



# Changes in patient-reported satisfaction and quality-of-life 6 months after rhinoplasty

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## KEYWORDS

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**Summary Background:** Rhinoplasty is a challenging and demanding procedure in plastic surgery. Surgical success, patient satisfaction, and improved quality-of-life are important outcomes. **Objectives:** This study aimed to evaluate patient-reported satisfaction with appearance, treatment, and decision outcomes as well as quality-of-life after rhinoplasty using validated questionnaires. The role of patient demographics on outcomes was also studied.

**Methods:** Patients who underwent a primary rhinoplasty were selected for this cohort study. Patient-reported satisfaction with appearance, treatment, and decision as well as quality-of-life were evaluated with the Utrecht Questionnaire and FACE-Q at intake and 6 months post-operatively.

**Results:** Overall, 380 patients were included. Patients reported a more positive subjective perception of nasal appearance (VAS score) at 6 months post-surgery compared with pre-operative scores ( $7.9 \pm 1.6$  vs  $3.2 \pm 1.4$ ,  $p < 0.05$ ). Furthermore, higher quality-of-life and body image scores were observed at 6 months postoperatively compared with preoperative scores ( $7.7 \pm 3.5$  vs  $15.2 \pm 4.4$ ,  $p < 0.05$ ). Patients reported high satisfaction with treatment outcome ( $70.3 \pm 23.4$ ) as well as with their decision to undergo surgery ( $75.9 \pm 23.4$ ) on a scale of 0-100 at 6 months postoperatively. Patients reached similar postoperative scores regardless of their intake scores. Patients  $\geq 30$  years and patients with a history of cosmetic surgery were less satisfied postoperatively.

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**Conclusion:** Despite differences in appearance satisfaction at intake, most patients showed greater satisfaction with appearance, treatment, and decision outcomes as well as quality-of-life 6 months postoperatively. However, older age and a history of cosmetic surgery influenced these outcomes negatively. These factors should be considered during preoperative management of outcome expectations.

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Aesthetic rhinoplasty is considered one of the most technically challenging procedures in aesthetic plastic surgery. Each procedure is unique and tailored to the specific anatomy and goals of the patient. With these challenging demands and the procedure's popularity, it is important to gain insight into what determines a good outcome.<sup>1</sup> Since the surgery is aimed to improve aesthetics, the success of this elective procedure can only be assessed by the patient. It is therefore essential to measure the outcome from the patient's perspective.<sup>2-4</sup>

Patient-reported outcome measures (PROMs) are designed to measure patient satisfaction and quality-of-life from the patient's perspective.<sup>5,6</sup> In 2013, a rhinoplasty specific PROM called the *Utrecht Questionnaire for Outcome Assessment in Aesthetic Rhinoplasty* (OAR) was developed by Lohuis et al.<sup>7</sup> The OAR takes only 2 minutes to complete and measures the perception regarding the appearance of the nose, body image, and quality-of-life in relation to nasal appearance. In 2015, new sets of the FACE-Q instruments were developed to gain a more comprehensive understanding of the quality-of-life impact of and the decision to undergo facial aesthetics procedures.<sup>8</sup>

The outcomes of these combined questionnaires can provide clinicians with multi-dimensional information about the patient's perspective and the possible benefits after rhinoplasty.<sup>9,10</sup> Previous studies with a wide range of study designs using validated PROMs evaluating the aesthetic aspect of rhinoplasty observed a beneficial effect on satisfaction and quality-of-life.<sup>11-14</sup> Nonetheless, few studies have shown outcomes of a large rhinoplasty cohort combined with clear, simple, or multi-dimensional PROMs in daily practice.<sup>15,16</sup> Additionally, limited research adequately describes how patient characteristics influence improvements in patient-reported satisfaction and quality of life, and those few available studies present contradictory findings.<sup>17-21</sup> Hence, there is a need to establish a consensus on the impact of patient characteristics on these outcomes.

This descriptive study aimed to assess patient-reported satisfaction with appearance, treatment, and decision outcomes as well as quality-of-life after rhinoplasty by using validated questionnaires that are easy to implement in clinical practice. A secondary aim was to report if any association between patient characteristics and these outcomes exists.

## Methods

### Study design and setting

A multicenter observational cohort study was performed at all eight practice sites of the Velthuis Clinic, The Netherlands.

Patients who underwent a primary aesthetic rhinoplasty between December 2016 and July 2021 were invited to complete e-questionnaires as part of ongoing routinely collected data. This study followed the *Reporting of studies Conducted using Observational Routinely collected Data* (RECORD) guidelines and was approved by the local Medical Ethics Review Committee (2020-6680).<sup>22</sup> Outcomes of these questionnaires were collected similarly as previously described by Selles et al., and data were managed with a secure web-based application for distributing questionnaires called GemTracker.<sup>10,23</sup> The questionnaires were sent by e-mail after the first consultation and 6 months postoperatively, when the results of preservation rhinoplasty are expected to be stable and swelling is reduced by 95%.<sup>24</sup> Additionally, Wähmann et al. recommended this time point after conducting a systematic review.<sup>12</sup> Three reminders were sent for each round of questionnaires if they were not completed.

### Participants

All patients with an aesthetic indication and who underwent primary open or closed preservation rhinoplasty were invited to complete e-questionnaires. Participants were excluded if another facial procedure was performed simultaneously or 6 months postoperatively or due to incomplete questionnaires.

Patient characteristics retrieved from the electronic database included sex, age, body mass index (BMI), smoking status (yes/no), alcohol consumption (yes/no), and cosmetic surgery history (yes/no). Patients who quit smoking less than 6 weeks before the procedure were categorized as smokers due to the lingering negative effects on wound healing. Patients who consumed alcohol were categorized as alcohol users without differentiating by the amount of alcohol consumption.<sup>25</sup>

### Questionnaires

The OAR is a validated PROM that evaluates body image and quality-of-life in relation to nasal appearance and can be easily implemented in daily practice.<sup>7</sup> The first part consists of a Visual Analogue Scale (VAS) whereby the appearance of the nose is rated, ranging from 0 (very ugly) to 10 (very nice). The second part consists of five questions that are scored on a 5-point Likert scale. A total sum score can be calculated ranging from 5-25 and a lower score indicates a better outcome. The OAR was completed preoperatively and 6 months postoperatively and was regarded as the primary outcome.

