Rhinoseptoplasty: functional and aesthetical satisfaction after 1 year A prospective study

Original Article

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Abstract

Objectives: We aim to evaluate patient functional and aesthetical satisfaction 1 year after rhinoseptoplasty and to determine the minimum clinically important difference (MCID) of SNOT-22 and ROE scores.
Study design: A 1-year prospective study of adult patients undergoing rhinoseptoplasty in CHVNG/E was conducted. SNOT-22 and ROE scores were assessed preoperatively and 1 year after surgery.
Results: We included 44 patients. 79.5% of our sample reported an improvement in quality-of-life regarding the functional outcome and 81.8% regarding the aesthetical outcome. The MCID of SNOT-22 score was 5 points, whilst the MCID of ROE score was 13.7 points. The mean change in ROE score was significantly lower among patients undergoing revision rhinoplasty (25.0 vs 51.4)(p=0.04).
Conclusions: Rhinoseptoplasty improved quality-of-life in most patients. The history of previous rhinoseptoplasty was the only predictor of lower postoperative satisfaction.
Keywords: Rhinoplasty; Septoplasty; SNOT-22; ROE; Minimal Clinically Important Difference

Introduction

Septorhinoplasty is a complex and demanding surgical procedure designed to achieve both aesthetic and functional outcomes with regard to patient satisfaction, thereby improving their overall quality of life. Although technical aspects play a crucial role in septorhinoplasty, the success of the surgery is closely related to patient satisfaction[1,2]. To assess septorhinoplasty success, a range of objective and subjective tools have been employed. However, there can be discrepancies between objective measures, such as the evaluation of nasal patency and facial anthropometric parameters, and the patient's subjective perception of outcomes[3,4]. This underscores

the importance of incorporating quality of life questionnaires into the evaluation process.

In 2000, Alsarraf R. developed several questionnaires to measure the quality of life following facial aesthetic procedures, including the Rhinoplasty Outcome Evaluation (ROE) questionnaire, specifically aimed at patients undergoing rhinoplasty[5]. Esteves S. et al. validated this questionnaire for European Portuguese in 2015[6]. The 22-item Sinonasal Outcome Test (SNOT-22) was originally designed to evaluate the quality of life and symptom severity in patients with chronic rhinosinusitis with nasal polyps[7]. This questionnaire is also used to evaluate septoplasty and inferior turbinectomy[8,9], and was validated for European Portuguese in 2016[10]. A key parameter to consider when administering the quality of life questionnaires is the evaluation of the relevance of the score variations, regardless of their statistical significance. Therefore, the minimal clinically important difference (MCID) represents the smallest score change that a patient perceives as a clinical improvement[11]. This study aimed to: 1) measure the degree of functional and aesthetic patient satisfaction one year after septorhinoplasty; 2) identify the factors contributing to higher satisfaction after the procedure; and 3) determine the MCID (SNOT-22 and ROE) required for a subjective improvement in the quality of life.

Materials and methods

Study design and population:
Patients scheduled for septorhinoplasty at the Centro Hospitalar Vila Nova de Gaia/Espinho (CHVNG/E) from January 2021 to January 2022 were invited to participate in this single-center, prospective study, and informed consent was obtained. The study received approval from the CHVNG/E Research Ethics Committe e (approval number 202/2022-1). The study excluded patients who were under 18 years of age, those undergoing endoscopic sinus surgery simultaneously, and those who did not complete the questionnaires (SNOT-22 and ROE) both preoperatively and one year postoperatively.

Surgical interventions:
All patients underwent septoplasty using the Cottle modified approach, which was combined with inferior turbinectomy and either open or closed rhinoplasty. The procedures were performed under general anesthesia by specialist physicians and interns in an inpatient setting.

Questionnaires administered:
The **SNOT-22 questionnaire** comprises 22 questions and can be subdivided into the following domains: rhinologic symptoms (questions 1–6 and 21–22), facial/otologic symptoms (7–10), sleep disorders (11–17), and psychological symptoms (18–20). Each question is assigned a score (0–5), where zero corresponds to the lack of that condition and five to the most severe situation. The total SNOT-22 score ranges between 0 to 110 points, defining three degrees of severity: mild (8–20 points), moderate (21–50), and severe (greater than 50)[12].

