anatomy
An International Journal of Experimental and Clinical Anatomy
http://dergipark.org.tr/en/pub/anatomy

Original Article

http://dergipark.org.tr/en/pub/anatomy
Received: March 10, 2023; Accepted: July 28, 2023
doi:10.2399/ana.23.1393798

Unlocking nasal angle anthropometry and nasolabial angle preferences: a key to achieve the perfect rhinoplasty

Niymet Pelin Çavdar Yılmaz[1], Ceren Bay[2], İrem Nur Yılmaz[2], Orhun Kelsaka[2], Fatma Nur Ok[2], Aslı Ateş[2], Ebubekir Demirtaş[2], İbrahim Tekdemir[1]

[1]*Department of Anatomy, Faculty of Medicine, Ankara University, Ankara, Türkiye*
[2]*Faculty of Medicine, Ankara University, Ankara, Türkiye*

Abstract

Objectives: Determining the ideal nasolabial angle is very important for setting aesthetic goals in rhinoplasty. By knowing the demographic data of the three main nasal angles, which are the key to facial balance, indications, planning and peroperative evaluations of surgery can be better applied. The aim of this study was not only to measure nasal angles but also to find out the nasolabial angle preferences of the Anatolian population.

Methods: 142 participants had their nasal angles (nasolabial, nasofrontal, nasofacial angles) measured both digitally and manually and a questionnaire was administered. Each participant was asked about their ideal nasolabial angle preferences and their propensity for rhinoplasty. The results were then compared between each other, age and gender.

Results: According to digital measurements, the mean nasolabial angle was 99.51±9.51° in men and 100.49±9.37° in women. The mean nasofacial angle was 32.35±3.44° mm in men and 32.54±3.17° in women. The mean nasofrontal angle was 138.49±9.29° in men and 141.64±8.10° in women. Manual measurements were similar. The mean ideal nasolabial angle in women (91.32±6.11°) was lower than the mean ideal nasolabial angle in men (94.78±4.47°). It was observed that the aesthetic perception of the participants was similar whether they had rhinoplasty or not. Participants aged less than 24 years were more likely to prefer higher nasolabial angles.

Conclusion: The nasal angles and preferred nasolabial angle results presented in this study may be useful in planning and evaluating rhinoplasty operations.

Keywords: ideal nasolabial angle; nasofacial angle; nasofrontal angle; nasolabial angle; photogrammetry; rhinoplasty

Anatomy 2023;17(2):70–81

Introduction

Located in the middle part of the facial profile, the nose gives the face its characteristic features and is associated with facial symmetry.[1] Considering that the nose is a very important aesthetic structure, rhinoplasty is one of the most popular operations in plastic and maxillofacial surgery. Although rhinoplasty, whether surgery or filler injection, is one of the most preferred medical aesthetic procedures in the Anatolian population, information on nasal angle morphometry and the ideal optimum for nasal angles in the population is still lacking in the literature.[2]

The nose varies greatly between people in terms of shape, size and anthropometric measurements. In addition, according to some researchers, ethnic diversity is important for rhinoplasty operations.[3] These differences affect the preferred profile. The preferred profile may also vary with beauty standards, aesthetic views of the society and personal preferences.[4]

Considering the patients' complaints, which range from functional limitations to compromised aesthetics, it is clear that the final results of rhinoplasty should be considered when planning the surgery.[5] Surgery can be effective if it gets as close as possible to the patient's goal through the incorporation of computer imaging into planning and

Table 1
Number and classification of participants in surveys and evaluations.

