

# Assessment of Patient Satisfaction With Evaluation Methods in Open Technique Septorhinoplasty

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**Abstract:** The aim of this study was to measure the postoperative satisfaction of patients who underwent open technique septorhinoplasty (SRP) using Nasal Obstruction Symptoms Evaluation (NOSE), Rhinoplasty Outcomes Evaluation (ROE) and visual analog scale (VAS), and to assess the reliability and usability of these forms in the outcome of SRP.

Forty-five patients who underwent primary open technique SRP were included in the study. The levels of patient satisfaction were assessed before the surgery and in the long-term using NOSE, ROE, and VAS.

Nasal Obstruction Symptoms Evaluation scores were found to be decreased significantly after surgery, whereas ROE scores were increased postoperatively ( $P < 0.01$ ). Patients' either functional (VAS) and aesthetic (VAS) increased significantly in the long-term after surgery ( $P < 0.01$ ). There were no statistically significant differences between preoperative and postoperative measurements of NOSE, ROE, functional VAS, and aesthetic VAS by sex ( $P > 0.05$ ).

There was a statistically significant positive relationship between ROE difference before and after surgery, and functional VAS difference ( $r = 0.544$ ,  $P = 0.001$ ). There was a positive correlation between pre-postoperative ROE difference, and aesthetic VAS difference ( $r = 0.766$ ,  $P = 0.001$ ). The relationship between the pre-postoperative NOSE score difference and functional VAS difference was found to be significantly negative ( $r = -0.833$ ,  $P = 0.001$ ). The relationship between pre-postoperative NOSE difference and aesthetic VAS difference was also significantly negative ( $r = -0.475$ ,  $P = 0.001$ ). There was a significant negative correlation between ROE difference between before and after surgery, and NOSE difference ( $r = -0.640$ ,  $P = 0.00$ ).

The disease-specific quality of life assessment forms used to evaluate patient esthetic and functional satisfaction correlate significantly with nasal obstruction and ROE.

**Key Words:** Nasal Obstruction Symptom Evaluation, patient satisfaction, Rhinoplasty Outcomes Evaluation, septorhinoplasty

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Septorhinoplasty (SRP) is a surgical procedure frequently performed to improve nasal function and/or cosmetic appearance. The goal of surgery is to ensure the opening of the nasal airway, and to shape a natural nose that is in harmony with the surrounding facial features and that does not attract attention.<sup>1</sup> Septorhinoplasty has both physical and psychologic effects on patients owing to its functional and cosmetic aspects.<sup>2</sup> Therefore, the evaluation of patient satisfaction in facial plastic surgery is very important.<sup>3</sup> Patient satisfaction and improved quality of life are among the most important parameters in successful SRP. Objective methods, such as rhinomanometry or tomography cannot be recommended as a primary evaluation method in determining patient satisfaction because many variables are involved in cosmetic nasal surgery in the postoperative period.<sup>4</sup>

The use of specially standardized instruments for treatment of the disease in question is increasing as an alternative and/or supplementary method in the measurement and evaluation of various surgical outcomes, patient satisfaction, and quality of life. Quality of life forms have been developed for this purpose.<sup>5,6</sup>

Quality of life forms can be general or disease-specific. General forms evaluate the harm or benefit caused by disease from different directions but by making generalizations. Disease-specific forms focus on a single disease, such as a selected disease state or particular function. Disease-specific assessments give more accurate results as general quality of life status assessments are affected by minor changes in a patient's health status.<sup>2</sup>

The Nasal Obstruction Symptoms Evaluation (NOSE) scale was developed by Stewart et al<sup>2</sup> to evaluate nasal function in rhinology and the Rhinoplasty Outcome Evaluation (ROE) was defined by Alsarraf<sup>6</sup> to evaluate nasal function and cosmetic status. These are disease-specific quality of life forms. The visual analog scale (VAS) is an instrument for assessment and evaluation of patient satisfaction and quality of life, which can be applied to any kind of medical treatment. These forms provide the surgeon with more objective findings on surgical success and compare various surgical techniques in terms of cosmetic and functional state.<sup>2,6,7</sup>

The purpose of this study was to measure the satisfaction of patients who underwent open technique septorhinoplasty using NOSE, ROE, and VAS and to assess the reliability and usability of these forms in the evaluation of aesthetic nasal surgery outcome.