The **ROE questionnaire** consists of six questions assessing the physical, emotional, and social impact of rhinoplasty. Each question is assigned a score from 0–4, where 0 represents the worst and 4 represents the best response. The total ROE score ranges between 0 to 24 points. This score is then divided by 24 and multiplied by 100 to yield a final percentage score between 0% to 100%. According to Izu SC et al., a score of 12 points (50%) is considered the lower limit of normal[13].

MCID calculation
MCID was calculated using the anchor-based method[14,15], which compares SNOT-22 and ROE score discrepancies with patients responses to two "anchor" questions: "How do you rate the change in your quality of life after septorhinoplasty functionally?" and "How do you rate the change in your quality of life after septorhinoplasty aesthetically?", where 1 corresponds to much worse, 2 to a little worse, 3 to the same, 4 to a little better, and 5 to much better. The MCID represents the mean/median score variation (SNOT-22 and ROE) difference

between the group of patients who rated the change in their quality of life as "a little better" and the group who rated it as "the same."

Statistical analysis:

Descriptive analysis was performed, and continuous variables with a normal distribution were presented as means (M) and standard deviation (SD), while those with a non-normal distribution were expressed as medians and interquartile range (IQR). Categorical variables were described as absolute and relative frequencies. Bivariate analysis compared categorical variables using the chi-square or Fisher's exact test, and continuous variables using the Mann-Whitney test, analysis of variance (ANOVA), or the independent sample t-test. The SPSS® software version 25.0 was used for statistical analysis, with p < 0.05 considered statistically significant.

Results

Sample characterization

This study included 44 patients: 26 women (59.1%) and 18 men (40.9%) between 18–63 years of age (median age ± IQR: 26.0 ± 18.0 years). Among them, 17 (38.6%) reported a history of nasal trauma. Comorbidities included Obstructive Sleep Apnea Syndrome (OSAS) in three patients (6.8%), asthma in five (11.4%), and allergies in 18 (40.9%), which could be related to allergic rhinitis.

Among the patients analyzed, ten (22.7%) had a history of nasal surgery; five cases of septorhinoplasty and five cases of isolated septoplasty. Most of these patients had undergone only one previous intervention, except for two patients who underwent two previous septorhinoplasty procedures.
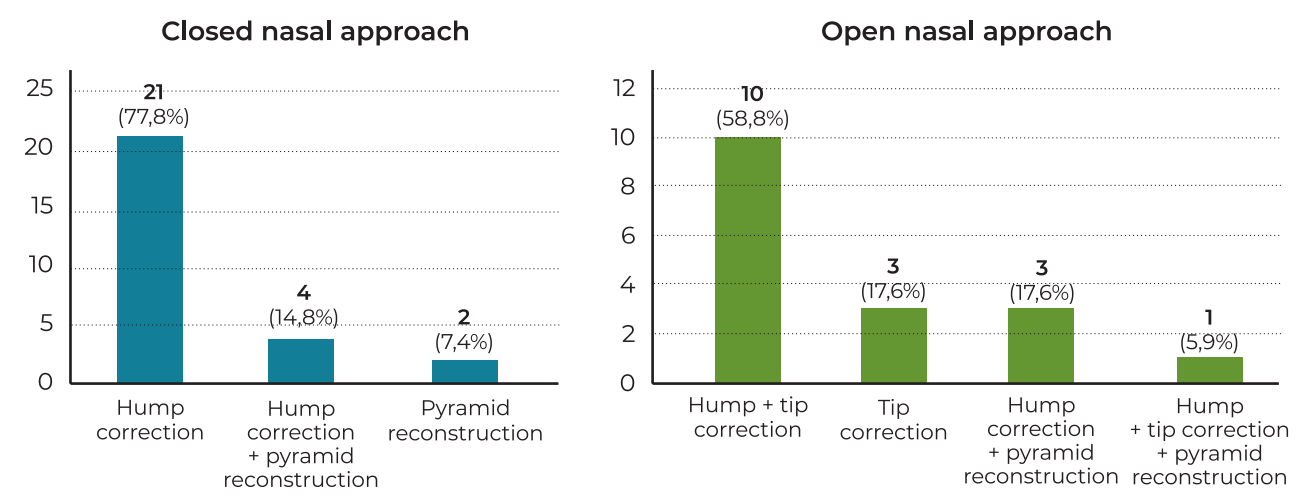
Preoperative SNOT-22 and ROE