	Participant with history of fascial/nasal trauma	Participant with history of nasal aestetic	Other participants	Total
Survey	18	9	116	142
Evaluations	-	-	116	116

intraoperative manual anthropometric measurements. However, information on the consistency between manual measurements and digital planning is lacking in the literature. The clinician performing rhinoplasty should know both the standardized norms of ideal aesthetics in nasal anthropometry and the patient's aesthetic outcome and should apply this without subjective correction. However, it is essential to know the angles used for aesthetic facial assessment; predictable guidelines are not available.[6]

Nasal angles are clearly the most important morphometric features for facial aesthetics. There are important angles for deciding what is an aesthetically pleasing nose and what is the most satisfactory nose according to personal preferences. The nasofrontal angle to define the junction of the forehead and nose, the nasofacial angle to measure the height of the nasal cartilage and nasal dorsum, the nasolabial angle to relate the tip of the nose and the lips are used in nasal analysis before rhinoplasty surgeries to achieve an aesthetic appearance because they are easy to measure.[7]

The aim of this study was to investigate the nasal angle morphometry and ideal nasolabial angle preferences of the Anatolian population. It was also aimed to provide clinicians with a new perspective, to contribute to the literature with anthropometric measurement of nasofrontal, nasofacial and nasolabial angles and to investigate whether there is a difference between digital and manual measurements.

Materials and Methods

This study was conducted on an Anatolian population consisting of 142 participants, 71 females and 71 males, aged 18–35 years. Participants were selected from Ankara University Faculty of Medicine students and research assistants. The study was conducted in the Department of Anatomy between February 2023 and May 2023. Exclusion criteria were age below 18 or above 35 years, history of facial or nasal trauma, and aesthetic surgery. Participants who had nasal trauma or nasal surgery were just asked to fill out a questionnaire to examine the differences in nasal angle preference between the surgery/trauma and non-surgery/non-trauma groups. Of the 142 total participants, 116 had their nasal angle morphometry assessed and were asked to participate in the survey, 9 had a history of plastic surgery and 18 had a history of trauma. Thus, 27 participants were only asked to participate in the survey (**Table 1**).

We studied on three different nasal angles: nasofacial, nasolabial and nasofrontal angles. Six landmarks were identified for measurements. All landmarks were demostrated on **Figure 1**.

- **Nasolabial angle (NLA):** The angle between the line connecting the pronasale (the most prominent anterior point on the tip of the nose) and subnasale (the midpoint at the base of the columella) points and the line connecting the subnasale and labialis superior points.

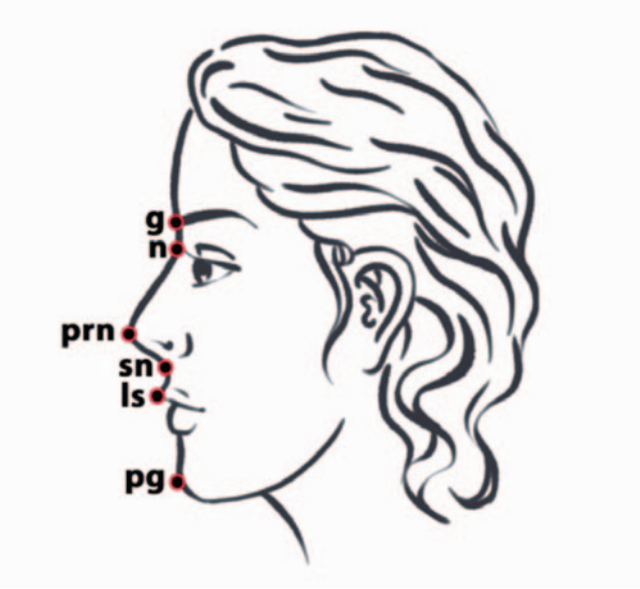

Figure 1. Six landmarks for measurements are shown. **g:** glabella (smooth prominence between the eyebrows); **ls:** labium superior; **n:** nasion (the midpoint of the frontonasal suture), **prn:** pronasale (the most prominent anterior point on the tip of the nose); **sn:** subnasale (the midpoint at the base of the columella); **pg:** pogonion (the most prominent median point on the anterior surface of the chin).

- **Nasofrontal angle (NFA):** The angle between the line connecting the glabella and nasion points and the line connecting the dorsum nasi and nasion points.
- **Nasofacial angle (NFcA):** The angle between the line connecting the glabella and pogonion points and the line connecting the pronasal and nasion points.[4,8]

Nasal angles were demostrated on **Figure 2**.

