



Perception of Nasal Aesthetics: Nose or Face?

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Abstract

Background Aesthetic assessment of the nose might not be limited to the nose as an isolated facial unit but might be the result of a broader perception of the whole facial image. The aim of this study was to investigate if the aesthetic evaluation of a nose is made by sole observation of the nose or influenced by the other features of the face.

Methods Nose and face photographs of 20 voluntary models were taken from five different angles and merged into a single image of just the noses and whole faces of each model. First the nose and then the face photos were sent to a reviewer group consisting of 100 individuals from different professions to evaluate the nose's beauty on standard questionnaires with a four-week interval to complicate the recall process.

Results Aesthetic evaluation of the isolated nose (Group 1) and the nose with the whole face (Group 2) were compared through Visual Analog Scale (VAS) scores ranging from 1 to 10 (1: the least, 10: the highest). The mean VAS score of the Whole Face Group (5.26 ± 1.28) was significantly higher than the score of the Isolated Nose Group (4.50 ± 1.32) (p 0.001). There was no significant difference between the scores of reviewers considering their gender, profession, or experience of having an aesthetic operation previously.

Conclusion Current study revealed that in the evaluation of the beauty of the nose, the holistic perception of the face

is as important as the perfection of the angles and proportions within the nose itself.

Level of Evidence V This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Nasal aesthetics · Attractive nose · Facial attractiveness · Beauty perception · Facial features · Visual impression

Introduction

Perceptions of facial beauty vary between different cultures and change over time [1–5]. Classical definitions of beauty, as described by proportions, cannot be applicable to every patient [6, 7]. Harmony of the facial features appears to be the essential component of a beautiful face. Eyes, lips, chin, nose, and the shape of the face are the most rated facial features for attractiveness. Among these facial features, the nose, with its central position and prominence, has a significant impact on judging facial attractiveness [8]. Since the nose is subject to a high degree of observation, it becomes a critical anatomical structure in facial aesthetic surgery. It has also been reported that decreasing the nasal asymmetry leads to a significant improvement in facial attractiveness [9].

A standardization of an attractive nose appearance has been suggested by emphasizing certain proportions, lines, angles, and polygons [10–13]. Isolated evaluation of aesthetic sub-units of the nose may provide objective evidence for assessment of the technical results of rhinoplasty. However, beauty is a subjective notion, and the perceptions

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of the patient and the surgeon are affected by both objective and subjective factors. Beyond the ethnic and cultural differences, there is a marked discrepancy between the patients' and surgeons' judgements on the aesthetic results of rhinoplasty [14, 15]. The surgeons claimed to be more critical of rhinoplasty results than the patients in some studies [16–18], possibly because of their higher awareness of the technical aspects.

Cultural, ethnic, and occupational background, and a personal history of rhinoplasty may also alter the perception of facial aesthetics [19, 20]. Thus, an aesthetic assessment of the nose might not be limited to the nose itself as an isolated facial unit but might be the result of a broader perception of the whole facial image. While the nose is a critical facial structure that affects the appreciation of the whole face, the overall judgement of the whole face might also affect our assessment of the shape of the nose as well. Although the varying concepts of nasal aesthetics among different ethnicities have been documented in previous studies [21–23], to our knowledge, there are no previous studies evaluating the variability of nasal aesthetics perception with the interpretation of other facial features.

The purpose of this study was to investigate if only the nose is considered while making an aesthetic evaluation of the nose, or if other features of the face are considered as well.

Materials and Methods

This cohort study was conducted at Marmara University, School of Medicine, Department of Plastic Reconstructive and Aesthetic Surgery between April 2020 and June 2020. A written informed consent was obtained from each participant. The study protocol was approved by the Marmara University School of Medicine, Clinical Research Ethics Committee (No: 09.2020.469). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Photographs of 10 females and 10 males (*voluntary models*) were captured and sent to a reviewer group consisting of 100 individuals from different professions to evaluate the nose beauty. The inclusion criteria for the faces displayed in the photographs were as follows: age between 20 and 35 years, having no congenital or acquired facial deformity, no significant asymmetry of any of the facial features, having no nasal trauma leading to permanent deformity, having no previous rhinoplasty, having no facial aesthetic and/or cosmetic operation, and having no minimally invasive procedures such as botulinum toxin or dermal filler treatment, and none of them were well-known or familiar faces to the reviewers. Distinctive nasal features such as prominent hump, bulky or bulbous nasal tip, deep