The mean preoperative SNOT-22 and ROE scores were 42.4 (SD = 19.44) and 28.2 (SD = 9.79), respectively. The preoperative SNOT-22 score was significantly higher in women than in men (M = 47.2 vs. 35.5; p = 0.047) (Table 1). The preoperative ROE score showed no differences between the sexes (p = 0.75) (Table 2). Age was not associated with preoperative SNOT-22 (p = 0.12) or ROE scores (p = 0.49).

Type of surgical intervention

Most patients (61.4%) underwent closed septorhinoplasty, with nasal hump correction being the most common intervention (77.8%). Among the patients undergoing open septorhinoplasty, 58.8% had the nasal hump and tip corrected (Figure 1), with columella and nasal dorsum reconstruction with a costal cartilage graft being performed in two patients.

Figure 1
Type of surgical intervention (closed and open)

Closed nasal approach

Open nasal approach

Pre- and postoperative SNOT-22 scores

The mean postoperative SNOT-22 score was 20.6 (SD = 12.44), which showed a statistically significant difference compared to the preoperative score (42.4) (p < 0.001). The median difference between the pre- and postoperative SNOT-22 scores was 17.5 (IQR = 12.50). Figure 2 shows the pre- and postoperative SNOT-22 scores stratified by severity. The preoperative SNOT-22 scores revealed that 90.9% of patients (n = 40) had severe–moderate symptoms. Postoperatively, this percentage decreased to 45% (n = 20). The mean pre- and postoperative SNOT-22 scores were significantly higher in patients with allergic rhinitis and asthma, although the median pre- and postoperative SNOT-22 score variation was not different in this group of patients. The SNOT-22 score variation showed no association with age, sex, history of previous nasal surgery, previous nasal trauma, or type of surgical intervention.

Pre- and postoperative ROE scores

The mean postoperative ROE was 76.6 (SD = 19.85), which showed a statistically significant difference compared to the preoperative score (28.2) (p < 0.001). The median variation between the pre- and postoperative ROE scores was 48.39 (SD = 19.85). T Patients with a history of previous septorhinoplasty (wS) had preoperative ROE scores similar to those of patients without a history of previous septorhinoplasty (woS) (M wS = 33.3, M woS = 27.6; p = 0.210). However, the pre- and postoperative ROE score variation was significantly lower in the group of patients undergoing revision septorhinoplasty (M wS = 25.0, M woS = 51.4; p = 0.039). Thus, the postoperative ROE score was significantly lower in patients with a history of previous septorhinoplasty (M wS = 58.4, M woS = 78.9; p = 0.027). The ROE score variation showed no association with age (p = 0.25), sex (p = 0.950), history of nasal trauma (p = 0.058), and type of surgical intervention (closed or open) (p = 0.332).

MCID

Figure 3A shows the median SNOT-22 score variation in each group of patients, stratified according to the score of the anchor question on the change in the functional quality of life. Figure 3B presents the same stratification based on the anchor question score on the change in the aesthetic quality of life.