The first step was to measure the anthropometric nasal angles. We used two methods for measurements: manual and digital. Each participant was asked to hold their head at a natural head position, supported with self balance and mirror method and Frankfurt horizontal plane (FHP) parallel to the ground.[9]

Anthropometric measurements were compatible with Farkas' description.[10] A goniometer was used for manual measurements. The nasal angles of the participants were measured twice by the same researcher and the average of the two measurements was taken for the result. For photogrammetric measurements, each patient gave written consent to have their photographs taken by signing an informed consent form. Photographs of the patients were taken with a ruler to ensure photographic standardization. All photographs were taken with a camera (Canon SX10, Canon) and a tripod placed 1.5 meters away from the participant while facing away from the participants' left profile. Photoshop CS4 (Adobe Systems, Inc., San Jose, CA, USA) was used to evaluate the angles in the photographs. The photographs were reviewed and facial landmarks were identified. The facial angles and landmarks were reviewed by a co-author and both reviewers agreed on the facial angles.

In the second step, participants were asked to take a survey that consists of twelve questions (**Table 2**) Information such as whether they had undergone any previous plastic surgery or facial trauma was also included in the questions. Through this questionnaire, we asked our participants which nasolabial angle they found more attractive among six photographs of the same woman with different nasolabial angles (85, 90, 95, 100, 105, 110°) created with Photoshop CS4 (Adobe Systems, Inc., San Jose, CA, USA). This process was repeated on another group of male photographs. Participants chose which nose they preferred. The photos are shown in **Figure 3**.