## MATERIALS AND METHODS

This was a longitudinal study evaluating preoperative satisfaction retrospectively and postoperative satisfaction prospectively.<sup>8,9</sup>

The study was approved by the local ethical committee. The study protocol was described in detail to the patients, and informed consent was obtained from all patients before surgery. Forty-five patients undergoing primary open technique septorhinoplasty comprised the study group. Patients who had undergone septorhinoplasty before or who had additional sinonasal pathology (such as nasal polyposis) were excluded from the study.

### Measures

To evaluate patient satisfaction after surgery in terms of functional and aesthetic status, the following instruments were used: the NOSE scale evaluating nasal functions, developed in 2004 by Stewart et al<sup>2</sup>; the ROE scale evaluating mostly the effects of aesthetic functions on quality of life in addition to functional assessment and defined in 2002 by Alsarraf.<sup>6</sup> Preoperative and postoperative status of patients at least 6 months after surgery were evaluated with NOSE, ROE, and VAS.

Nasal Obstruction Symptoms Evaluation consists of 5 questions evaluating respiratory function of the nose, especially nasal congestion (Fig. 1A). All questions are scored from 0 to 4, where higher scores indicate greater nasal function impairment, and lower scores indicate that nasal function is good. It queries for nasal congestion during the day and during exercise, and sleep problems at night. Application is quick and easy, it is less laborious for the respondent, and it is suitable for both prospective and retrospective studies as it can be used repeatedly. It is a reliable scale providing a quick

response on the subject of clinical health status. It is suitable for large groups of patients and with various rhinological treatment modalities.<sup>2</sup> The raw values obtained from NOSE scale ranging from 0 to 20 were multiplied by 100/20 for easy and understandable assessment of ratings.

Rhinoplasty Outcomes Evaluation evaluates the patient’s nasal appearance and function, the person’s self-esteem, and personal change requests about his nose, and also queries how the external appearance of his nose affects personal, social, and professional life and in this manner, patient satisfaction and the effect of surgery on quality of life are measured. Rhinoplasty Outcomes Evaluation consists of 6 questions and each question is scored between 0 and 4 points (Fig. 1B). A high score indicates a patient’s satisfaction with their nose functionally and aesthetically, whereas lower scores indicate dissatisfaction.<sup>6,10</sup> The raw values obtained from ROE scale ranging from 0 to 24 were multiplied by 100/24 to bring the score into the range 0 to 100.

The visual analog scale is used in the evaluation of any health service or treatment and patient satisfaction.<sup>3,11</sup> For VAS, the patients were requested to evaluate their noses in terms of functional (FVAS) and aesthetic (AVAS) states by grading answers between 0 and 10. The values obtained were multiplied by 10 to bring the score into the range 0 to 100.

### Surgical Technique

All patients underwent “open approach” septorhinoplasty using transverse, mid columellar gullwing incision at the narrowest distance between the nostrils. The incisions were extended horizontally to join the vertical marginal incisions on each side of the nostrils and connected to incisions caudal to the lateral crura. The nasal skin was then elevated off the alar cartilages and the osseo-cartilaginous pyramid in the supraperiosteal plane with gentle retraction and scissor dissection to the nasion. After dividing the intracurral ligament, the caudal septum was exposed bilaterally down to the maxillary spine and crest, and corrected as necessary. Medial osteotomies were performed by guiding a small osteotome along the nasal septum and driving it up to the level of the nasal process of the frontal bone. After completion of lateral osteotomies beginning at the piriform aperture and ending at the frontal bone on both sides, the tip was modified depending on the deformity, and the alar cartilages were either excised or augmented, depending on the modification desired. The incisions were closed with 6/0 nonabsorbable (polypropylene) sutures.

### RESULTS

The age of the patients ranged from 18 to 61, with a mean age of 31.62 ± 31.00 years.

In terms of distribution by sex, 35.6% of patients (N = 16) were women, and 64.4% (N = 29) were men. The postoperative follow-up period ranged from 6 to 30 months, and the mean was 12.89 ± 7.17 months.

