

**To study the effect of septoplasty in relieving nasal obstruction and on quality of life****Sharmila Dhulipalla\****Associate Professor, Department of ENT, Katuri Medical College & Hospital, Chinakondrupadu, Guntur, Andhra Pradesh, India***Received: 07-05-2021 / Revised: 20-06-2021 / Accepted: 31-07-2021****Abstract**

Septoplasty is a surgical procedure to correct the deviation of nasal septum. Nasal obstruction is the most common complaint in majority of these patients. There are two potential ways to assess the outcome of surgery after septoplasty: objective and subjective measures. Subjective assessment is done in our study with Nasal obstruction symptom evaluation (NOSE) scoring. In the present study the effectiveness of septoplasty in treating nasal obstruction and its effect on quality of life was evaluated. **Method:** A prospective randomized study was done on 100 patients with symptomatic deviated nasal septum. These patients underwent septoplasty between the study period of November 2018 to May 2020. Follow up was done for a period of 6 months after surgery. We used NOSE scoring to analyze the severity of symptoms both preoperatively and postoperatively and did diagnostic nasal endoscopy to compare the results and to look for residual deviations. **Results:** We found statistically significant improvement in mean NOSE score during the follow up visits. The mean value increment was 48.70 and 48.95 after 3 months and 6 months respectively following surgery ( $p < 0.0001$ ). Each individual symptom score improvement was also compared which showed a significant improvement in all the four symptom scores out of five. Diagnostic nasal endoscopic evaluation also showed promising results with less residual deformity on follow up. **Interpretation and conclusion:** Septoplasty is an effective surgical procedure for deviated nasal septum which produces significant symptomatic relief for the patient. Nasal obstruction symptom evaluation (NOSE) questionnaire effectively assessed the improvement in quality of life among the symptomatic patients.

**Keywords:** Deviated nasal septum; Nasal obstruction symptom evaluation (NOSE); Nasal obstruction.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

**Introduction**

The main functions of the nose include olfaction, heat exchange, humidification and defense. All these functions require good interaction between the inspired air and the mucous membranes or the sensory cells of the olfactory system. This is achieved by complicated aerodynamics that depends on the geometry of the internal nose. The septum helps to preserve this geometry. The septum also supports the dorsum, columella and the tip of the nose and as such it contributes to cosmesis. The nose which is the most prominent part of the face is very much vulnerable starting from life in utero, in which the septum is mainly involved. Therefore, in adulthood a straight septum is more of an exception than the rule. [1] The deviated nasal septum is one of the most common causes of unilateral nasal obstruction. Trauma during birth including forceps delivery, passing through narrow pelvic canal etc can cause early deviation in the nasal septum or deviation which becomes evident during the pubertal growth spurt. With each occurrence of injury, there will be subtle changes in the growth pattern of septum which becomes evident in on later date. Besides it will also cause disturbance in growth of its attached bony structures to grow in an unnatural way. Nasal septal deformities (NSD) are one of the most common disorders in humans. The incidence of NSD in adult humans was shown to be very high, ranging about 90%. [2] Both septal deformity and deviation has different meanings, deformity means change of shape or change of form while deviation means declination from the medio sagittal plane. In 1958, Cottle [2,3] is the

first person to define septal distortions which he divided into 4 groups: subluxation, large spurs caudal deflection and tension septum. Later in 1987, Mladina was the first to make user friendly classification into six basic types: which he put into two groups: vertical deformities (type 1, 2, 3 and 4), and horizontal deformities (type 5 and 6). He also described seventh type named Passali deformity, which is a well defined combination of previous six types. Even though nasal obstruction is the most obvious symptom of a deviated nasal septum (DNS); it is attributed to many other symptoms in rhinology such as recurrent bleeding from nose, anosmia, frequent crusting, headache, sinusitis, post nasal bleeding, snoring, external nasal deformity etc. Treatment includes correction of anatomical deformity. Deviated nasal septum is a common cause of nasal airway obstruction and most common presenting symptom is nasal obstruction. Septoplasty is the preferred surgery to correct deviated septum. [4,5] The current study utilizes Nasal Obstruction Symptom Evaluation (NOSE) scale which was developed and validated by Michael G. Stewart in 2002 and it has been used by many investigators and has been translated in many languages for convenience. This scoring system uses 5 questions with answers in grading 0 – 4. Each response is multiplied by 5 have the sum of all to give total score of 100. This questionnaire can be used pre and post operatively to assess the improvement of symptoms after the surgery. [6]

**Aim and objectives**

1. To evaluate the effectiveness of septoplasty in treating nasal obstruction.
2. To evaluate the effect of septoplasty on quality of life.