As a secondary outcome, two scales of the health-related quality-of-life domain from the *FACE-Q Aesthetic* were used. The purpose of adding these PROMs was to provide a more multi-dimensional patient perspective of the outcome.<sup>8</sup> The first scale, satisfaction with outcome, measures satisfaction with the result of a facial procedure (e.g., statements such as result being great, just as expected). The second scale, satisfaction with decision, measures satisfaction with their decision to undergo a facial procedure (e.g., statements about the procedure being what was wanted and needed). Both scales consist of multiple items, are scored on a 4-point Likert scale, and were completed 6 months postoperatively. For each scale, the sum score is Rasch-transformed and ranges from 0-100. A higher score indicates greater satisfaction.

**Statistical analysis**

Complete case analysis was performed with participants who completed all questionnaires at both time points. A paired *t*-test was performed between preoperative and postoperative scores for the VAS appearance and OAR sum score. Mean and standard deviation were used to describe continuous, normally distributed data. Effect sizes were calculated for each change score interpreted according to Cohen’s criteria (0.2, small; 0.5, medium; and 0.8, large).<sup>26</sup> A subgroup analysis of patients showing progress or no progress at 6 months postoperatively was conducted to determine if there were any differences between the patient characteristics, satisfaction, or quality-of-life scores.

A non-responder analysis was performed to determine possible bias, the level of similarity, and comparability because not all patients completed the questionnaires. Therefore, the analysis was based on patients who only completed the baseline questionnaires (non-completers) and patients who completed questionnaires at baseline and at 6 months postoperatively (completers). Baseline patient

**Table 1** Baseline patient characteristics (N = 380).

Variable	N (%)
Sex (female)	340 (89.5)
Age (years) <sup>a</sup>	28.04 ± 9.65
< 30 years	256 (67.4)
≥30 years	124 (32.6)
BMI (kg/m <sup>2</sup> ) <sup>a</sup>	22.03 ± 3.24
Smoking status (yes)	46 (12.1)
Alcohol consumption (yes)	212 (55.8)
Cosmetic surgery history (yes)	50 (13.2)

<sup>a</sup> Mean ± SD.

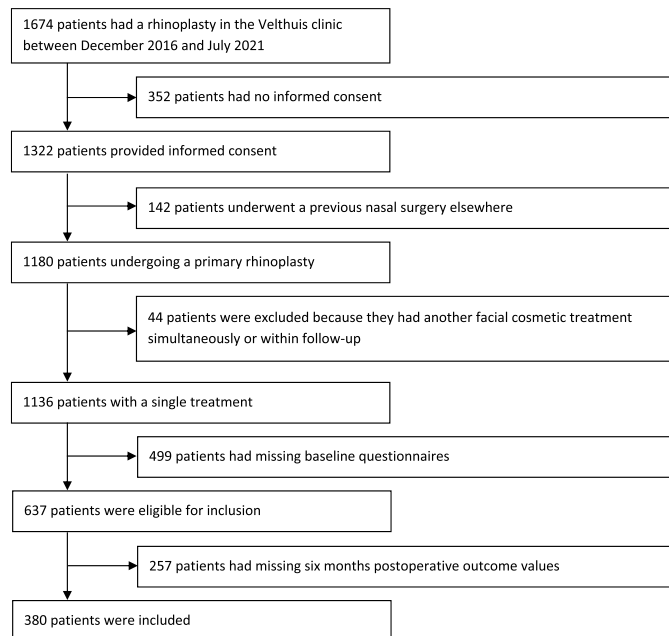
characteristics and OAR scores were compared using Chi-squared test and unpaired *t*-test. Additionally, effect sizes were calculated and interpreted according to Cohen’s criteria and Cliff’s delta (0.147, small; 0.330, medium; 0.474, large).<sup>26,27</sup>

Subgroup analyses based on patient characteristics including age, sex, smoking status, alcohol consumption, and cosmetic surgery history were performed. To analyze whether postoperative outcomes were affected by the preoperative patient-reported outcomes, preoperative scores were stratified into quartiles for the VAS appearance score and the total score of the OAR.

All data were analyzed with R version 3.6.3 (R Foundation for Statistical Computing, Vienna, Austria). Statistical significance was set at a p-value of < 0.05.

**Results**

Overall, 380 (32.2%) of 1180 patients completed all questionnaires (Figure 1). In this study, 89.5% of the patients were female, and the average age was 28 (18–63) years (Table 1).



**Figure 1** Flowchart of patient inclusion.

**Table 2** Patient-reported outcome measures (PROMs).

	Intake	6 months	Effect size <sup>e</sup>	Intake-6 months Δ score
<b>The Utrecht Questionnaire for Outcome Assessment of Aesthetic Rhinoplasty</b>				
VAS appearance score <sup>a*</sup>	3.2 ± 1.4	7.9 ± 1.6	3.1	4.7 ± 2.1
OAR sum score <sup>b*</sup>	15.2 ± 4.4	7.7 ± 3.5	1.9	7.5 ± 5.3
E1 concerned <sup>c*</sup>	3.7 ± 0.9	1.7 ± 0.9	2.2	2.0 ± 1.3
E2 bothered <sup>c*</sup>	3.3 ± 1.1	1.8 ± 0.9	1.5	1.5 ± 1.3
E3 daily life <sup>c*</sup>	2.7 ± 1.1	1.4 ± 0.8	1.3	1.3 ± 1.3
E4 relationships <sup>c*</sup>	2.5 ± 1.2	1.3 ± 0.7	1.3	1.2 ± 1.3
E5 stressed <sup>c*</sup>	3.0 ± 1.2	1.4 ± 0.8	1.6	1.6 ± 1.3
<b>FACE-Q scales<sup>d</sup></b>				
Satisfaction with outcome		70.3 ± 23.4		
Satisfaction with decision		75.9 ± 23.4		

All values are reported as mean ± standard deviation.

\*Statistically significant (p < 0.05)