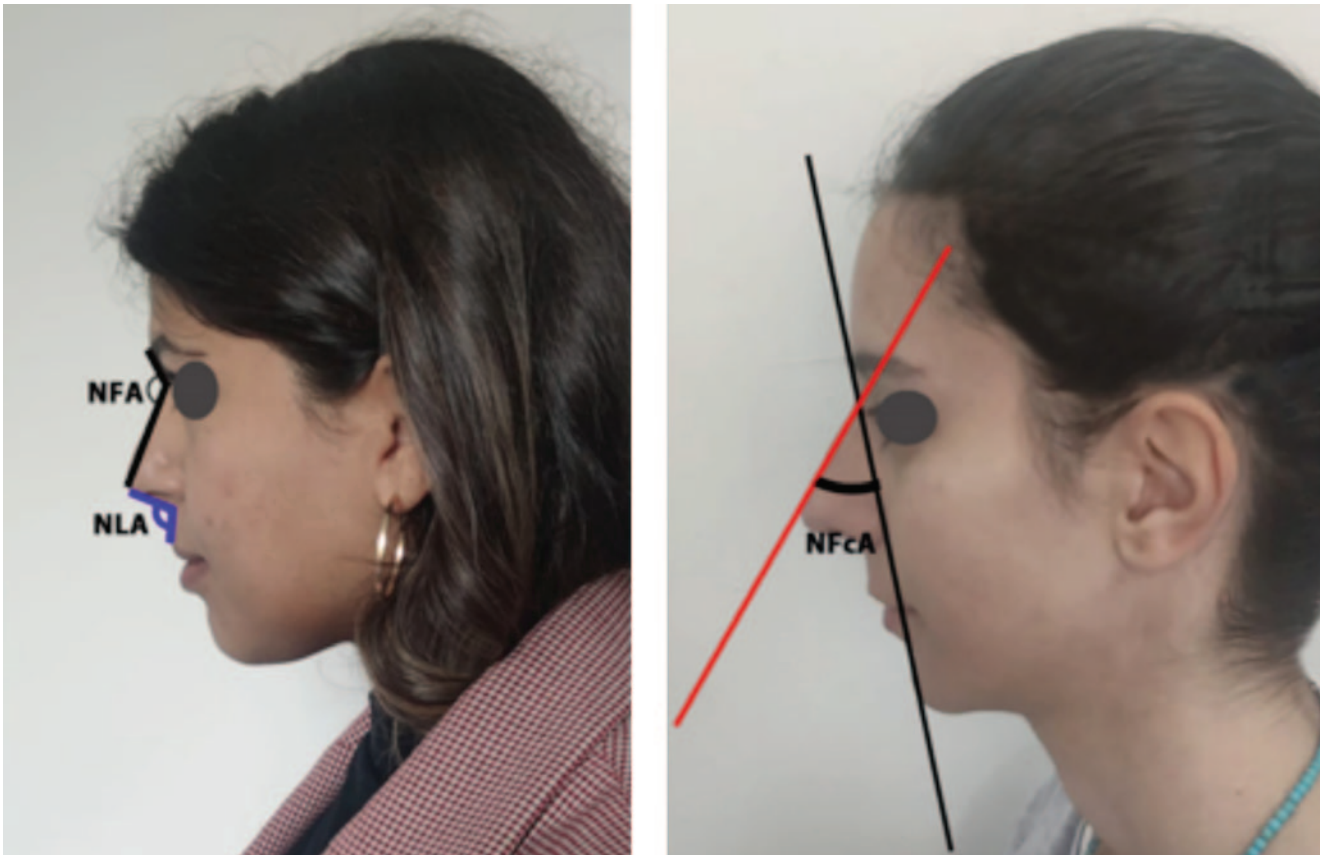

Figure 2. Nasal angle measurements are shown. **NFA:** nasofrontal angle; **NFcA:** nasofacial angle; **NLA:** nasolabial angle.

Table 2
Survey questions.

Participant Information and Approval Form
Name/Surname
Phone number
Age
Gender
Have you had a rhinoplasty operation before?
If you had, could you mention what was it and what was the content of operation?
Do you like the appearance of your nose?
Do the people around you like the appearance of your nose?
Would you consider having a rhinoplasty operation to change the appearance of your nose?
Down below, there are photos of a volunteer female's nasolabial angle modified by 5 degrees. Which one do you think is more appealing to eye?
Down below, there are photos of a volunteer male's nasolabial angle modified by 5 degrees. Which one do you think is more appealing to eye?

The statistical analyses were performed using SPSS version 26 (Statistical Package for the Social Sciences, IBM Inc., Chicago, IL, USA). Age (Mann-Whitney U p=0.83), history of rhinoplasty (χ^2=0.12, df=1, p=0.73), history of other plastic surgery (χ^2=3.06, df=1, p=0.08), and history of facial trauma (χ^2=2.29, df=1, p=0.13) were statistically unrelated. Descriptive statistics such as frequency and percentage, mean and standard deviation, and median (minimum and maximum) were calculated. Paired t-tests were used to compare mean nasal angle measurements between men and women. Except for the age variable, all other consistent variables were normally distributed in the Shapiro-Wilk normality test. A p-value <0.05 was considered statistically significant.

Results

According to digital measurements, the mean nasolabial angle was 99.51±9.51° in men and 100.49±9.37° in women. The mean nasofacial angle was 32.35±3.44° in men and 32.54±3.17° in women. The mean nasofrontal angle was 138.49±9.29° in men and 141.64±8.10° in women. The ideal nasolabial angle was 94.78±4.47° for men and 91.32±6.11° for women.

According to the manual results, the mean nasolabial angle was 96.02±10.48° for men and 98.36±8.65° for women. The mean nasofacial angle was 34.05±4.21° in men and 35.22±4.67° in women. The mean nasofrontal angle was 136.49±10.19° in men and 139.97±8.96° in women. Both digital and manual results of nasolabial and nasofrontal angles were shown to be very similar (independent t-test p=0.56), but the differences in nasofacial angle measurements were not statistically significant (p=0.03) (**Table 3**).

After anthropometric measurements and statistical analyses were performed by our team, it was calculated that the nasofrontal angle was higher in females

Table 3
The differences between digital and manual measurements by gender. The results are given as mean±standart deviation (SD).