radix, and over or under-projected nasal tip were also excluded. Four senior residents and four plastic surgeons examined the averageness of facial features as a preliminary selection. The models were not allowed to wear any jewelry, ornaments, make-up or tattoos. All photographs were taken by a single plastic surgeon in a room using the same background via a Canon EOS 750D (Canon Inc., Tokyo, Japan) camera (18–135 mm lens), with two 220 V/50 Hz soft-boxes, and tripod. Each model's full face was photographed from five different angles at a 2-meter distance from the camera. Two lateral, two 45° oblique, and one frontal photograph were captured with the head in an upright position. All models were instructed to stand, look at the prespecified points while rotating their heads, moving their heads with body rotation with eyes open and mouth closed and without an apparent facial expression.

Nose images were cropped from full-face images and nose-only photographs from five different angles of each model were merged as a single image (Fig. 1). The same procedure was applied to the full-face photographs (Fig. 2). All images were further divided into two gender subgroups of 10 female and 10 male models.

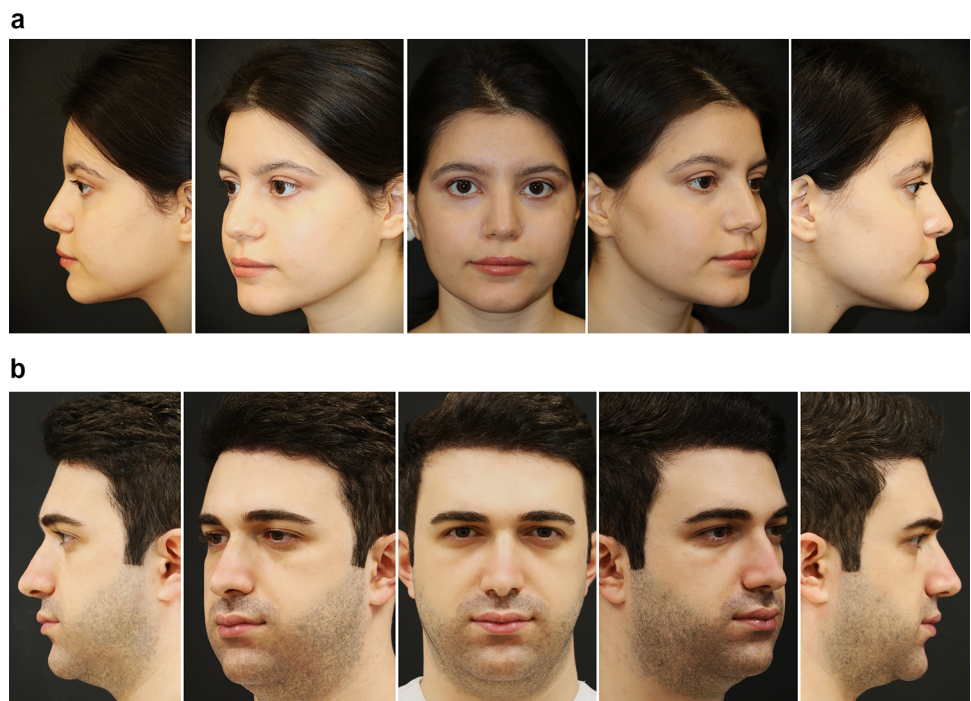
Two questionnaire forms were created using Google Forms (Google Inc., CA, USA). The Visual Analog Scale (VAS) scores ranging from 1 to 10 (1: the least, 10: the highest) were added to the bottom line of each image as the captions in Group 1 and Group 2. Reviewers were asked to rate the beauty of the noses quantitatively in photographs sent to them. These forms were sent to a total of 100 reviewers with a four-week interval to complicate the recall process [24, 25]. Since, the aim of this study was to evaluate the difference in opinions of the reviewers regarding the nose beauty when evaluated separately or combined with facial images, they were asked to respond to the first questionnaire consisting of Group 1(Nose) images and, then, to the second questionnaire consisting of Group 2 (Whole Face) images after a four-week interval. Both forms were available for 72 hours, and access was not permitted after 72 hours.

