	2	3	4	5
15)LACK OF GOOD NIGHTS SLEEP	0	1	2	3	4	5
16)WAKE UP TIRED	0	1	2	3	4	5
17)FATIGUE	0	1	2	3	4	5
18)REDUCED PRODUCTIVITY	0	1	2	3	4	5
19)REDUCED CONCENTRATION	0	1	2	3	4	5
20)FRUSTRATED/RESTLESS/IRRITATED	0	1	2	3	4	5
21)SAD	0	1	2	3	4	5
22)EMBARRASED	0	1	2	3	4	5

ANNEXURE IV - PHOTOGRAPHS (DNE)

CASE 1

PRE OPERATIVE (PICTURE-1) **POST OPERATIVE (PICTURE-2)**

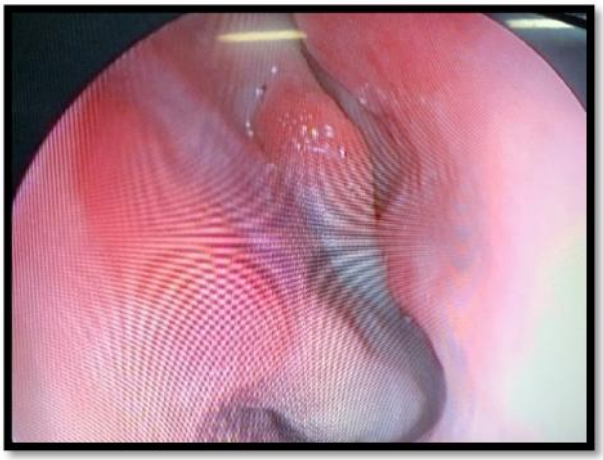
CASE 2

PRE OPERATIVE (PICTURE-3) **POST OPERATIVE (PICTURE-4)**

CASE 3

PRE OPERATIVE (PICTURE-5) **POST OPERATIVE (PICTURE-6)**

CASE 4



PRE OPERATIVE (PICTURE-7) **POST OPERATIVE (PICTURE -8)**

ANNEXURE V - KEY TO MASTER CHART

- **Age**- In years
- **SEX**
    - Male – M
    - Female – F
- **SIDE OF DEVIATION**-
    - Right- R
    - Left – L
    - 'S' shaped- S
- **NOSE scale**

- Nasal congestion – A
- Nasal blockage – B
- Trouble breathing through nose – C
- Trouble sleeping – D
- Unable to breathe through nose during exercise/exertion – E
- Total score – F
    I. No - 0
    II. Very mild - 1
    III. Moderate - 2
    IV. Mod-severe - 3
    V. Severe - 4

- **SNOT-22 QUESTIONNAIRE: Total of 22 questions:**

  Total Score based on-

- No problem- 0
- Very mild problem - 1
- Mild problem- 2
- Moderate- 3
- Severe problem- 4
- Problem as bad as it can be- 5

SL. NOI.	NAME	PT. NO.	AGE	SEX	DNS	NOSE SCORE(20)		SNOTT-22 QUESTIONNAIRE		NAIRE(110)
						PREOP	POSTOP	PREOP	POSTOP	
1	MAHANTESH	4146840	19	M	RIGHT	16	3	29	4	
2	RESHMA	4048210	24	F	RIGHT	16	0	32	4	
3	PRATIBHA	4019826	45	F	LEFT	14	2	20	3	
4	GOVIND	3216980	21	M	LEFT	18	2	26	5	
5	UDAY	4198672	23	M	LEFT	14	8	12	5	
6	JAYASHREE	4126389	32	F	RIGHT	9	1	8	3	
7	VITTAL	4326701	34	M	LEFT	11	1	25	6	
8	SURAJ	869391	21	M	RIGHT	10	2	13	1	
9	IRANNA	4748494	21	M	S SHAPED	15	1	40	4	
10	SAVITRI	4216732	33	F	S SHAPED	2	0	14	8	
11	ASHOK	4127345	34	M	LEFT	13	5	30	9	
12	SHEETAL	4023876	18	F	RIGHT	14	5	25	25	
13	SANDESH	881745	19	M	S SHAPED	13	3	58	13	
14	HALAPPA	882731	17	M	LEFT	12	5	6	4	
15	SHIVKUMAR	882730	22	M	RIGHT	12	3	22	5	
16	KISHORE	883670	22	M	LEFT	13	4	19	3	
17	DIPINKUMAR	4321980	28	M	LEFT	3	1	6	2	
18	SANTOSH	898569	20	M	RIGHT	12	4	22	9	
19	SHIVANAND	898347	22	M	LEFT	10	4	17	5	
20	MALLIKARJUN	899132	19	M	LEFT	12	5	25	8	
21	GADIGESHWAR	900809	22	M	RIGHT	9	4	38	13	
22	MOHAMMAD H	900494	26	M	S SHAPED	10	8	17	12	
23	AYUB M	901022	40	M	RIGHT	17	6	36	10	
24	SIMRAN	901302	19	F	RIGHT	13	6	31	15	
25	PRASHANT	914575	21	M	LEFT	10	8	16	12	
26	NAGARAJ	914512	24	M	RIGHT	10	5	15	9	
27	AKKATAI	916444	35	F	RIGHT	14	9	22	12	
28	DEEPA	925457	17	F	LEFT	12	8	31	11	
29	SANDEEP	928682	17	M	RIGHT	15	6	18	8	
30	VINEET	930456	17	M	RIGHT	16	12	21	7	