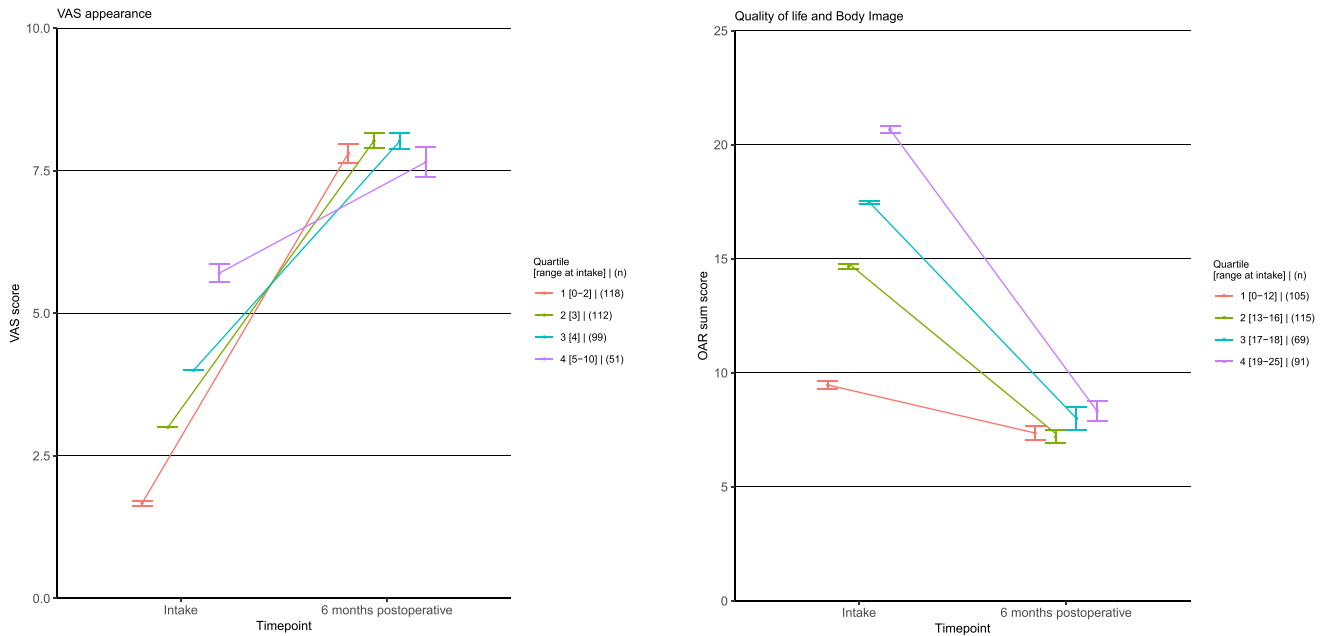
<sup>a</sup> VAS score: ranging from 0-10. Higher score indicates greater satisfaction with the appearance of the nose.

<sup>b</sup> Sum, E1 to E5 (range, 5-25). Lower scores indicate higher quality-of-life and body image.

<sup>c</sup> E1 to E5 (range, 1-5). Lower scores indicate higher quality-of-life and body image. E1. Are you concerned about the appearance of your nose? E2. Does this concern bother you often? E3. Does this concern affect your daily life (e.g., your work)? E4. Does this concern affect your relationships with others? E5. Do you feel stressed by the appearance of your nose?

<sup>d</sup> FACE-Q scales (range, 0-100). Higher scores indicate higher satisfaction.

<sup>e</sup> Effect size: interpreted according to Cohen's criteria; negligible, < 0.2; small, 0.2; medium, 0.5; and large, 0.8



**Figure 2** The Utrecht Questionnaire for Outcome Assessment of Aesthetic Rhinoplasty scores per quartile. Patients are stratified based on VAS appearance score and sum score at intake. Values are reported as mean and standard error.

**Main outcomes**

Patients reported a more positive subjective perception of nasal appearance (VAS score) at 6 months compared with preoperative scores (7.9 ± 1.6 vs 3.2 ± 1.4, p < 0.05) with a large effect size (Table 2). After stratifying patients into quartiles based on their intake VAS appearance score, all quartiles showed improvement postoperatively, and patients achieved similar levels of satisfaction. Smaller

increments were seen from quartiles with higher preoperative VAS appearance scores. Patients with negative changes in the VAS appearance score were found in all quartiles (Figure 2).

Higher quality-of-life and body image scores regarding nasal appearance were observed at 6 months after rhinoplasty compared with preoperative scores (7.7 ± 3.5 vs 15.2 ± 4.4, p < 0.05) with a large effect size (Table 2). After stratifying patients into quartiles based on their

**Table 3** Subgroup analysis progression in The Utrecht Questionnaire for Outcome Assessment of Aesthetic Rhinoplasty 6 months postoperatively.

Patient characteristics N (%)	Yes N = 340	No N = 40	p-value	Effect size <sup>f</sup>
Sex (F)	306 (90.0)	34 (85.0)	0.482	0.050
Age (years) <sup>a</sup>	27.4 ± 9.3	33.8 ± 10.7	< 0.001	0.680
BMI (kg/m <sup>2</sup> ) <sup>a</sup>	22.1 ± 3.3	21.8 ± 2.4	0.698	0.065
Smokers	43 (12.6)	3 (7.5)	0.492	0.051
Alcohol consumption	188 (55.3)	24 (40.0)	0.690	0.047
Cosmetic procedure in the past	40 (11.8)	10 (25.0)	<b>0.036</b>	0.132
<b>OAR scores<sup>a</sup> at intake</b>				
VAS appearance <sup>b</sup>	3.1 ± 1.3	4.4 ± 1.8	< 0.001	0.936
OAR sum score (range, 5-25) <sup>c</sup>	15.7 ± 4.1	10.7 ± 4.1	< 0.001	1.209
E1 concerned <sup>d</sup>	3.8 ± 0.8	2.8 ± 1.1	< 0.001	1.204
E2 bothered <sup>d</sup>	3.4 ± 1.0	2.5 ± 1.2	< 0.001	0.872
E3 daily life <sup>d</sup>	2.8 ± 1.1	1.8 ± 1.1	< 0.001	0.905
E4 relationships <sup>d</sup>	2.6 ± 1.1	1.6 ± 0.8	< 0.001	0.969
E5 stressed <sup>d</sup>	3.1 ± 1.1	2.1 ± 1.0	< 0.001	0.918
<b>OAR scores<sup>a</sup> at 6 months</b>				
VAS appearance <sup>b</sup>	8.1 ± 1.3	5.9 ± 2.4	< 0.001	1.567
OAR sum score (range, 5 - 25) <sup>c</sup>	7.1 ± 2.7	12.5 ± 5.7	< 0.001	1.727
E1 concerned <sup>d</sup>	1.6 ± 0.8	2.9 ± 1.2	< 0.001	1.543
E2 bothered <sup>d</sup>	1.7 ± 0.8	2.9 ± 1.2	< 0.001	1.377
E3 daily life <sup>d</sup>	1.3 ± 0.6	2.3 ± 1.3	< 0.001	1.322
E4 relationships <sup>d</sup>	1.2 ± 0.6	2.1 ± 1.2	< 0.001	1.371
E5 stressed <sup>d</sup>	1.3 ± 0.6	2.4 ± 1.4	< 0.001	1.465
<b>FACE-Q<sup>a</sup> (range, 0-100)<sup>e</sup></b>				
Satisfaction with outcome	72.4 ± 22.2	49.9 ± 23.6	< 0.001	1.010
Satisfaction with decision	78.6 ± 22.0	52.5 ± 22.5	< 0.001	1.186

The subgroup analysis stratified by question E3 and E4 of the OAR showed statistically significant differences in age and all questions of the OAR at intake. However, the effect size was small for age. For all the questions of the OAR at intake, the effect size was medium to large. No differences were observed regarding the postoperative scores.