The reviewer group consisted of plastic surgeons, patients undergoing an aesthetic and/or cosmetic operation, and others. Plastic surgeons were selected from the members of the Turkish Society of Plastic Surgery with available contact information, while patients were selected from those who underwent an aesthetic procedure in our clinic. The others were randomly chosen for the study. The first 100 consecutive participants aged 20 to 65 years old who were fluent in Turkish and reached via text message or electronic mail and willing to participate in the study were included. All participants were informed about the nature of the study. Those with severe visual impairment or psychiatric illnesses such as schizophrenia were excluded from the study to strengthen the outcome reliability. All

Fig. 1 Nose photographs from five different angles of each model were merged into a single image and sent to the reviewer group to evaluate nose beauty. **a** A female model. **b** A male model



Fig. 2 Whole face photographs from five different angles of each model were also merged into a single image and sent to the reviewer group after a four-week interval to evaluate nose beauty again. **a** A female model. **b** A male model



reviewers were asked to evaluate the nasal beauty of Group 1 and Group 2 images based on their subjective perceptions using the VAS scores ranging from 1 to 10 (1 being the least, 10 being the highest).

Statistical Analysis

Statistical analysis was performed using the SPSS for Windows version 21.0 software (IBM Corp., Armonk, NY, USA). Descriptive data were expressed as mean standard deviation (SD), median (min-max), or number and frequency, where applicable. The normality assumption was checked using the Shapiro-Wilk test. The paired sample *t*-test was used to analyze dependent variables, while the independent sample *t*-test was carried out to analyze independent variables. The Cronbach alpha (α) value was calculated for the questionnaire to determine the reliability of the data. The Tukey's non-additivity test was conducted to determine whether the scale was collectable. The chi-square test was performed to analyze the results of the crosstab. A *p* value of 0.05 was considered statistically significant.

Results

The mean ages of 10 women and 10 men were 23.5 ± 1.9 years (*range*: 21 to 27 yrs) and 25.8 ± 3.7 years (*range*: 21 to 32 yrs) respectively, indicating no statistically significant difference between the two sexes ($p > 0.05$).

97 reviewers (53 females and 44 males) out of 100, completed the questionnaire and were included in the study. The mean age of the reviewers was 40.8 ± 0.89 (range, 22 to 63) years. Demographic characteristics of the reviewers including age, sex, and profession or experience are summarized in Table 2.

The validity and reliability studies of a total of 20 items in the scale in both groups were carried out the Cronbach's α (α) was calculated as 0.955. According to the coefficient of Cronbach α table, the scale had an excellent reliability ($\alpha \geq 0.95$) [26].

Aesthetic evaluation of the isolated nose (Group 1) and aesthetic evaluation of the nose with the whole face (Group 2) were compared. The mean VAS score of Group 1 (*Nose*) was 4.50 ± 1.32 while the score of Group 2 (*Whole Face*) was 5.26 ± 1.28 . The difference is statistically significant ($p < 0.001$).

The mean VAS scores of Group 1 (*Nose*) and Group 2 (*Whole Face*) are shown in Table 1. There was no difference between the scores of male and female models ($p < 0.001$).

The VAS scores given by the reviewers to evaluate the nose was higher in all groups when the whole face was seen. There was no significant difference between the VAS scores of male and female reviewers ($p > 0.05$) and, there was also no significant effect of being a plastic surgeon or having an aesthetic and/or cosmetic operation as a reviewer.