Figure 2
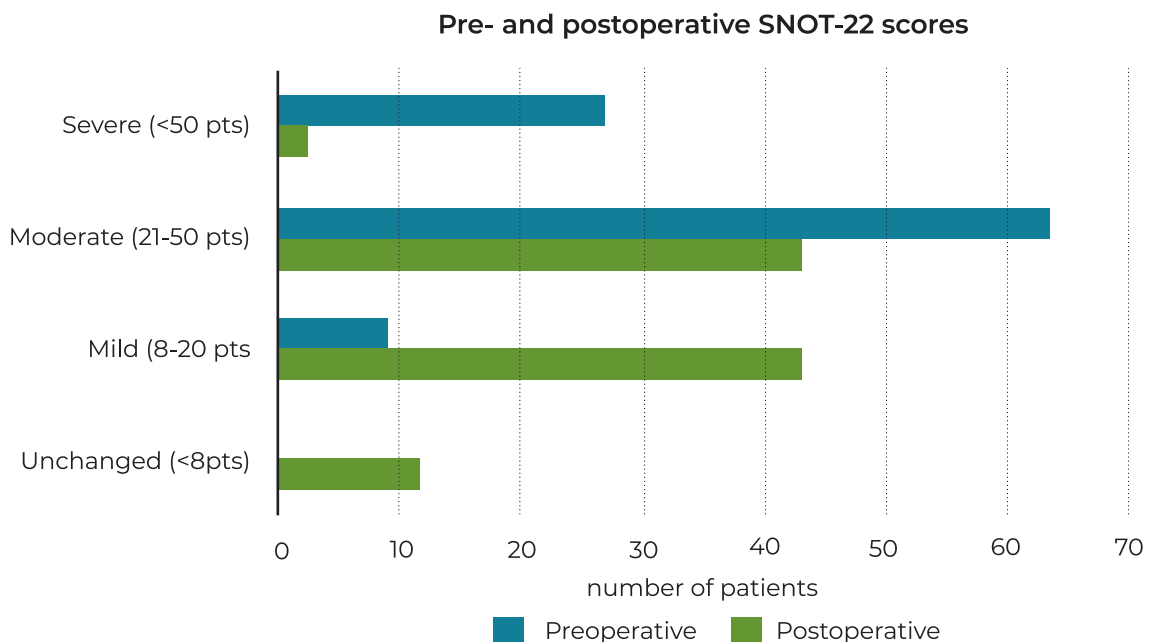Pre- and postoperative SNOT-22 scores stratified by severity

Pre- and postoperative SNOT-22 scores

Table 1
Relationship between the SNOT-22 score and analyzed clinical parameters

		n	pre-SNOT (M ± SD)	p value	post-SNOT (M ± SD)	p value	Pre-post SNOT variation (median ± IQR)	p value
Sex	Female	26	47,2 ± 19,3		23,3 ± 9,9		17,5 ± 14,3	
	Male	18	35,5 ± 18,0	0,049	16,7 ± 14,8	0,080	16,5 ± 11,5	0,430
Asthma	No	39	40,1 ± 17,2		19,3 ± 11,5		18,0 ± 11,0	
	Yes	5	60,4 ± 28,3	0,026	31,2 ± 15,7	0,042	14,0 ± 53,0	0,910
Allergies	No	26	37,5 ± 18,2		17,4 ± 10,2		16,5 ± 14,75	
		18	49,4 ± 19,6	0,045	25,3 ± 14,2	0,037	18,5 ± 11,5	0,360
Prior nasal surgery	No	34	41,9 ± 19,1		19,3 ± 10,7		18,0 ± 12,3	
	Yes	10	43,8 ± 21,7	0,780	25,0 ± 17,2	0,340	14,0 ± 10,8	0,350
History of Nasal trauma	No	27	45,0 ± 16,4		24,4 ± 12,5		17,0 ± 10,0	
	Yes	17	38,2 ± 23,4	0,259	14,6 ± 10,0	0,009	18,0 ± 18,0	0,961
Surgical approach	Closed	27	41,5 ± 21,8		19,3 ± 12,7		15,0 ± 14,0	
	Open	17	43,8 ± 15,6	0,702	22,8 ± 12,1	0,369	20,0 ± 11,0	0,391

SNOT, 22-item Sinonasal Outcome Test; SD, standard deviation; IQR, interquartile range.

Table 2
Relationship between the ROE score and analyzed clinical parameters

|		n	pre-ROE (M ± SD)	p value	post-ROE (M ± SD)	p value	Pre-post ROE variation (M ± SD)	p value
Sex	Female	26	28,5 ± 9,6		76,8 ± 18,7		48,2 ± 17,9	
	Male	18	27,8 ± 10,3	0,810	76,4 ± 21,9	0,950	48,6 ± 20,9	0,950
Previous septorhinoplasty	No	39	27,6 ± 10,0		78,9 ± 18,4		51,4 ± 16,2	
	Yes	5	33,3 ± 6,6	0,210	58,3 ± 23,2	0,027	25,0 ± 25,4	0,039
History of nasal trauma	No	27	28,6 ± 10,3		72,8 ± 21,8		44,3 ± 19,9	
	Yes	17	27,7 ± 9,3	0,782	82,6 ± 15,0	0,086	54,9 ± 15,9	0,058
Surgical approach	Closed	27	28,9 ± 9,9		79,5 ± 18,4		50,6 ± 17,7	
	Open	17	27,2 ± 9,9	0,592	72,0 ± 21,7	0,231	44,8 ± 21,1	0,332

ROE, Rhinoplasty Outcome Evaluation; SD, standard deviation.