Statistically significant P-values ( $p < 0.05$ ) are shown in Bold font.

<sup>a</sup> Values are mean ± standard deviation.

<sup>b</sup> VAS score: range, 0-10. Higher score indicates greater satisfaction with the appearance of the nose.

<sup>c</sup> OAR sum score: range, 5-25. Lower scores indicate higher quality-of-life and body image.

<sup>d</sup> E1 to E5: range, 1-5. Lower scores indicate higher quality-of-life and body image. E1. Are you concerned about the appearance of your nose? E2. Does this concern bother you often? E3. Does this concern affect your daily life (e.g., your work)? E4. Does this concern affect your relationships with others? E5. Do you feel stressed by the appearance of your nose?

<sup>e</sup> FACE-Q scales: range, 0-100. Higher scores indicate higher satisfaction.

<sup>f</sup> Effect size: interpreted according to Cohen's criteria; negligible, <0.2; small, 0.2; medium, 0.5; and large, 0.8 or Cliff's delta criteria; negligible <0.147; small, 0.147; medium, 0.33; large, 0.474.

intake OAR sum score, all quartiles showed improvement postoperatively, and patients reported similar levels of improvement in quality-of-life. Smaller increments were seen from quartiles with lower preoperative OAR sum scores. The patients with negative changes in the OAR sum score were predominantly classified in the quartile with the lowest preoperative OAR sum score (Figure 2).

Regarding the FACE-Q scores, patients reported high satisfaction with treatment outcome ( $70.3 \pm 23.4$ ) and high satisfaction with the decision to undergo the procedure ( $75.9 \pm 23.4$ ) 6 months postoperatively.

Of all the participants, 89.5% had improved scores at 6 months postoperatively for satisfaction with appearance and quality-of-life. A total of 40 patients remained stable or decreased in scores regarding satisfaction with appearance or quality-of-life after rhinoplasty. These patients were older ( $p < 0.001$ , 33.8 vs 27.4 years) and more patients had a cosmetic surgery history ( $p = 0.04$ , 25.0% vs 11.8%) (Table 3). Moreover, of those 40 patients, the preoperative

VAS and OAR scores were significantly greater with a large effect size compared with the patient group that did show progression at 6 months post-rhinoplasty. However, their postoperative 6-month VAS and OAR scores were significantly worse (both  $p < 0.001$ , 5.9 vs 8.1 and 12.5 vs 7.1, respectively), which was also observed regarding the postoperative FACE-Q scores satisfaction with outcome and decision (both  $p < 0.001$ , 49.9 vs 72.4 and 52.5 vs 78.6, respectively).

### Subgroup analyses

The non-responder analysis showed a statistical difference in age between non-completers and completers ( $30.1 \pm 11.3$  vs  $28.0 \pm 9.7$ ). However, the effect size was very small ( $< 0.2$ ) (Table 4) and regarded as not clinically relevant.

Regarding the VAS appearance score, the age group <30 years showed a statistically worse VAS score



**Table 4** Non-responder analysis.

Patient characteristics N (%)	Non-completers N = 257	Completers N = 380	p-value	Effect size <sup>e</sup>
Sex (female)	226 (87.9)	340 (89.5)	0.634	0.015
Age (years)	30.0 ± 11.3	28.0 ± 9.7	0.021	0.186
BMI (kg/m <sup>2</sup> ) <sup>a</sup>	21.6 ± 2.6	22.0 ± 3.2	0.086	0.139
Smokers	41 (16.0)	46 (12.1)	0.204	0.038
Alcohol consumption	136 (52.9)	212 (55.8)	0.527	0.029
Cosmetic procedure in the past	44 (17.1)	50 (13.2)	0.204	0.040
<b>OAR scores<sup>a</sup> at intake</b>				
VAS appearance <sup>b</sup>	3.3 ± 1.4	3.2 ± 1.4	0.358	0.074
OAR sum score (range, 5 - 25) <sup>c</sup>	15.5 ± 4.5	15.2 ± 4.4	0.411	0.067
E1 concerned <sup>d</sup>	3.7 ± 0.9	3.7 ± 0.9	0.826	0.018
E2 bothered <sup>d</sup>	3.3 ± 1.0	3.3 ± 1.1	0.967	0.003
E3 daily life <sup>d</sup>	2.7 ± 1.2	2.7 ± 1.1	0.390	0.070
E4 relationships <sup>d</sup>	2.6 ± 1.2	2.5 ± 1.2	0.497	0.055
E5 stressed <sup>d</sup>	3.1 ± 1.2	3.0 ± 1.2	0.161	0.113

A non-responder analysis was performed between patients who only completed the questionnaire at baseline and patients who completed all questionnaires at baseline and 6 months postoperatively to determine the differences in patient characteristics and baseline PROMs. The non-responder analysis showed statistically significant differences in age. However, the effect size was negligible.

<sup>a</sup> Values are mean ± standard deviation.

<sup>b</sup> VAS score: range, 0-10. Higher score indicates greater satisfaction with the appearance of the nose.

<sup>c</sup> OAR sum score: range, 5-25. Lower scores indicate higher quality-of-life and body image.

<sup>d</sup> E1 to E5: range, 1-5. Lower scores indicate higher quality-of-life and body image. E1. Are you concerned about the appearance of your nose? E2. Does this concern bother you often? E3. Does this concern affect your daily life (e.g., your work)? E4. Does this concern affect your relationships with others? E5. Do you feel stressed by the appearance of your nose?

<sup>e</sup> Effect size: interpreted according to Cohen's criteria; negligible, <0.2; small, 0.2; medium, 0.5; and large, 0.8 or Cliff's delta criteria; negligible <0.147; small, 0.147; medium, 0.33; large, 0.474.

\* Statistically significant ( $p < 0.05$ ).

preoperatively compared with the group aged  $\geq 30$  years but a higher VAS score postoperatively with small effect size (Table 5). However, statistically significant differences in patient characteristics were observed in the age group  $\geq 30$  years; BMI was higher (medium effect size) and more patients had a cosmetic surgery history (small effect size). Patients with a cosmetic surgery history showed a statistically worse VAS score postoperatively with a small effect size. However, patients without a cosmetic surgery history and with a higher postoperative VAS score were younger (Table 6). The subgroup analyses based on sex, smoking status, and alcohol consumption showed no significant differences between preoperative or postoperative VAS scores (Supplementary Tables 1-3).