Discussion

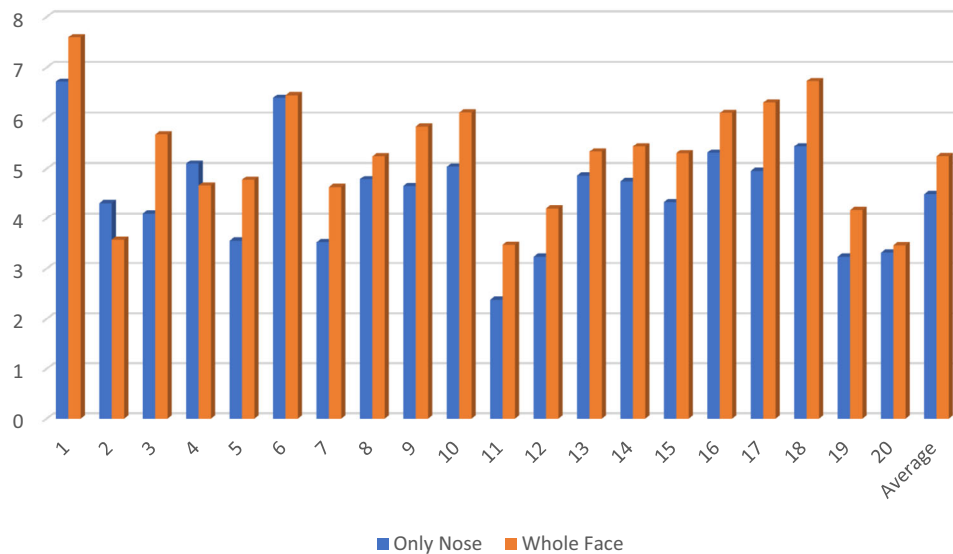
The nose is one of the dominant landmarks that influence the observer's visual impression of the face [27]. A deformed nose has been reported to receive significant attention, which leads to a negative perception and even personality traits [28]. Rhinoplasty is one of the most commonly performed cosmetic procedures [29, 30] and, not surprisingly, has favorable effects on a number of psychometric parameters, leading to restored self-confidence and major life changes [19, 31]. However, it is not clear whether these positive effects of rhinoplasty are always due to technical success in reaching the aesthetic ideals of a beautiful nose or to the decreased negative stigma of a deformed nose on a pretty face. Or, on the contrary, even the optimal result of rhinoplasty might not satisfy the patient [14] when any negative stigmata disrupting the aesthetic harmony in other parts of the face are ignored. This dilemma led us to conduct this study, and our findings revealed that the latter opinion, the aesthetic evaluation of the nose being influenced by the rest of the features of the face, became the stronger claim. Even

Table 1 Distribution of the reviewers ($n = 97$) by occupation (*plastic surgeon or not*), undergone to any cosmetic surgery previously or not, and their gender (*female or male*)

	Occupation		Cosmetic operation		Gender	
	Plastic surgeon	Others	Yes	No	Female	Male
n (%)	37 (%38.1)	60 (%61.9)	37 (%38.1)	60 (%61.9)	53 (%54.6)	44 (%45.4)
Average age (\pm SD)	42.59 (\pm 9.03)	39.70 (\pm 8.52)	37.78 (\pm 8.75)	42.66 (\pm 8.35)	41.30 (\pm 6.65)	40.20 (\pm 10.87)
	$p = 0.116$		$p = 0.007^*$		$p = 0.561$	

SD Standard deviation

* $p < 0.05$ statically significant

Table 2 Correlation of VAS (*Visual Analog Scale*) score data (from 0 to 10) for nasal beauty in photographs with the Only Nose (*Group 1*) and nasal beauty in photographs with the Whole Face (*Group 2*) ($p=0,001$)*.

* $p<0,001$ statistically significant

though this possibility has been already mentioned previously by the professionals, to our knowledge no other study examined this subject by comparing the numerical scores. In this respect, the findings of our study provide complementary objective data on it.

Previous studies support an opposite interaction between the aesthetic evaluation of the nose and the face. Mikalsen et al., pointed out that the sense of attractiveness is affected by the position of the nose [32]. Also, Zhang et al. recorded the eye movements of female and male participants on selected photographs in order to explore the anatomic regions that contribute information to the judgment of facial attractiveness and noted that the nose is vital in the judgment of female facial attractiveness [8]. Although the nose has been emphasized as a prominent marker in the judgement of facial attractiveness, aesthetical evaluation was not specifically focused on the nose but the whole face in these studies. Harmony of facial features—the optimal relationship between the proportions of craniofacial units—is the key to an attractive face [33–37]. It has also been demonstrated that the eyes, mouth, and ears are the primary focus of attention on an unfamiliar face. However, the primary focus of attention can easily move to another facial feature in the presence of a pronounced defect or asymmetry. Since the nose is a prominent organ in the middle of the face, its deviations, asymmetries, or aesthetic deformities are easily observed, which might lead to a decrease in the overall aesthetic perception of the face [28, 38]. Or, on the contrary, the aesthetic perception of an

average nose might be overrated when compared to its isolated aesthetic evaluation in the absence of harmonious facial features.