	Male	Female	p-value
n	58	58	
Digital measurement results of the mean nasofacial angle	32.35±3.44°	32.54±3.17°	0.03 (t-test)
Manual measurement results of the mean nasofacial angle	34.05±4.21°	35.22±4.67°	0.03 (t-test)
Digital measurement results of the mean nasolabial angle	99.51±9.51°	100.49±9.37°	0.56 (t-test)
Manual measurement results of the mean nasolabial angle	96.02±10.48°	98.36±8.65°	0.56 (t-test)
Digital measurement results of the mean nasofrontal angle	138.49±9.29°	141.64±8.10°	0.59 (t-test)
Manual measurement results of the mean nasofrontal angle	136.49±10.19°	139.97±8.96°	0.59 (t-test)

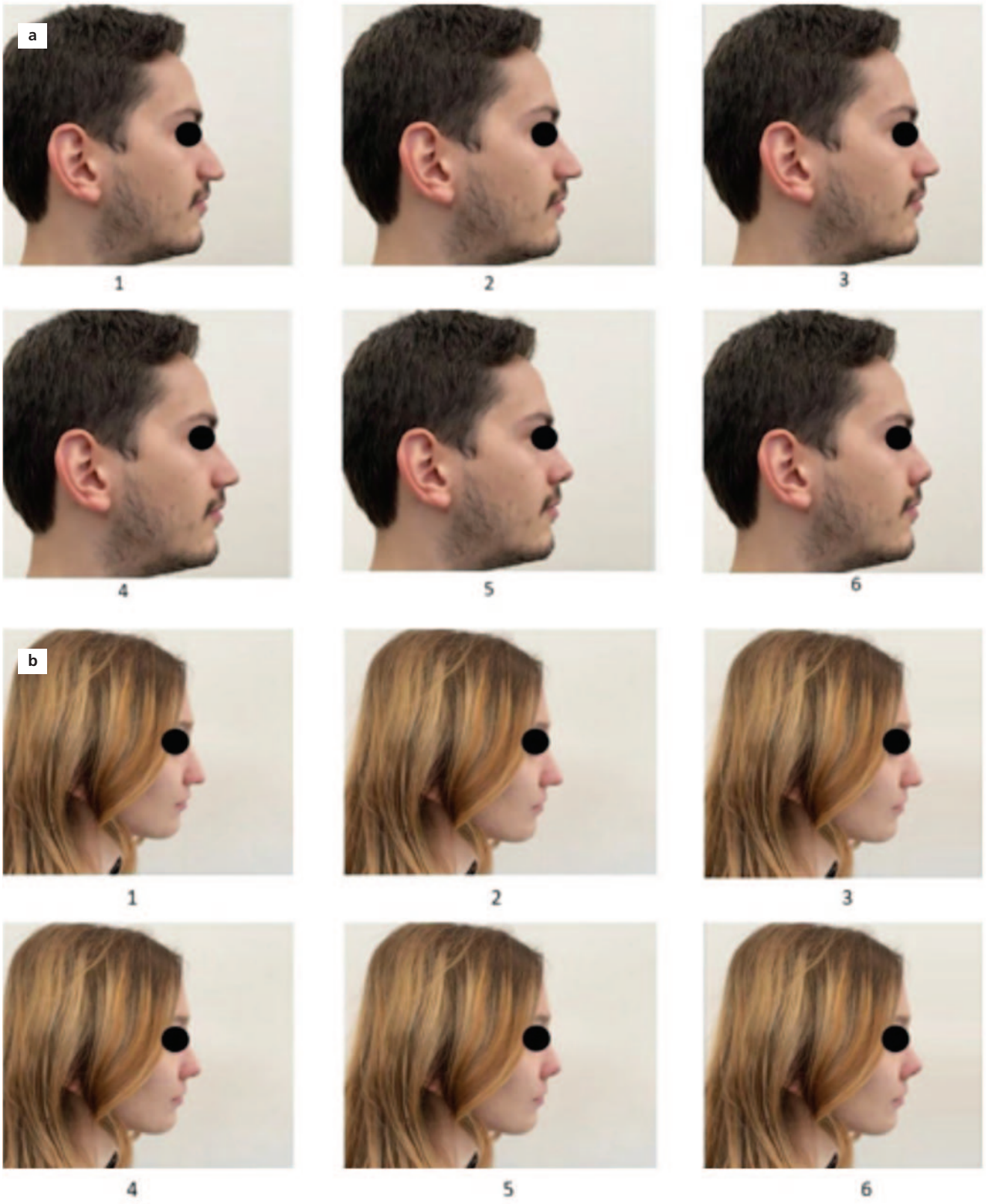

Figure 3. Photographes used for the survey of ideal nasolabial angle preference. The nasolabial angle was altered by 5 degrees (85, 90, 95, 100, 105, 110°) on the photograph of the same individuals with Photoshop CS4 (Adobe Systems, Inc., San Jose, CA, USA). (**a**) man; (**b**) woman. (**1**) 85 degrees; (**2**): 90 degrees; (**3**): 95 degrees; (**4**): 100 degrees; (**5**):105 degrees; (**6**): 110 degrees.

Table 4
Descriptive statistical analysis by gender.

	Male	Female	p-value
n	58	58	
Age			
Mean±SD	21.26±2.38°	21.21±1.9°	0.86 (MWU)
Median (min-max)	21 (18–31)	21 (18–35)	
Nasofacial angle			
Mean±SD	32.35±3.44°	32.54±3.17°	0.59 (t-test)
Median (min-max)	32 (26–42)	33 (25–39)	
Nasolabial angle			
Mean±SD	99.51±9.51°	100.49±9.37°	0.56 (t-test)
Median (min-max)	100 (68–117)	101 (81–121)	
Nasofrontal angle			
Mean±SD	138.49±9.29°	141.64±8.10°	0.03 (t-test)
Median (min-max)	137.50 (119–156)	141 (125–164)	

MWU: Mann-Whitney U test.

(32.54±3.17°) than in males (32.35±3.44°) (independent t-test p=0.03). In addition, nasofacial angles (independent t-test p=0.59) and nasolabial angles (independent t-test p=0.56) were independent of each other (**Table 4**). The mean ideal nasolabial angle in women (91.32±6.11°) was lower than the mean ideal nasolabial angle in men (94.78±4.47°) (p=9x10–8). And this difference between them is less than 5 degrees.