Regarding the OAR sum score, statistically worse preoperative scores were observed for the age group < 30 years with a medium size effect. Postoperatively, the age group < 30 years had a significantly higher quality-of-life score with a small effect size (Table 5). Patient characteristics did differ between subgroups, with higher mean BMI and more patients with a cosmetic surgery history in the age group  $\geq 30$  years. The subgroup analysis based on cosmetic surgery history showed patients without a history of cosmetic surgery showed a significant increase in quality-of-life scores postoperatively, with small effect size (Table 6). However, it should be noted that these patients were significant younger, with large effect size. No significant differences were observed in subgroup analyses based on sex, smoking status, and alcohol consumption.

Regarding the FACE-Q scores, patients aged < 30 years were more satisfied compared with those aged  $\geq 30$  years (Table 5). Patients with a previous cosmetic surgery history

had significant lower FACE-Q scores with medium effect size compared with patients with no history of cosmetic surgery (Table 6). No significant differences were observed in subgroup analyses based on sex, smoking status, and alcohol consumption (Supplementary Tables 1-3).

## Discussion

This large cohort study compared satisfaction with appearance and body image as well as quality-of-life in patients scheduled for a primary aesthetic rhinoplasty before and 6 months after the procedure. Patients showed significantly improved scores in nasal appearance satisfaction as well as quality-of-life and body image at 6 months postoperatively, with large effect sizes ( $> 0.8$ ). This improvement was independent of their baseline scores since all patients reached similar scores postoperatively. Moreover, the FACE-Q scales "Satisfaction with Outcome" and "Decision" showed a high satisfaction score 6 months after rhinoplasty. Age ( $\geq 30$  years) and cosmetic surgery history had a significant negative effect on the improvements in patient-reported satisfaction with appearance and quality-of-life 6 months post-surgery.

These findings suggest that rhinoplasty is a successful procedure regardless of how positively or negatively an individual may view their appearance during the first consultation. The procedure goes beyond the idea of changing the shape of the nose and also has an impact on quality-of-life. Clinicians should be aware that patients with low self-esteem regarding their nose may show greater improvement compared to those with higher self-esteem.

**Table 5** Subgroup analysis by age.

Patient characteristics N (%)	Age < 30 N = 256	Age ≥ 30 N = 124	p-value	Effect size <sup>f</sup>
Sex (female)	229 (89.5)	111 (89.5)	1.000	0.001
BMI (kg/m <sup>2</sup> ) <sup>a</sup>	21.5 ± 2.3	23.2 ± 4.4	< 0.001	0.532
Smokers	36 (14.1)	10 (8.1)	0.130	0.060
Alcohol consumption	140 (54.7)	72 (58.1)	0.609	0.034
Cosmetic procedure in the past	14 (5.5)	36 (29.0)	< 0.001	0.236
<b>OAR scores<sup>a</sup> at intake</b>				
VAS appearance <sup>b</sup>	3.0 ± 1.2	3.6 ± 1.7	< 0.001	0.404
OAR sum score (range, 5-25) <sup>c</sup>	16.0 ± 4.2	13.4 ± 4.3	< 0.001	0.615
E1 concerned <sup>d</sup>	3.9 ± 0.9	3.4 ± 1.9	< 0.001	0.531
E2 bothered <sup>d</sup>	3.5 ± 1.0	2.9 ± 1.1	< 0.001	0.613
E3 daily life <sup>d</sup>	2.8 ± 1.1	2.4 ± 1.0	0.001	0.350
E4 relationships <sup>d</sup>	2.7 ± 1.2	2.2 ± 1.0	0.001	0.379
E5 stressed <sup>d</sup>	3.2 ± 1.1	2.5 ± 1.1	< 0.001	0.622
<b>OAR scores<sup>a</sup> at 6 months</b>				
VAS appearance <sup>b</sup>	8.1 ± 1.5	7.5 ± 1.8	< 0.001	0.388
OAR sum score (range, 5-25) <sup>c</sup>	7.4 ± 3.4	8.2 ± 3.9	0.040	0.225
E1 concerned <sup>d</sup>	1.6 ± 0.9	1.9 ± 1.0	0.010	0.284
E2 bothered <sup>d</sup>	1.7 ± 0.9	1.9 ± 1.0	0.095	0.183
E3 daily life <sup>d</sup>	1.4 ± 0.8	1.5 ± 0.8	0.277	0.119
E4 relationships <sup>d</sup>	1.3 ± 0.7	1.5 ± 0.8	0.011	0.279
E5 stressed <sup>d</sup>	1.4 ± 0.8	1.5 ± 0.9	0.392	0.094
<b>FACE-Q<sup>a</sup> (range, 0-100)<sup>e</sup></b>				
Satisfaction with outcome	73.6 ± 22.0	63.1 ± 23.9	< 0.001	0.451
Satisfaction with decision	80.3 ± 22.0	67.9 ± 23.8	< 0.001	0.523

Statistically significant P-values ( $p < 0.05$ ) are shown in Bold font.

The subgroup analysis stratified by age showed statistically significant differences in BMI, cosmetic procedure in the past, all intake scores and postoperative VAS appearance, OAR sum scores, E1, E4, and FACE-Q scores. The effect size was between small and medium.

<sup>a</sup> Values are mean ± standard deviation.

<sup>b</sup> VAS score: range, 0-10. Higher score indicates greater satisfaction with the appearance of the nose.

<sup>c</sup> OAR sum score: range, 5-25. Lower scores indicate higher quality-of-life and body image.

<sup>d</sup> E1 to E5: range, 1-5. Lower scores indicate higher quality-of-life and body image. E1. Are you concerned about the appearance of your nose? E2. Does this concern bother you often? E3. Does this concern affect your daily life (e.g., your work)? E4. Does this concern affect your relationships with others? E5. Do you feel stressed by the appearance of your nose?

<sup>e</sup> FACE-Q scales: range, 0-100. Higher scores indicate higher satisfaction.

<sup>f</sup> Effect size: interpreted according to Cohen's criteria; negligible, <0.2; small, 0.2; medium, 0.5; and large, 0.8 or Cliff's delta criteria; negligible <0.147; small, 0.147; medium, 0.33; large, 0.474.

Smaller increments were seen in satisfaction with the appearance of the nose and quality-of-life in patients with high baseline scores. These observations can be used during the first consultation to assure that all patients perceive similar enhancement post-surgery, but progression may be experienced differently for each patient.