**Materials and methods**

This is a Prospective randomized study on 100 patients with

\*Correspondence

**Dr. Sharmila Dhulipalla**

Associate Professor, Department of ENT, Katuri Medical College & Hospital, Chinakondrupadu, Guntur, AP, India.

E-mail: [dhulipallasharmila@yahoo.com](mailto:dhulipallasharmila@yahoo.com)

**Dhulipalla**

[www.ijhcr.com](http://www.ijhcr.com)

International Journal of Health and Clinical Research, 2021; 4(18):175-175

symptomatic deviated nasal septum who have undergone septoplasty between study period of November 2018 to May 2020 .The study was conducted at Katuri Medical College/ Hospital. Guntur.

Patients were selected on the basis of following criteria

- a) All patients with symptomatic deviated nasal septum.
- b) All patients who are willing to give consent.

Patients with following criteria was excluded from study

- a) Patients below the age of 18 years.
- b) Patients with nasal polyposis.
- c) Patients with allergic rhinitis.
- d) Patients undergoing septoplasty with other nasal surgeries.
- e) Revision septoplasty.

A group of 100 patients with deviated nasal septum attending outpatient department with symptoms of nasal obstruction, underwent complete ear nose throat and general medical evaluation and assessed with NOSE questionnaire.

Diagnostic nasal endoscopy was done to assess degree of septal deviation, site of obstruction, turbinate hypertrophy, signs of sinusitis or any other pathology. Radiological investigations were done including X-ray and CT scan of the paranasal sinuses in required cases. Surgery was performed under general/local anesthesia after giving local infiltration with 1% xylocaine with 1:100000 adrenaline. Freer's incision was used and mucoperichondrial flap elevated followed by resection of deviated part

of septum. Spurs if present also removed. Flaps were repositioned and sutured with absorbable suture material. After surgery both the nasal cavities were packed with medicated gauze and removed on the first postoperative day. Saline douching or pressurized saline nasal spray were started after 7 days and postoperative assessment was done in terms of symptoms relieved like nasal obstruction, headache, hyposmia, post nasal discharge. Follow-up visits were done after 3<sup>rd</sup> month and 6<sup>th</sup> month. During the follow up period, NOSE questionnaire and diagnostic endoscopy was done and it was compared with preoperative findings. The results were statistically analyzed.

**Results**

**Age distribution**

Age distribution of the sample population was between 18 to 48 years with mean age of 28.93 years. Majority of patients were in 3<sup>rd</sup> decade.

**Sex distribution**

Out of 100 patients 58 were males and 42 were females. The male to female ratio was 1.38:1(Figure 1).