- According to preoperative NOSE measurements, the decline seen in the mean postoperative NOSE measurements was statistically significant at an advanced level ( $P < 0.01$ ). Nasal Obstruction Symptoms Evaluation values decreased significantly after surgery compared with before surgery and the average difference in preoperative and postoperative NOSE values was 61.11 ± 25.89 (Table 1; Fig. 2).
- According to preoperative ROE measurements, the increase seen in the mean postoperative ROE measurements was statistically significant at an advanced level ( $P < 0.01$ ). Rhinoplasty Outcomes Evaluation values increased significantly after surgery compared with before surgery and the

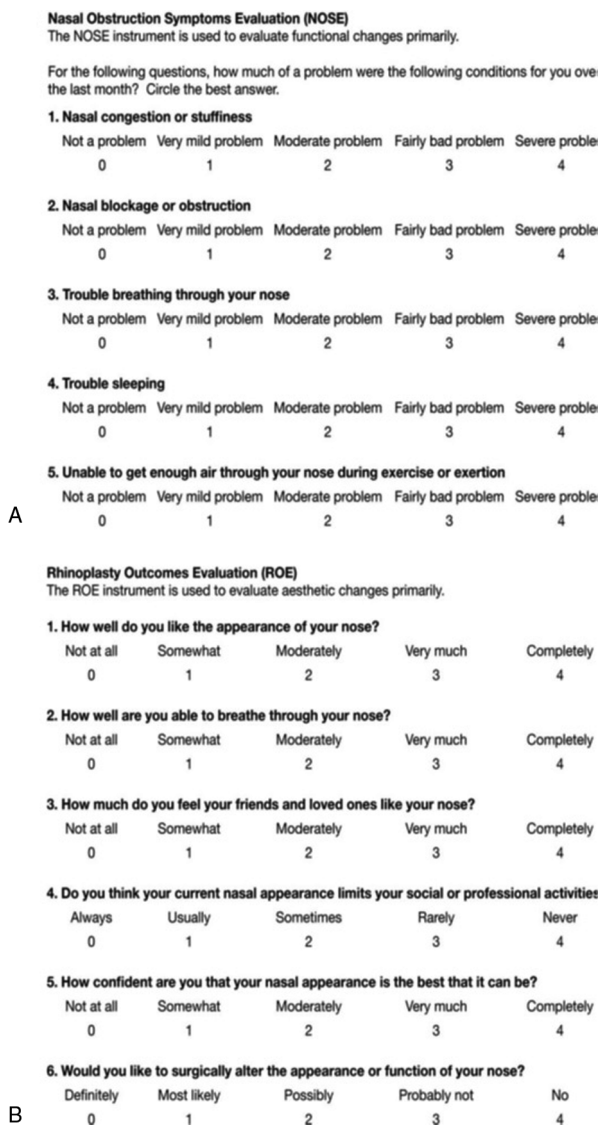


FIGURE 1. A, The Nasal Obstruction Symptoms Evaluation questionnaire.<sup>2</sup> B, Rhinoplasty Outcomes Evaluation questionnaire.<sup>5</sup>

**TABLE 1.** Preoperative–Postoperative Nasal Obstruction Symptoms Evaluation, Rhinoplasty Outcomes Evaluation, Functional Visual Analog Scale and Aesthetic Visual Analog Scale Differences

(N = 45)	Preoperative Mean ± SD	Postoperative Mean ± SD	Difference Mean ± SD	P Value
NOSE	76.89 ± 22.57	15.78 ± 15.58	61.11 ± 25.89	0.001*
ROE	27.13 ± 14.75	81.39 ± 19.37	−54.26 ± 18.85	0.001*
FVAS	23.33 ± 20.67	81.78 ± 18.13	−58.44 ± 23.83	0.001*
AVAS	25.33 ± 19.72	79.56 ± 20.44	−54.22 ± 22.91	0.001*

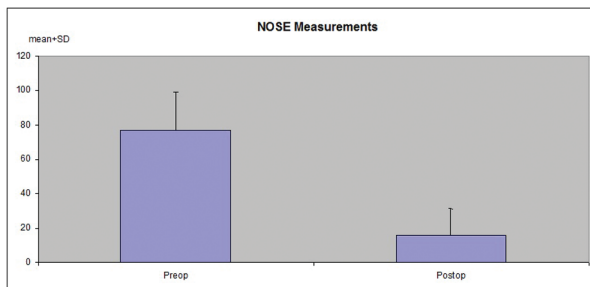
Paired samples test.

AVAS, aesthetic visual analog scale; FVAS, functional visual analog scale; NOSE, Nasal Obstruction Symptoms Evaluation; ROE, Rhinoplasty Outcomes Evaluation; SD, standard deviation.