A comparison of these findings with those of relevant studies confirms that rhinoplasty has a positive effect on satisfaction with nasal appearance as well as quality-of-life and body image.<sup>7,11,12,15</sup> Subgroup analysis based on age (<30 years vs ≥30 years) showed a greater benefit in younger patients after rhinoplasty. This result is consistent with previous studies.<sup>11,17</sup> Yang et al. explained that the patients' peers might show more appreciation towards them after surgery.<sup>11</sup> Moreover, Amodeo et al. described an improvement in body image may be triggered by positive reactions in social life, which leads to improvement in psychosocial well-being.<sup>28</sup> In addition, Schwitzer et al. mentioned that older patients might experience difficulties in accepting major modifications in their facial appearance. On the other hand, older patients might have waited longer to undergo the procedure due to less severe problems. As a

result, this could have resulted in a less impressive enhancement, which eventually leads to a smaller improvement in satisfaction.<sup>17</sup> Regarding cosmetic surgery history, patients without previous cosmetic procedures showed greater satisfaction after rhinoplasty. A possible explanation for this might be that they are inexperienced with the process, which may result in lower expectations. Other studies did mention that 'surgiholics' are associated with the expectation of secondary gain.<sup>29</sup> These patients have high or unrealistic expectations and are often disappointed afterward. It should be noted that the patients without previous cosmetic procedures were also younger, which may influence the outcome. Therefore, future research should investigate which factors contribute independently to the satisfaction with treatment outcome by developing a full explanatory multivariable model.

Contrary to expectations, this study did not find a difference between the subgroup analysis based on sex. This may be explained by the fact that this study population only contained 10% males and therefore had limited power. Previous studies have suggested that male sex is a risk for dissatisfaction.<sup>17,29,30</sup> The acronym SIMON (single, immature,

**Table 6** Subgroup analysis by cosmetic history.

Patient characteristics N (%)	Yes N = 50	No N = 330	p-value	Effect size <sup>f</sup>
Sex (female)	47 (94.0)	293 (88.8)	0.383	0.050
Age (years) <sup>a, a</sup>	36.5 ± 11.5	26.8 ± 8.7	<b>&lt; 0.001</b>	1.069
BMI (kg/m <sup>2</sup> ) <sup>a</sup>	22.6 ± 3.0	22.0 ± 3.3	0.191	0.299
Smokers	6 (12.0)	40 (12.1)	1.000	0.012
Alcohol consumption	27 (54.0)	185 (56.1)	0.904	0.017
<b>OAR scores<sup>a</sup> at intake</b>				
VAS appearance <sup>b</sup>	3.4 ± 1.5	3.2 ± 1.4	0.364	0.138
OAR sum score (range, 5-25) <sup>c</sup>	14.5 ± 4.9	15.3 ± 4.3	0.218	0.187
E1 concerned <sup>d</sup>	3.6 ± 1.0	3.7 ± 0.9	0.293	0.160
E2 bothered <sup>d</sup>	3.0 ± 1.2	3.4 ± 1.0	<b>0.032</b>	0.327
E3 daily life <sup>d</sup>	2.4 ± 1.1	2.7 ± 1.1	0.159	0.214
E4 relationships <sup>d</sup>	2.5 ± 1.2	2.5 ± 1.2	0.939	0.012
E5 stressed <sup>d</sup>	2.9 ± 1.2	3.0 ± 1.2	0.649	0.069
<b>OAR scores<sup>a</sup> at 6 months</b>				
VAS appearance <sup>b</sup>	7.2 ± 1.9	8.0 ± 1.5	<b>0.002</b>	0.483
OAR sum score (range, 5-25) <sup>c</sup>	9.0 ± 4.1	7.5 ± 3.4	<b>0.005</b>	0.427
E1 concerned <sup>d</sup>	2.2 ± 1.1	1.7 ± 0.9	<b>&lt; 0.001</b>	0.629
E2 bothered <sup>d</sup>	2.0 ± 1.0	1.8 ± 0.9	<b>0.047</b>	0.303
E3 daily life <sup>d</sup>	1.6 ± 0.9	1.4 ± 0.8	0.112	0.241
E4 relationships <sup>d</sup>	1.6 ± 0.9	1.3 ± 0.7	<b>0.005</b>	0.427
E5 stressed <sup>d</sup>	1.6 ± 0.9	1.4 ± 0.8	0.184	0.202
<b>FACE-Q<sup>a</sup> (range, 0-100)<sup>e</sup></b>				
Satisfaction with outcome	59.7 ± 23.5	71.6 ± 23.0	<b>0.001</b>	0.514
Satisfaction with decision	65.3 ± 25.3	77.5 ± 22.7	<b>0.001</b>	0.529

The subgroup analysis stratified by cosmetic procedure in the past showed statistically significant differences in age, preoperative score E2, and postoperative VAS appearance, OAR sum score, E1, E2, E4, and FACE-Q scores. The effect size was between small to large. Statistically significant P-values ( $p < 0.05$ ) are shown in Bold font.

<sup>a</sup> Scores are mean ± standard deviation.

<sup>b</sup> VAS score: range, 0-10. Higher score indicates greater satisfaction with the appearance of the nose.

<sup>c</sup> OAR sum score: range, 5-25. Lower scores indicate higher quality-of-life and body image.

<sup>d</sup> E1 to E5: range, 1-5. Lower scores indicate higher quality-of-life and body image. E1. Are you concerned about the appearance of your nose? E2. Does this concern bother you often? E3. Does this concern affect your daily life (e.g., your work)? E4. Does this concern affect your relationships with others? E5. Do you feel stressed by the appearance of your nose?

<sup>e</sup> FACE-Q scales: range, 0-100. Higher scores indicate higher satisfaction.

<sup>f</sup> Effect size: interpreted according to Cohen's criteria; negligible,  $< 0.2$ ; small, 0.2; medium, 0.5; and large, 0.8 or Cliff's delta criteria; negligible  $< 0.147$ ; small, 0.147; medium, 0.33; large, 0.474.

male, overly expectant, and narcissistic) suggests being aware of this type of problematic patient.<sup>31</sup> Moreover, a recent systematic review, conducted by Herruer et al., identified male sex as a high-risk characteristic that has a negative influence on satisfaction after facial cosmetic surgery.<sup>29</sup> However, these generalizations do not address all male rhinoplasty patients, and setting realistic goals as well as having a clear understanding of the expectations could result in finding excellent candidates.<sup>30</sup>

As predicted, smoking status did not influence differences in patient-reported satisfaction. Regardless of advisement or requirement to stop smoking practices prior to elective plastic surgery, studies revealed that smoking status does not influence rhinoplasty outcomes.<sup>32,33</sup> However, it is suggested to keep advising patients to quit smoking to minimize the general systematic effects of cigarette smoking.<sup>34</sup> Intriguingly, alcohol consumption did not affect differences in patient-reported satisfaction. A possible explanation for this might be that only high consumption of alcohol was observed by Meyer et al. as a characteristic of patient dissatisfaction, and in the current study, the amount of alcohol consumption was not reported.<sup>25</sup>