Among the 44 patients analyzed, 35 (79.5%) reported a clinically significant functional improvement in the quality of life postoperatively. The SNOT-22 score variation required a MCID of five points. Aesthetically, 81.8% of patients reported a clinically significant improvement in the quality of life, with a MCID of 13.7 points.

Discussion

The multidimensionality of the concept complicates the evaluation of patient satisfaction after septorhinoplasty. Validated quality of life questionnaires such as the SNOT-22 and ROE quantify the postoperative functional and aesthetical outcomes of septorhinoplasty. However, the perceived clinical improvement differs according to the patient's expectations in relation to

3A
SNOT-22 score variation
(median ± IQR)

3B
ROE score variation
(mean ± SD)
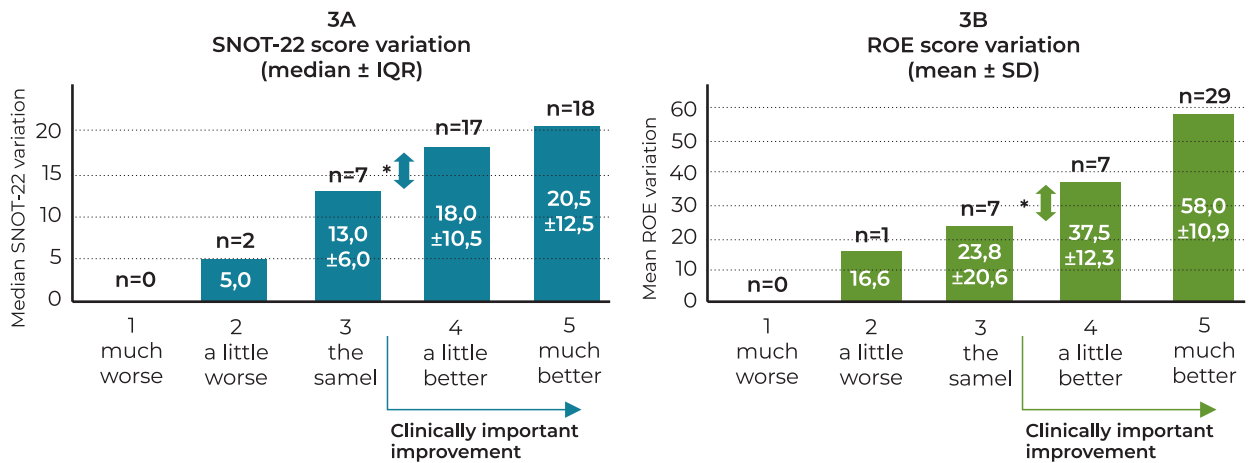
(*) represents the MCID. SNOT, 22-item Sinonasal Outcome Test; ROE, Rhinoplasty Outcome Evaluation; SD, standard deviation; IQR, interquartile range.

the procedure, among other factors. This study aimed to evaluate the functional and aesthetic determinants of patient satisfaction one year after septorhinoplasty, in addition to identifying the minimal SNOT-22 and ROE score variation required for a subjective improvement in the quality of life.

In our sample, the median postoperative SNOT-22 score variation was comparable to a reduction of 17 points reported by Buckland JR et al[11]. In functional terms, the SNOT-22 score MCID calculated for our sample was five points. This corroborates with the findings of Medeiros N et al., who evaluated patients undergoing septoplasty and reported an MCID of 4.2 points[12]. Other studies have reported a higher MCID in patients with chronic rhinosinusitis (CRS). Chowdhury NI et al. evaluated 120 patients with CRS undergoing medical treatment and reported an MCID of 8.0 points[13], which aligns with the MCID of 8.9 points reported by Hopkins C et al. in their analysis of 2,284 patients with CRS undergoing endoscopic sinus surgery [7].