**Sex distribution**

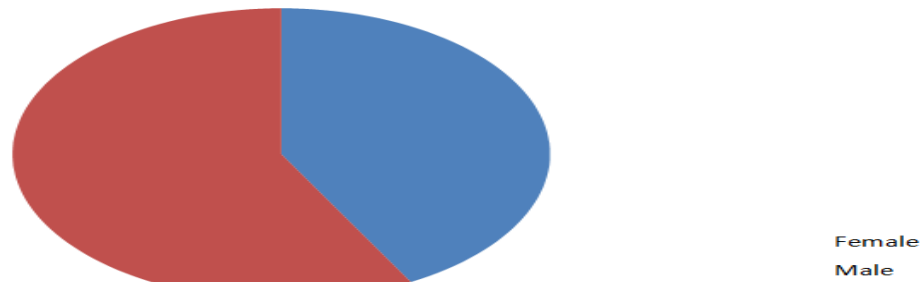


Fig 1. Sex Distribution

**Symptoms**

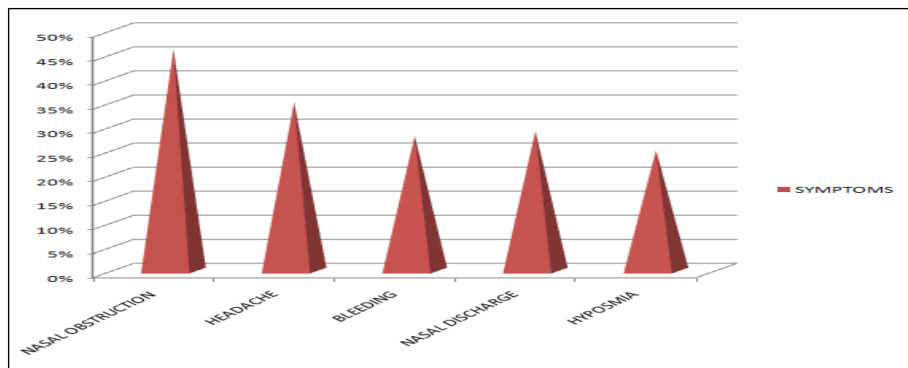
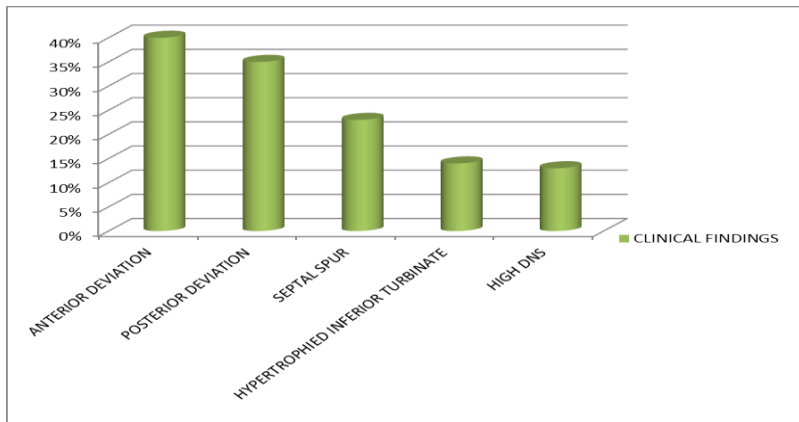


Fig 2:Symptoms

All the patients presented with one or more of the following symptoms:headache, nasal obstruction, anosmia or hyposmia, bleeding, nasal discharge. The frequency of symptoms is depicted in the graph below (Figure 2)The commonest symptom was nasal obstruction (46%), followed by headache (35%), bleeding (28%), nasal discharge (29%) and hyposmia (25%).

**Clinical examination**

All the patients who had symptomatic deviated nasal septum were evaluated thoroughly by anterior rhinoscopy followed by diagnostic nasal endoscopy preoperatively. The findings on clinical examination is shown in the graph (Figure 3)



Among the 100 patients who underwent surgery, 40 patients had anterior deviation and 35 patients had posterior deviation. Twenty three patients had septal spur, 14 patients with inferior turbinate hypertrophy and 13 patients had high DNS. All the patients were given NOSE score questionnaire prior to surgery and were scored accordingly.

**Follow-up**

Post surgery patients were followed up after 3<sup>rd</sup> and 6<sup>th</sup> month. During the follow up period NOSE scoring and DNE examination was done. The comparison of pre and postoperative DNE findings is shown below (Table 1). The DNE findings were consistent at both the follow up visits.

**Table 1: Preoperative and postoperative DNE findings**

Clinical Finding	Preoperative	Postoperative
Anterior Deviation	40	11
Posterior Deviation	35	10
Septal Spur	23	2
Hypertrophied Inferior Turbinate	14	8
High DNS	13	6

**Comparison of NOSE score before and after surgery**

**Table 2: NOSE score before and after Surgery**

Mean NOSE score Preoperative	Mean NOSE score Postoperative (3 months)	Mean NOSE score Postoperative (6 months)	Improvement In NOSE score	P Value
59.25	10.55	10.30	48.95	0.0001

The NOSE score analysis showed preoperatively mean NOSE score value of 59.25 and postoperatively 10.55 at 3<sup>rd</sup> month and 10.30 at 6<sup>th</sup> month. The mean value increment was 48.70 and 48.95 at 3<sup>rd</sup> month and 6<sup>th</sup> month respectively. This improvement in NOSE score value is calculated and statistically analyzed using students paired t test and the p value was calculated to be less than 0.0001 which shows the improvement in score is statistically significant (Table 2).