This study might be considered to be limited since functional aspects were not reported. Previous studies have shown that general satisfaction and aesthetic evaluation in cosmetic rhinoplasty were significantly correlated with nasal breathing outcomes.<sup>35,36</sup> However, Ozturk et al. did not use a PROM to evaluate functional outcomes, and Radulesco et al. investigated patients who all had preoperative non-reversible nasal obstruction; thus, the correlation would not be surprising. It should be noted that in the present study, the main indication to undergo a rhinoplasty was due to aesthetics. Complementing the routine outcome measurement with a functional PROM would be interesting to comprehend the mechanism between the possible correlation between aesthetic rhinoplasty and functional outcomes and is recommended for future studies. Furthermore, it should be noted that no anthropometric measurements or surgical approaches were taken into consideration for this study. However, previous literature indicated no association between patient satisfaction and facial proportions or open and closed approach.<sup>37,38</sup> Another potential limitation is the low response rate due to the voluntary nature of completing routine outcome questionnaires. Patients may be motivated to



fill them out when dissatisfied or, conversely, when satisfied. However, comparing patient characteristics and baseline scores between completers and non-completers revealed no significant differences, suggesting the possibility of comparable outcomes.

Despite its limitations, the current study adds to a more comprehensive understanding of patient-reported satisfaction with appearance, treatment, and quality-of-life as well as which patients benefit more by undergoing rhinoplasty. The use of the patient-reported outcome scores during the first consultation with the surgeon could be helpful. The surgeon would be provided with adequate information for each individual and could help them to better understand the possible benefits of the procedure. Moreover, patients with certain characteristics who tend to be less satisfied could be screened and additional interventions could be applied to result in, for example, better expectation management.<sup>39,40</sup>

Future research should be undertaken to investigate which factors determine the variance in patient-reported satisfaction with appearance and quality-of-life after rhinoplasty and to understand how much of an impact these factors have on this variance. With these insights, specific additional support could be given to the surgeon to ensure sufficient information is communicated to the patients during preoperative consultation. This ultimately leads to providing more realistic expectations and greater patient-reported satisfaction and quality-of-life.

## Conclusion

With rhinoplasty being one of the most complex aesthetic procedures, it is crucial to measure outcomes from the patient's perspective to determine surgical success. Rhinoplasty is a beneficial procedure since the majority of patients showed greater satisfaction with appearance, treatment outcome, and quality-of-life postoperatively. Patient characteristics including older age ( $\geq 30$  years) and a positive cosmetic surgery history were less satisfied with their appearance, treatment outcome, and quality-of-life. These factors can be used during preoperative management of outcome expectations.

## Statement of ethical approval

Approved by the local Medical Ethics Review Committee (2020-6680).

## Conflicts of interest

None.

## Funding

None.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.bjps.2024.02.038](https://doi.org/10.1016/j.bjps.2024.02.038).

## References

- ISAPS International Survey on Aesthetic/Cosmetic Procedures Performed in 2021. International Society of Aesthetic Plastic Surgery (ISAPS). [Accessibility verified October 3, 2023]. ([https://www.isaps.org/media/vdpdanke/isaps-global-survey\\_2021.pdf](https://www.isaps.org/media/vdpdanke/isaps-global-survey_2021.pdf)).
- Chisholm E, Jallali N. Rhinoplasty and septorhinoplasty outcome evaluation. *Ear Nose Throat J* 2012;**91**(3):E10–4. <https://doi.org/10.1177/014556131209100315>.
- Rhee JS, McMullin BT. Outcome measures in facial plastic surgery: patient-reported and clinical efficacy measures. *Arch Facial Plast Surg* 2008;**10**(3):194–207. <https://doi.org/10.1001/archfaci.10.3.194>.
- Alderman A, Chung KC. Measuring outcomes in aesthetic surgery. *Clin Plast Surg* 2012;**40**(2):297–304.
- Sharma K, Steele K, Birks M, Jones G, Miller G. Patient-reported outcome measures in plastic surgery: an introduction and review of clinical applications. *Ann Plast Surg* 2019;**83**(3):247–52. <https://doi.org/10.1097/sap.0000000000001894>.
- Pusic AL, Lemaine V, Klassen AF, Scott AM, Cano SJ. Patient-reported outcome measures in plastic surgery: use and interpretation in evidence-based medicine. *Plast Reconstr Surg* 2011;**127**(3):1361–7. <https://doi.org/10.1097/PRS.0b013e3182063276>.
- Lohuis PJ, Hakim S, Duivesteijn W, Knobbe A, Tasman A-J. Benefits of a short, practical questionnaire to measure subjective perception of nasal appearance after aesthetic rhinoplasty. *Plast Reconstr Surg* 2013;**132**(6):913e–23e.
- Klassen AF, Cano SJ, Schwitzer JA, Scott AM, Pusic AL. FACE-Q scales for health-related quality of life, early life impact, satisfaction with outcomes, and decision to have treatment: development and validation. *Plast Reconstr Surg* 2015;**135**(2):375–86. <https://doi.org/10.1097/PRS.0000000000000895>.
- Ching S, Thoma A, McCabe RE, Antony MM. Measuring outcomes in aesthetic surgery: a comprehensive review of the literature. discussion 481-2 *Plast Reconstr Surg* 2003;**111**(1):469–80. <https://doi.org/10.1097/01.Prs.0000036041.67101.48>.
- Selles RW, Wouters RM, Poelstra R, et al. Routine health outcome measurement: development, design, and implementation of the hand and wrist cohort. *Plast Reconstr Surg* 2020;**146**(2):343–54. <https://doi.org/10.1097/PRS.00000000000007008>.
- Yang F, Liu Y, Xiao H, Li Y, Cun H, Zhao Y. Evaluation of preoperative and postoperative patient satisfaction and quality of life in patients undergoing rhinoplasty: a systematic review and meta-analysis. *Plast Reconstr Surg* 2018;**141**(3):603–11. <https://doi.org/10.1097/prs.0000000000004102>.
- Wähmann MS, Bulut OC, Bran GM, Veit JA, Riedel F. Systematic review of quality-of-life measurement after aesthetic rhinoplasty. *Aesthet Plast Surg* 2018;**42**(6):1635–47.
- Litner JA, Rotenberg BW, Dennis M, Adamson PA. Impact of cosmetic facial surgery on satisfaction with appearance and quality of life. *Arch Facial Plast Surg* 2008;**10**(2):79–83. <https://doi.org/10.1001/archfaci.10.2.79>.
- Bulut OC, Wallner F, Oladokun D, et al. Long-term quality of life changes after primary septorhinoplasty. *Qual Life Res* 2018;**27**(4):987–91. <https://doi.org/10.1007/s11136-017-1761-8>.
- Cingi C, Songu M, Bal C. Outcomes research in rhinoplasty: body image and quality of life. *Am J Rhinol Allergy* 2011;**25**(4):263–7. <https://doi.org/10.2500/ajra.2011.25.3649>.
- Cingi C, Eskizmir G. Deviated nose attenuates the degree of patient satisfaction and quality of life in rhinoplasty: a prospective controlled study. *Clin Otolaryngol* 2013;**38**(2):136–41. <https://doi.org/10.1111/coa.12099>.