The tendency of the participants to rhinoplasty was calculated as 1.9 out of 5 in the population. Accordingly: participants are less likely to have a rhinoplasty. In addition, each participant's likelihood of having rhinoplasty did not change depending on whether the difference between their own nasolabial angle and their preferred nasolabial angle was above or below 5 degrees (p=0.39) Participants' aesthetic perception was similar with or without rhinoplasty (**Table 5**).

Although it was concluded that the mean ideal nasal angle preference of participants who had undergone rhinoplasty (93.89°) was higher than that of participants who had not undergone rhinoplasty (93.27°), it was statistically insignificant (independent t-test p=0.74).

It was found that there was a difference between the average ideal nasolabial angle preference of the participants who had not undergone nasal surgery and their own nasolabial angle measurements (11.76°). However, this was not statistically significant.

Our results suggest that participants under 24 years of age were more likely to prefer higher nasolabial angles, but this result was not statistically significant (p=0.14).

Discussion

Human nose consists of a lot of landmarks which reveals a wide range of measurements and angles.[10] Therefore there are a lot of components to take into account when describing and performing surgery to achieve an ideal nose shape. Nasal angles are essential shape components which provide facial aestetic and symmetry. The nasolabial angle is one of the key parameter and the most common angle used for planning and controlling the

Table 5
Impact of the difference between the preferred and present nasal angles to surgery choice.