**Comparison of each symptom scores**

**Table 3: Symptom score**

Symptoms	Preoperative mean and SD	Postoperative mean and SD	P value	Statistical significance
Nasal congestion or stuffiness	2.17 (1.20)	1.25 (1.23)	0.0001	S
Nasal blockage or obstruction	2.91 (0.94)	0.97 (0.64)	0.0001	S
Trouble breathing through my nose	2.41 (1.79)	1.15 (1.16)	0.0001	S
Trouble sleeping	1.83 (1.34)	1.22 (1.11)	0.0006	S
Unable to get enough air through my nose during exercise or exertion	2.34 (1.37)	2.38 (2.43)	0.8861	NS

The change in NOSE score symptoms were individually analyzed statistically using paired t test and all were found to be statistically significant except the symptom of 'unable to get enough air through nose during exercise or exertion' (Table 3).

**Discussion**

Nasal obstruction is mostly on the side of deviation but can also

occur on the opposite side as a result of turbinate hypertrophy. The inspiratory currents are displaced and the ensuing turbulence gets

concentrated over a small area producing drying and crusting. It may often produce ulceration and bleeding. The pressure produced by the sharp spurs and deviations on adjacent sensory nerves produces pain and the condition is known as anterior ethmoidal nerve syndrome or Sluder's neuralgia. The definitive treatment for symptomatic septal deviation is septoplasty. However the benefits of the surgery as perceived by each and every patient will range from complete relief of symptoms to total failure. There are no defined parameters to assess the success of septoplasty. The diagnosis of deviated septum itself is more of a subjective conclusion. Hence it is difficult to estimate the success rate. The objective measures to quantify the success of surgery for nasal obstruction includes rhinomanometry and acoustic rhinometry. Septoplasty is a surgical procedure to straighten the deviated nasal septum. The history of septoplasty dates back to early 19th century. But the modern era of septoplasty techniques started when both Freer and Killian described submucous resection operations. The complications and poor long term results associated with submucous resection operation was resolved by Cottle with the practice of conservative septal resections which is the modern septoplasty technique. Many studies have shown the success rate of septoplasty to be 43 to 85% [7, 8, 9, 10] in the long term and it depends greatly on the parameter used to measure the success. NOSE Score is a disease specific quality of life instrument for subjective assessment of nasal obstruction. It is a form of questionnaire containing 5 symptoms with increasing severity. In 2017 Saha M, Banerjee S et al. did a prospective study assessing septoplasty outcomes using NOSE scoring which concluded this score as a parameter which helps patients themselves as a tool to assess the outcome of surgery. [11] Other subjective assessment questionnaires like SNOT-22, Nasal surgical questionnaires and various visual analog scales were used in various other studies. In 2013 Satish H S et al. analyzed the effectiveness of septoplasty using Sinonasal outcome test - 22 (SNOT-22). It showed encouraging results to use it as a useful tool to assess the improvement of quality of life postoperatively. [12] The study by Umihanic S et al. in 2016 was regarding the discrepancy between subjective and objective findings after septoplasty on a group of 40 patients with DNS and 30 healthy adults as control group. Both subjective and objective assessment was done before and after surgery with rhinomanometry and NOSE scoring. The study concluded uncertain correlation between rhinomanometric findings and subjective scoring similar to other studies by Zahedi FD et al and Stewart et al. [13, 14]

All the 100 patients in our group were in the age group of 18 to 48 years with mean age of 28.93 years. The male population was relatively high with a male female ratio of 1.38:1 which is consistent with other studies like Behnam H et al in 2014, [15] Younas M et al [16] and Rubasinghe M S et al. [17] Main presenting symptoms was nasal obstruction (46%) followed by headache (35%), bleeding (28%), nasal discharge (29%) and hyposmia (25%).

Preoperatively, diagnostic nasal endoscopy was done which showed anterior deviation as the commonest type of deviation followed by posterior deviations, septal spur, hypertrophied turbinate and high DNS. We compared the pre and postoperative DNE findings for residual deformity. Out of the 14 patients who had inferior turbinate hypertrophy, 8 patients continued to have same findings. The number of anterior and posterior deviations reduced from 40 and 35 to 11 and 10 respectively following septoplasty. Twenty three patients who had septal spur were which reduced to 2 and 13 patients who had high DNS were reduced to 6 after 3 months of surgery. The diagnostic nasal endoscopy findings at 3 months and 6 months were consistent. Even though few patients had residual deformity, there was a significant symptomatic improvement for all the patients.