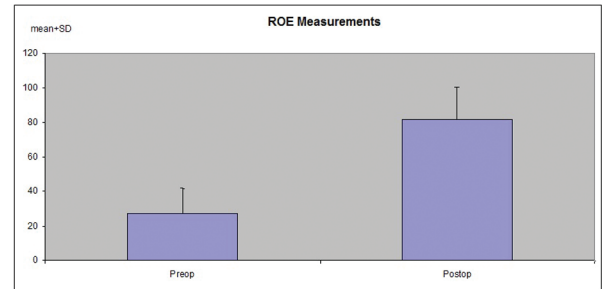
\*  $P < 0.01$ .

average difference in preoperative and postoperative ROE values was  $54.26 \pm 18.85$  (Table 1; Fig. 3).

- According to preoperative functional VAS FVAS measurements, the increase seen in the mean postoperative FVAS measurements was statistically significant at an advanced level ( $P < 0.01$ ). Functional visual analog scale values increased very significantly after surgery compared with before surgery and the average difference in preoperative and postoperative mean FVAS values was  $58.44 \pm 23.83$  (Table 1).
- According to preoperative AVAS measurements, the increase seen in the mean postoperative AVAS measurements was very statistically significant ( $P < 0.01$ ). Aesthetic visual analog scale values increased significantly after surgery compared with before surgery and the average difference in preoperative and postoperative mean AVAS values was  $54.22 \pm 22.91$  (Table 1).
- There was a statistically significant positive relationship between ROE difference before and after surgery, and FVAS difference before and after surgery ( $r = 0.544$ ,  $P = 0.001$ ).
- There was a statistically significant positive relationship between ROE difference before and after surgery, and AVAS difference before and after surgery ( $r = 0.766$ ,  $P = 0.001$ ).
- There was a statistically significant negative relationship between NOSE difference before and after surgery, and FVAS difference before and after surgery ( $r = 0.833$ ,  $P = 0.001$ ).
- There was a statistically significant negative relationship between NOSE difference before and after surgery, and AVAS difference before and after surgery ( $r = -0.475$ ,  $P = 0.001$ ).
- Although VAS measurements increased after surgery, NOSE measurements decreased.



**FIGURE 2.** Distributions of preoperative and postoperative Nasal Obstruction Symptoms Evaluation measurements.



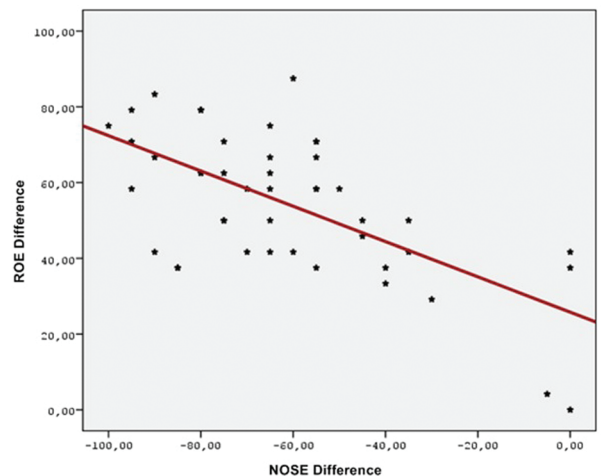
**FIGURE 3.** Distributions of preoperative and postoperative Rhinoplasty Outcomes Evaluation measurements.

- There was a statistically significant negative relationship between ROE difference before and after surgery, and NOSE difference before and after surgery ( $r = -0.640$ ,  $P = 0.001$ ). Although ROE measurements increased after surgery, NOSE measurements decreased (Fig. 4).
- There were no statistically significant differences between preoperative and postoperative measurements of NOSE, ROE, FVAS, and AVAS by sex ( $P > 0.05$ ).

**DISCUSSION**

The nose is the most important component of the face in terms of appearance as well as expression. This appearance is more prominent, especially in patients with nasal deformity. Septorhinoplasty is a surgical procedure commonly performed to improve nasal function and/or cosmetic appearance.<sup>10</sup> Although a successful SRP provides cosmetic improvement, it should not adversely affect nasal function or nasal physiology. There are 2 key elements that will determine patient satisfaction after SRP: one is patient expectation, which will affect satisfaction in terms of cosmetic outcome, and the other is improving nasal airway patency, which will affect satisfaction in terms of functional state.<sup>12,13</sup>

In recent years, there has been an increasing trend in cosmetic surgery. Of all surgeries to improve cosmetic appearance, 2.2% are rhinoplasty operations. People undergo cosmetic surgery to feel better or else they believe that this will improve their self-esteem and social state. In a study conducted by Castle et al,<sup>14</sup> it has been



**FIGURE 4.** Relationship between measurement differences of Rhinoplasty Outcomes Evaluation and Nasal Obstruction Symptoms Evaluation.

reported that the majority of people undergoing cosmetic treatment are satisfied psychosocially after surgery.