Questionnaire	Desired nose - current difference	N	Mean	SD
Would you consider having surgery to change the appearance of your nose?	≥5	105	1.95	1.243
	<5	37	1.76	1.065

SD: standard deviation.

rhinoplasty.[11–14] While there are researches who define the ideal nasolabial angle, these definitions are broad and surgeries rely more on the subjective judgement of the surgeon rather than the literature.[14] The ideal nasolabial angle is described in the literature in a very large range as between 90 and 120 degrees.[15] But, it is also important for the operation success and patient satisfaction to know about the population's preference for that angle. Hence, present study have searched not only the Anatolian population's morphometric measurements of nasal angles but also their choices about the ideal nasolabial angle. Because of the majority of the participants of the present study are university students who come from different regions of Anatolia, the results represents the entire country. Since the common usage of nasolabial angle for the preparation and controlling of the surgery and that was founded the only parameter which has a consistency between the average and published aesthetic ideals, only the nasolabial angle were chosen for the survey in the study.[16]

Previous studies have searched for the ideal nasolabial angle preference in different ethnic groups[11,12,14,15,17–19] (**Table 6**). Brown and Guyuron[14] found the ideal nasolabial angle for men as 95.6±2.7°, for women as 98.5±2.6. The ideal nasolabial angle was found to be 94.78±6.47° for men and 91.32±6.11° for women. Brown and Guyuron[14] studied only 10 men and 10 women and a multicultural sample group. The racial difference and small sample size may account for the large difference between the ideal nasolabial angle measurements for women. In another study conducted by Alharethy et al.[11] with 506 male and 521 female Saudi Arabians, the ideal nasolabial angle for men was 89.39±3.66° and 90.62±5.15° for women. These are relatively closer to our results. However, our results are lower than the other studies in the table. This may be due to ethnic differences.

The preferences of the Anatolian population are missing in the literature. The ideal nasolabial angle preferences of the Anatolian population were evaluated for the first time in this study. We also investigated how the ideal nasolabial angle affects people's opinions about rhinoplasty. Our study is the first to evaluate three nasal angles and the ideal nasolabial angle together in both men and women. It is also the first study to show how facial trauma or undergoing rhinoplasty affects ideal nasolabial angle preferences. We compared our results between genders and ages. In the present study the main three nasal angles were evaluated: nasolabial, nasofrontal and nasofacial angle. Nasal angles are one of the most important and significant components of the nose when deciding the ideal nose shape. There are some previous studies that worked on nasal angles before[4,7,8,10,11,14–16,20–42] (**Table 7**). In a general comparison between previous studies with present study including different races the

Table 6
The ideal nasolabial angle (NLA) preference in previous studies and present study.

Study	Year	Age	Ethnicity	Sample size	Ideal NLA (degree) (women)	Ideal NLA (degree) (men)
Alshawaf et al.[12]	2023	20–39	Canadian Saudi Kuwaiti Lebanese	197	109.5±5.32	97.1±6.39
Sinno et al.[15]	2014	18–70	Caucasian African Americans Asians Native Americans	98	104.9±4.0	97.0±6.3
Patel et al.[18]	2012		Indian American	35	101.6	
Tavakoli et al.[19]	2023	<18–>65	Iranian	203	133.55±4.53	137.64±4.20
Alharethy et al.[11]*	2017	21.84±1.2	Middle Eastern	1027	Male 90.8°±5.6° Female 90.5°±4.8°	Male 89.5°±3.5° Female 89.3°±3.8°
Patel et al.[17]	2023		Multicultural	177		
Brown et al.[14]	2012		Multicultural	28	98.5±2.6	95.6±2.7
Present study	2023	18–35	Turkish	142	91.32±6.11	94.78±4.47

*In this study, participants were asked which angle they preferred for both men and women and the results were divided into two categories. **NLA:** nasolabial angle.

Table 7
Comparison with previous studies and present study according to the results of nasal angles.