Both preoperatively and postoperatively, patients were given NOSE questionnaire and scoring was done accordingly. Total mean NOSE score values were 59.25 and on pre and postoperative analysis respectively. The mean NOSE score improvement value of 48.95, which on statistical analysis showed significant improvement.

Individual symptom in the questionnaire scores were also compared statistically both preoperatively and postoperatively. All the 5 symptom's scoring showed statistical improvement following surgery except the symptom of 'unable to get enough air through nose during exercise or exertion'. NOSE scoring was more of a subjective tool and moreover other factors such as mucosal flap edema, crusting and other coexisting allergic symptoms would have influenced the scoring system postoperatively. The associated conditions along with deviated nasal septum like allergic rhinitis can affect the outcome. In the study by Younas M et al, among the 224 subjects who participated in the study, 79 patients had allergic rhinitis associated with deviated septum. The decrease in mean NOSE score was 43% in allergic as compared with 70% in non-allergic patients. The patients with allergic rhinitis had more crusting, mucosal swelling and recurrence of symptoms on stoppage of medications. [16] Samuel S. Becker et al in their study, collected data of 547 patients who had undergone septoplasty. Among them, about 70 patients underwent revision surgery. The main cause of nasal obstruction in majority of these patients was nasal valve abnormality. Hence even when we find a deviated nasal septum in a patient, it is very crucial to identify other causes of nasal obstruction. [18] The symptomatic improvement in septal deviation following septoplasty was demonstrated in many other studies also. A study on 86 patients who underwent septoplasty done by Gandomi et al in 2009 reported a significant improvement in NOSE score in 89.5% of patients at 3 months and same improvement persisted up to 6 months following surgery. [19] In a study by Bezerra T F on 46 patients, the preoperative median NOSE score was 75 and postoperative score was 10 at 3 months, which showed a statistically significant improvement. Rubasinghe M S et al. in 2012 did a prospective study on 30 patients and retrospective study on 35 subjects and calculated a mean NOSE score of 9.46 preoperatively and 0.53 postoperatively with a significant improvement. [17] A similar study was done by Mondina M et al in 2012 which used NOSE and RhinoQOL questionnaires as assessment tools showed a mean improvement in NOSE score by 35.2 points, 6 months postoperatively. Allergic rhinitis present among 28% of their population was a predictive factor for less improvement. In spite of all these hindrance statistical analysis showed a significant difference in the improvement. [20] Velsco LC et al did a prospective study on 72 patients who underwent septoplasty with or without partial inferior turbinectomy. [21] The patients were assessed preoperatively and on the 7th, 14th, 30th, and 60th postoperative day. The evaluation was done with a complete otorhinolaryngology examination and a questionnaire with questions on the main symptoms of nasal obstruction which was scored according to the intensity of each symptom. They also did a comparative study between patients with nasal obstruction with allergic symptoms and without allergic symptoms. The nasal obstruction had improved in 94.4% patients by 60th postoperative day and the average symptomatic score improvement in patients with and without allergic symptoms was similar on the 60th postoperative day. From our study, we inferred that septoplasty is not only a good surgical technique to relieve nasal obstruction but also improves the quality of life in patients with symptomatic deviated nasal septum.

#### Conclusion

In our study of 100 patients who underwent septoplasty, majority of them were in 2<sup>nd</sup> and 3<sup>rd</sup> decade and male to female ratio was 1.38:1. Nasal obstruction was the most common symptom followed by headache, bleeding, nasal discharge and hyposmia. On diagnostic nasal endoscopy, anterior deviation was the most common abnormality followed by posterior deviation, septal spur, HIT and high DNS. Post operative follow up visits showed lesser residual deformity except in case of high DNS. Postoperatively and during subsequent visits, there was a significant statistical improvement in NOSE scoring. Septoplasty is an effective treatment for nasal obstruction in patients with symptomatic deviated nasal septum and

NOSE scoring is a useful parameter for assessing the improvement in quality of life among symptomatic DNS patients.

#### Acknowledgment

The author is thankful to Department of ENT for providing all the facilities to carry out this work.