Nowadays, the evaluation of quality of life and patient satisfaction in all surgical procedures is becoming increasingly important. In particular, the evaluation of patient satisfaction in facial plastic surgery is very important.<sup>3,12</sup> In cosmetic surgery, the assessments of patient and physician are not always in agreement. Good and bad results can be interpreted differently according to patient and physician. Despite the surgeon indicating how successful the surgery was, if the patient is dissatisfied, the surgery cannot be considered to have been successful.<sup>3,12,15</sup> The main determinant of patient satisfaction is achieving the recommended success rate, the results promised before surgery, and the perception of the patient about treatment.<sup>3,12</sup> The effectiveness of treatment is not only affected by the process, it is also affected by the patient's social status, psychological status, and expectations. Therefore, in spite of everything, no matter how good the surgery, to expect 100% patient satisfaction is unrealistic and impossible.<sup>16</sup>

Important parameters in the assessment of the SRP are as follows: the quantitative measurement of nasal appearance, qualitative and quantitative changes of nasal function, patient satisfaction, and health-related quality of life assessments.<sup>17</sup> Fitzpatrick et al<sup>18</sup> emphasized the importance of area (region)-specific quality of life assessment in clinical assessment of quality of life. Nasal Obstructive Symptom and ROE are both area-specific and disease-specific quality of life forms.<sup>3</sup> Application is easy and does not take much time.<sup>18</sup> Some studies have revealed that scales whose evaluation is shorter were more sensitive in determining clinical status compared with longer scales.<sup>2</sup> Lee and Constantinides<sup>4</sup> reported that NOS and ROE can be used for the objective evaluation of cosmetic and functional results of functional rhinoplasty.

It has been shown in many studies that patient satisfaction is significantly higher in surgeries including both aesthetic and functional aims compared with aesthetic only or functional only surgery.<sup>19–21</sup> Nasal deformity was present in all patients included in our study. Patients were affected in terms of both cosmetic state and functional state. Therefore, one of the most important reasons for high patient satisfaction that we have achieved after surgery is that both nasal appearance and function improved together.

In a study conducted by Vural et al<sup>22</sup> on patients with septum deviation in the evaluation of patients' nasal function, it has been emphasized that NOSE scale was a test, which could be used as a quality of life scale. Rhinomanometry and computed tomography were not absolutely necessary in terms of diagnosis and postoperative follow-up.

Lam et al<sup>23</sup> have evaluated nasal airway assessment in 290 patients using NOSE, VAS, and acoustic rhinometry. A weak correlation was determined between objective methods and quality of life scale and therefore, the importance of subjective evaluations in the evaluation of nasal airway was stressed.

The NOSE research scale evaluates the effect of current nasal obstruction on quality of life and patient satisfaction, especially after surgery.<sup>2</sup> The average preoperative and postoperative NOSE values of our patients were  $76.89 \pm 22.57$  and  $15.78 \pm 15.58$ , respectively. This decrease in NOSE values was statistically significant at an advanced level.

There was no statistically significant difference between men and women patients. Most has prospectively investigated quality of life in 41 patients who underwent functional rhinoplasty with NOSE scale and a linear scale before and after surgery. Preoperative and postoperative NOSE scores were 58.4 and 15.7, respectively. A significant improvement was found in NOSE and linear scales in the postoperative period compared with the preoperative period. As a result, functional rhinoplasty was emphasized as surgery increasing

quality of life disease specifically.<sup>17</sup> This improvement is consistent with the values of NOSE in our study.

Rhinoplasty Outcomes Evaluation is an appropriate form to assess the satisfaction of patients who underwent rhinoplasty in terms of both functional and cosmetic surgery.<sup>15</sup> It evaluates the appearance and function of the patient's nose, the confidence about the nose and the desire for change of the nose, and queries how the external appearance of the nose affects personal, social, and professional life.<sup>6</sup> Baykal et al<sup>24</sup> have used ROE in a study on 47 patients with septorhinoplasty to evaluate the difference between 3 groups according to nasal pathologies—patients with nasal dorsal hump, patients with nasal axis deviation, and patients who had both together.