17. Schwitzer JA, Albino FP, Mathis RK, Scott AM, Gamble L, Baker SB. Assessing demographic differences in patient-perceived improvement in facial appearance and quality of life following rhinoplasty. *Aesthet Surg J* 2015;**35**(7):784–93.
18. Howldar S, Fida A, Allinjawi O, Zaqzoog F, Qurban G. Long-term cosmetic and functional outcomes of rhinoplasty: a cross sectional study of patients' satisfaction. *Saudi J Otorhinolaryngol Head Neck Surg* 2018;**20**(1):1.
19. Koybasi S, Bicer YO, Seyhan S, Kesgin S. Satisfaction in rhinoplasty: the possible impact of anxiety and functional outcome. *Eur Arch Otorhinolaryngol* 2018;**275**(3):729–33. <https://doi.org/10.1007/s00405-017-4860-9>.
20. Arima LM, Velasco LC, Tiago RS. Influence of age on rhinoplasty outcomes evaluation: a preliminary study. *Aesthet Plast Surg* 2012;**36**(2):248–53. <https://doi.org/10.1007/s00266-011-9805-x>.
21. AlHarethy S, Al-Angari SS, Syouri F, Islam T, Jang YJ. Assessment of satisfaction based on age and gender in functional and aesthetic rhinoplasty. *Eur Arch Otorhinolaryngol* 2017;**274**(7):2809–12. <https://doi.org/10.1007/s00405-017-4566-z>.
22. Nicholls SG, Quach P, von Elm E, et al. The REporting of Studies Conducted Using Observational Routinely-Collected Health Data (RECORD) statement: methods for arriving at consensus and developing reporting guidelines. *PLoS One* 2015;**10**(5):e0125620. <https://doi.org/10.1371/journal.pone.0125620>.
23. GemsTracker. Erasmuc MC, Equipe Zorgbedrijven. [Accessibility verified October 3, 2023]. (<https://gemstracker.org>).
24. Pavri S, Zhu VZ, Steinbacher DM. Postoperative edema resolution following rhinoplasty: a three-dimensional morphometric assessment. *Plast Reconstr Surg* 2016;**138**(6):973e–9e.
25. Meyer L, Jacobsson S. The predictive validity of psychosocial factors for patients' acceptance of rhinoplasty. *Ann Plast Surg* 1986;**17**(6):513–20.
26. Cohen J. A power primer. *Psychol Bull* 1992;**112**(1):155–9. <https://doi.org/10.1037//0033-2909.112.1.155>.
27. Cliff N. *Ordinal Methods for Behavioral Data Analysis*. New York: Taylor & Francis; 1996. p. 1–197.
28. Andretto Amodeo C. The central role of the nose in the face and the psyche: review of the nose and the psyche. *Aesthet Plast Surg* 2007;**31**(4):406–10. <https://doi.org/10.1007/s00266-006-0241-2>.
29. Herruer JM, Prins JB, van Heerbeek N, Verhage-Damen G, Ingels K. Negative predictors for satisfaction in patients seeking facial cosmetic surgery: a systematic review. *Plast Reconstr Surg* 2015;**135**(6):1596–605. <https://doi.org/10.1097/prs.0000000000001264>.
30. Rohrich RJ, Mohan R. Male rhinoplasty: update. *Plast Reconstr Surg* 2020;**145**(4):744e–53e. <https://doi.org/10.1097/prs.0000000000006835>.
31. Gorney M. Criteria for patient selection: an ounce of prevention. Presented at the Residents and Fellows Forum, Aesthetic Plastic Surgery Annual Meeting; May 16, 2003 Boston.
32. Layliev J, Gupta V, Kaoutzanis C, et al. Incidence and pre-operative risk factors for major complications in aesthetic rhinoplasty: analysis of 4978 patients. *Aesthet Surg J* 2017;**37**(7):757–67. <https://doi.org/10.1093/asj/sjx023>.
33. Andrews JE, Jones NN, Moody MP, et al. Nasoseptal surgery outcomes in smokers and nonsmokers. *Facial Plast Surg Aesthet Med* 2021;**23**(4):283–8. <https://doi.org/10.1089/fpsam.2020.0349>.
34. Erol O, Koycu A. The effect of smoking on septoplasty and septorhinoplasty outcomes. *Aesthet Plast Surg* 2022;**46**(3):1378–84. <https://doi.org/10.1007/s00266-021-02683-9>.
35. Ozturk K, Gode S, Karahan C, Midilli R. Assessing the rhinoplasty outcome: Inter-rater variability of aesthetic perception in the light of objective facial analysis. *Eur Arch Otorhinolaryngol* 2015;**272**(12):3709–13. <https://doi.org/10.1007/s00405-015-3494-z>.
36. Radulesco T, Penicaud M, Santini L, Thomassin JM, Dessi P, Michel J. Outcomes of septorhinoplasty: a new approach comparing functional and aesthetic results. *Int J Oral Maxillofac Surg* 2018;**47**(2):175–9. <https://doi.org/10.1016/j.ijom.2017.09.002>.
37. Zojaji R, Sobhani E, Keshavarzmanesh M, Dehghan P, Meshkat M. The association between facial proportions and patient satisfaction after rhinoplasty: a prospective study. *Plast Surg (Oakv)* 2019;**27**(2):167–72. <https://doi.org/10.1177/2292550319826097>.
38. Gökçe Kütük S, Arıkan OK. Evaluation of the effects of open and closed rhinoplasty on the psychosocial stress level and quality of life of rhinoplasty patients. *J Plast Reconstr Aesthet Surg* 2019;**72**(8):1347–54. <https://doi.org/10.1016/j.bjps.2019.03.020>.
39. Barone M, Cogliandro A, La Monaca G, Tambone V, Persichetti P. Cognitive investigation study of patients admitted for cosmetic surgery: information, expectations, and consent for treatment. *Arch Plast Surg* 2015;**42**(1):46–51. <https://doi.org/10.5999/aps.2015.42.1.46>.
40. Steiger JD. The rhinoplasty consult. *Facial Plast Surg* 2011;**27**(05):393–6.