Regarding the aesthetic outcomes, the mean ROE variation was 48.39 (preoperative M = 28.2, postoperative M = 76.6), which is concurrent with the results of Arima LM et al. and Esteves S et al[14,15]. History of previous septorhinoplasty was the only demographic parameter that was found to be a predictor of the magnitude

of postoperative satisfaction. The ROE score variation was significantly lower in the group of patients undergoing revision septorhinoplasty, as demonstrated by Abbas OL, who reported a mean ROE score variation of 40.0 points in patients undergoing primary rhinoplasty and 29.6 points in patients undergoing revision[16]. This difference can be attributed to the higher technical complexity of revision surgeries and greater expectations of these patients. In aesthetic terms, the ROE MCID calculated for our sample was 13.7 points. Nevertheless, to date, no other published studies have estimated the MCID after septorhinoplasty using the ROE questionnaire.

This prospective study evaluated patient satisfaction one year post-septorhinoplasty after the healing process was complete to investigate the long-term postoperative outcomes. This interval is longer than that considered in most studies.

The main limitations of our study include a small sample size, being a single-center study, and that it analyzed the outcomes of procedures performed by surgeons with different levels of experience and using different approaches.

Finally, the MCID is influenced by the calculation method and demographic characteristics of the sample. Therefore, further prospective and multicenter studies with larger samples are

Table 3
22-item Sinonasal Outcome Test (SNOT-22) questionnaire

	Questão	No problem 0	Very mild problem 1	Mild problem 2	Moderate problem 3	Severe problem 4	Worst Possible problem 5
1.	Need to blow the nose						
2.	Sneezing						
3.	Runny nose						
4.	Cough						
5.	Discharge dripping from the nose into the throat						
6.	Thick nasal discharge						
7.	Feeling of ear fullness						
8.	Dizziness or vertigo						
9.	Ear pain						
10.	Facial pain or pressure						
11.	Difficulty falling asleep						
12.	Waking up at night						
13.	Lack of a good night's sleep						
14.	Waking up tired						
15.	Fatigue or tiredness during the day						
16.	Reduced productivity in daily activities						
17.	Reduced concentration						
18.	Frustration, restlessness, irritability						
19.	Sadness						
20.	Feeling of embarrassment						
21.	Reduced sense of smell or taste						
22.	Congested nose						

required to determine the minimum SNOT-22 and ROE score variations necessary for a subjective improvement in the quality of life of patients following septorhinoplasty.

Conclusion

In this study, a high percentage of patients reported a clinically significant improvement in the quality of life after septorhinoplasty: 79.5% functionally and 81.8% aesthetically. A history of previous septorhinoplasty was the only determinant of lower postoperative satisfaction. This finding underscores the importance of selecting patients with appropriate surgical indications and, more importantly, managing patients' expectations preoperatively.

Table 4
Rhinoplasty Outcome Evaluation (ROE) questionnaire

Do you like the appearance of your nose?				
Not at all 0	Somewhat 1	Moderately 2	Very much 3	Completely 4
Are you able to breathe through your nose?				
Not at all 0	Somewhat 1	Moderately 2	Very much 3	Completely 4
Do you think your friends and loved ones like the appearance of your nose?				
Not at all 0	Somewhat 1	Moderately 2	Very much 3	Completely 4
Do you think the current appearance of your nose limits your social and professional activities?				
Not at all 0	Somewhat 1	Moderately 2	Very much 3	Completely 4
Do you think the appearance of your nose is the best that it can be?				
Not at all 0	Somewhat 1	Moderately 2	Very much 3	Completely 4
Would you surgically change the appearance or function of your nose?				
Not at all 0	Somewhat 1	Moderately 2	Very much 3	Completely 4

Conflict of Interests

The authors declare that they have no conflict of interest regarding this article.

Data Confidentiality

The authors declare that they followed the protocols of their work in publishing patient data.

Human and animal protection

The authors declare that the procedures followed are in accordance with the regulations established by the directors of the Commission for Clinical Research and Ethics and in accordance with the Declaration of Helsinki of the World Medical Association.

Privacy policy, informed consent and Ethics committee authorization

All the processed data were based in published reports that fulfilled privacy policy and ethical considerations.

Financial support

This work did not receive any grant contribution, funding or scholarship.

Scientific data availability

There are no publicly available datasets related to this work.

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