In our study, preoperative and postoperative ROE scores were  $27.13 \pm 14.75$  and  $81.39 \pm 19.37$ , respectively. The difference was statistically significant at an advanced level. There was no statistically significant difference between male and female patients. In the literature, Arima et al<sup>9</sup> have evaluated the satisfaction of 19 patients with rhinoplasty (17 men and 2 women) using ROE. This was a longitudinal study evaluating preoperative satisfaction retrospectively, and postoperative satisfaction prospectively. The mean follow-up period was 40.9 months. Preoperative and postoperative mean ROE scores were  $24.6\% \pm 11.3\%$  and  $76.1\% \pm 19.5\%$ , respectively, and the increase in patient satisfaction was statistically significant. Study design and results were in line with our study. Saleh et al<sup>25</sup> have used NOSE and ROE to assess the satisfaction of 113 patients undergoing septorhinoplasty. The preoperative and postoperative mean NOSE values were 65 and 24.5, respectively, and the preoperative and postoperative mean ROE values were 45.30 and 76.95, respectively. The results are similar to our study.

In our study, we have performed an assessment of the preoperative and postoperative situation in the postoperative period. We have done it in this manner because assessment of quality of life and patient satisfaction can give variable results dynamically in the process with disease and during the treatment given. In addition, the tension that patients experience preoperatively may reflect survey results and may lead to an incorrect assessment. Because the patient's postoperative distress affects the response, therefore, when evaluating short-term and long-term postoperative results, differences may be seen in responses. This situation is described as a "response shift."<sup>3</sup> In a study conducted by Hellings and Nolst Trenité, ROE surveying was performed in the postoperative period twice in the same visit to evaluate preoperative status retrospectively as well as postoperative satisfaction prospectively.<sup>8</sup>

Besides NOSE and ROE, in this study, we have also used VAS to assess patient satisfaction postoperatively. We have applied VAS to our patients separately as aesthetic (A) and functional (F) states. In our study, preoperative and postoperative mean FVAS values were  $23.33 \pm 20.67$  and  $81.78 \pm 18.13$ , respectively, whereas preoperative and postoperative mean AVAS values were  $25.33 \pm 19.72$  and  $79.56 \pm 20.44$ , respectively. When comparing preoperative and postoperative VAS measurements, the difference was statistically significant at an advanced level. This means that our patients have benefited from SRP surgery in terms of both aesthetic and functional aspects. Our patient satisfaction was high. Lavinsky-Wolff et al have evaluated 44 patients with septorhinoplasty and have performed vertical dome division at 2 separate visits with ROE, NOSE, and VAS in the preoperative and postoperative period including an average follow-up of 5 months. Preoperative ROE, NOSE, and VAS values were 29, 75, and 65, respectively and postoperative values were 79, 20, and 88, respectively.<sup>26</sup> The results were statistically significantly different and are consistent with our study.

In our study, the preoperative and postoperative results of instruments that we have used to determine patient satisfaction

(NOSE, ROE, AVAS, and FVAS) were compared, and the results were statistically significantly different for all of them, which indicate high patient satisfaction. In addition, when evaluating the relationship of tools with each other depending on the difference of instruments before and after surgery, there was a statistically significant relationship. This significant relationship indicates that the instruments used in the evaluation of surgery were matching up with our results.

The most important factor determining the success of SRP is proper patient selection. It is important that the expectations of patients are realistic and accessible surgically. The most important step for realistic expectation is a very good communication between patient and physician.<sup>12</sup> Therefore, patients should be carefully evaluated in terms of motivation, expectations, and psychologic factors.<sup>27</sup> There should be complete agreement between the surgeon and patient about the surgical plan and the results expected. In particular, the relationship between nasal function and appearance should be emphasized. The surgeon should determine the patient's complaints in order of importance and evaluate how many of these requests are reasonable and realizable and share this with the patient.

Septorhinoplasty is a surgery that enhances the quality of life in terms of the patient's social, psychologic, and physical states if it is performed with appropriate indications. A patient who is satisfied with the cosmetic and functional aspects is the most important indicator of the success of septorhinoplasty surgery. In the evaluation of patient satisfaction in aesthetic and functional nasal surgery, methods offering the possibility of subjective assessment are more convenient to use rather than objective measurement methods. The use of disease-specific quality of life assessment forms developed for this purpose gives reliable results for the evaluation of the surgery.

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