#### References

1. Olphen VFA. The septum. Gleeson M, Browning CG, Burton MJ, Clarke R et al., Scott Brown's Otorhinolaryngology Head and Neck Surgery, 7th ed: Volume 2. Great Britain: Hodder Arnold; 2008:1569-1582.
2. Cottle MH, Loring RM, Fischer GG, Gaynon IE. The maxilla-premaxilla approach to extensive nasal septum surgery. *AMA Arch Otolaryngol* 1958;68:301-13.
3. Mladina R et al, Nasal septal deformities in ear, nose and throat patients: An International Study. *Am J ORL*, 2008; 29:75-82.
4. Mladina R. The role of maxillary morphology in the development of pathological septal deformities. *Rhinology*, 1987; 25(3): 199-205.
5. Kridel R, Angela, Sturm-O'Brien. Nasal septum. Cummings Otolaryngology, Head and Neck surgery. 6<sup>th</sup>ed: volume 1. Philadelphia: Elsevier; 2015. section2: 474-492.
6. Stewart MG, Smith TL, Weaver EM. Outcomes after nasal septoplasty: results from the Nasal Obstruction Septoplasty Effectiveness (NOSE) Study. *Otolaryngol Head Neck Surg*. 2004; 130(3):283-290.
7. Siegel NS, Gliklich RE, Taghizadeh F, and Chang Y, Outcomes of septoplasty, *Otolaryngol Head Neck Surg*, 2000; 122:228-232.
8. Thomas JN, S.M.R.-A two year follow-up survey, *J Laryngol Otol*, 1978; 92:661-66.
9. Ilium P. Septoplasty and compensatory inferior turbinate hypertrophy: Long-term results after randomized turbinoplasty, *Eur Arch Otorhinolaryngol* 254(suppl), 1997:S89-S92.
10. Fjermedal O, Saunte C, and Pederson S. Septoplasty and/or submucous resection? 5 years nasal septum operations. *J Laryngol Otol*, 1988; 102:796-798.
11. Saha M et al, Use of nasal obstruction symptom evaluation scale in objective evaluation of symptomological improvement in post septoplasty patients, *Bengal journal of otolaryngology and head and neck surgery*, 2017; 25(1):645-657.
12. Satish HS et al, Septoplasty outcome using SNOT- 22 Questionnaire study, *Journal of Dental and Medical Sciences*, 2013; 6(5):34-38.
13. Umihanic S et al, The discrepancy between subjective and objective findings after septoplasty, *Med Arch*, 2016; 70(5): 336-338.
14. Zahedi FD, Functional outcome evaluation of septorhinoplasty for nasal obstruction, *Indian journal of otolaryngology and head and neck surgery*, 2015; 68:1.
15. Behnam H, Nasal septum surgery: Evaluation of pre and postoperative Respiratory function in patients with septal deviation by Acoustic rhinometry and rhinomanometry, *Bulletin of Environment, Pharmacology and life sciences*, 2014; 3(4):181-183.
16. Younas M et al, Satisfaction of patients undergoing nasal septoplasty for septal deformity, *Khyber Med Univ J*, 2012; 4(3): 115-118.
17. Rubasinghe M S, Patient Profile, Indications, Complications and Evaluation of Septoplasty Outcome in a Base Hospital in Srilanka, *Ceylon Journal of Otolaryngology*, 2016; 5(1):14-18.
18. Becker SS, Eric JD, Stowell N, Barker D et al, Revision septoplasty: Review of sources of persistent nasal obstruction, *Am J Rhino*, 2008; 22: 440-444.
19. Gandomi B, Bayat A, Kzemei T. Outcomes of septoplasty in young adults, the nasal obstruction septoplasty effectiveness study. *American journal of otolaryngology*. 2009; 31(3):189-192.
20. Mondina M, Assessment of nasal septoplasty using NOSE and RhinoQol questionnaires, *Eur Arch Otolaryngology*, 2012; 269(10):2189-2195.
21. Velasco LC, Arima LM, Tiago RS. Assessment of symptom improvement following nasal septoplasty with or without turbinatectomy. *Brazilian Journal Otorhinolaryngology*. 2011; 77(5) : 577-583.

**Conflict of Interest: Nil**

**Source of support: Nil**