The noses were rated with higher scores when the unfamiliar [39], youthful [40] whole faces were visible to the reviewers, regardless of their professional, experiential, or gender background. Thus, it can be possible to comment that, in the absence of any stigma on the face, an average unoperated nose or an average outcome of a rhinoplasty operation can be rated higher if the other facial features are in harmony. Or, in an unhappy scenario, any stigma or disharmony of other facial features might have a negative impact on the aesthetic evaluation of the nose. The latter might be the reason why patient satisfaction is generally lower following a rhinoplasty operation when compared to other cosmetic operations [41]. Patients might be unaware or underestimate the negative impact of their own facial features such as orthognathic deformities or skin and soft tissue problems when seeking a rhinoplasty operation and might not have realistic expectations. Their aesthetic demands might also be complicated with the contemporary technological tools such as social media. Thus, a preoperative analysis of the whole face including a careful interview with the patient is especially important to understand the patient expectations and to predict the possible outcome. If necessary, additional aesthetic procedures combined with rhinoplasty [42–44] might improve the harmony of facial units and might increase patient satisfaction.

There is no significant difference between the reviewers in evaluating the beauty of the nose and face. Evaluation of beauty is a subjective process and VAS scoring is a simple instrument to quantify the opinions of reviewers. Although the VAS scores given by the plastic surgeons are lower than those of the other participants, that difference is not statistically significant. The evaluation of rhinoplasty results by surgeons and patients has yielded conflicting results. In comparison with surgeons, rhinoplasty patients downgraded the shape of their own noses, according to Bonne et al. [15], and Guyuron and Bokhari emphasized the challenge of pleasing male patients [14]. In the study by Tobin and Webster [45], however, surgeons were found to be more critical than patients who rated other people's noses. In our study patients and surgeons appeared to have similar opinions on the aesthetic evaluation of the noses and it is interesting to find that plastic surgeons do not have a different concept of beauty than the general public. The surgeons' opinion, on the other hand, was still more critical, though not statistically significant.

A critical group of reviewers included patients who had already undergone an aesthetic procedure. Their evaluation deserves special attention. It has been reported that cleft patients who have had a cleft rhinoplasty procedure give better facial aesthetics scores than professionals when evaluating their own outcomes [46]. This might not be solid evidence since cleft surgery, unlike cosmetic rhinoplasty, has a functional dimension to correct a significant deformity on the face. On the other hand, cosmetic rhinoplasty patients gave lower scores to their own noses in the pre-op and post-op periods compared to surgeons [15]. The reviewers of our study had been selected among patients who had previously experienced pure cosmetic facial operations. It is interesting to note that we did not find any significant difference in the perception of nasal aesthetics between professionals, aesthetic surgery experienced reviewers and lay people in our present study. The opinion of our reviewers might be more tolerant since there was no real assessment of operated noses and there was no need for an assertive discussion of a given rhinoplasty outcome. Although patient satisfaction is generally accepted as a primary outcome measure of success in aesthetic procedures, the patient's own assessment may also be influenced by social environment, education, life experience, and level of expectations [47, 48]. Hence, it may not be all that realistic during the early operative period and may also vary during the long term.

The main limitation of this study is that the reviewers' comments were made on the static photographs of the models. The nose and face are dynamic elements which are livened up by the movements of facial musculature. Especially, the eyes might have greater influence to the attractiveness of a face in a live situation than only in a photo.

So, these interpretations might not be fully adapted to real-life conditions. Another limitation of the study is that professional comments are limited to plastic surgeons. Comments from beauticians may also be valuable in this regard.

In conclusion, our study supports the opinion that in the evaluation of the beauty of the nose, the holistic perception of the face is as important as the perfection of the angles and proportions within the nose itself. Although this emphasis has generally been made, it was not based on any objective research and the results of our study prove this to be a meaningful claim.

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Declarations

Conflict of interest The authors declare that they have no conflicts of interest to disclose.

Disclosures None.

Human or Animal Participants This article does not contain any studies with human participants or animals performed by any of the authors other than the evaluation of nose beauty on pictures of voluntary participants and a written informed consent was obtained from each participant whose faces and noses have been evaluated by the reviewers.

Ethical Committee The study protocol was approved by the Marmara University School of Medicine, Clinical Research Ethics Committee (No: 09.2020.469). The study was conducted in accordance with the principles of the Declaration of Helsinki.

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