Study	Population	n	Age	Method	NFA-degree		NFcA-degree		NBA-degree		Preferred NLA	
					M	F	M	F	M	F	M	F
Mohammed Ali[35]	Egyptians	M:500 F:500	20–70	2D	138.10±9.28	142.51±9.50	39.51±6.26	38.47±6.44				
Oghenemavwe et al.[37]	Urhobos (Nigeria)	M:60 F:60	18–35	Direct	117.75±9.07	127.85±9.50	40.77±6.29	35.60±7.46				
Fariaby et al.[29]	Iranian	M:50 F:50	20	2D	126±9	134±8	36±4	36±3	97±11	98±10		
Al-Qattan et al.[20]	Saudi Arabian	M:104 F:105	18–27	2D	135.9±9.6	145.9±6.1	41.4±6.8	33.3±4.1	100.4±16.4	102.3±10.0		
Aung et al.[23]	Chinese	M:45 F:45	3D	137.43±8.10	139.09±7.65			99.91±12.65	97.71±9.69			
Baik et al.[24]	Korean	M:30 F:30	21–27	3D	141.59±4.86	146.67±5.59	29.19±2.47	29.59±3.06				
Choe et al.[27]	Korean American	F:72	18–35	2D		136.8±6.4		32.3±5.1		92.1±9.2		
Elsamny et al.[28]	Egyptian	M:300	18–23	2D	144.0±7.2		33.1±2.9		104.5±11.2			
Farkas et al.[10]	North American Caucasian	F: 34				133.9±6.5				102.1±8.2		
Gode et al.[30]	Turkish	M:20 F:20	23.9 (19–35)	2D	143.3±8.3	140.9±7.5			103.1±5.3	119.2±9.7		
Leong and White[33]	Chinese Caucasian	54 50	18–55	2D 2D	129.3±6.5 129±10.4	136.6±6.5 135.3±3.7	34.7±6.8 36.7±7	33.7±5.5 36.6±5.2	86.2±12.5 96.8±7.8	87.6±13.7 101.8±8.8		
Leong and White[16]	Caucasian	M:24 F:26	18–55	2D	129.3±12.1	137.5±4.8	36.7±7.8	37.2±5.4	95.6±10.2	101.1±8.6		
Ofodile and Bokhari[36]	African-American	M:28 F:41	20–63		135.6±5.4	131.9±6.8			83.5±10.5	91.0±9.3		
Husein et al.[32]	Indian American	F:102	18–30	2D		138.2±8.1		31.8±4.5		97.2±10.6		
Springer et al.[38]	Caucasian	M:128 F:128	18–30	2D	130	137	34	32	114	106		
He et al.[31]	Chinese	M:56 F:63	18–25	2D	138.15±8.43	147.71±5.48			98.50±10.54	100.05±11.33		

Table 7 *[Continued]*
Comparison with previous studies and present study according to the results of nasal angles.

Study	Population	n	Age	Method	NFA-degree		NFcA-degree		NBA-degree		Preferred NLA	
					M	F	M	F	M	F	M	F
Amini et al.[21]	Persian	M:50 F:50	18–30						97±8.9	94.6±10.5		
Borman et al.[26]	Turkish	M:525 F:525	20–30		136.49±5.80	137.02±5.37			97.79±9.13	95.07±10.42		
Maral[8]	Turkish	M:63 F:63	18–29	3D	150.19±8.93	151.25±9.06	30.30 ±3.49	31.10±3.49	110.62±10.50	113.03±10.65		
Alharethy[11]	Saudi Arabian	M:506 F:521							95.96±2.57	97.7±2.32	89.39±3.66	90.62±5.15
Uzun et al.[40]	Turkish	M:108	18–30	2D	134.96±7.78				90.32±11.88			
Tabrizi et al.[39]	Iranian	M:27 F:35	24.32±4.02	2D	125.23±3.76		32.35±1.97		83.95±3.10			
Sinno et al.[15]	Caucasian-Asian	M:32 F:66									97.0±6.3	104.9±4.0
Ese Anibor et al.[22]	Nigeria	M:50 F:50	18–25	2D	132.0± 7.5	100.56±7.6	39.6±5.0	37.4±4.9				
Li et al.[34]	Chinese	M:399 F:501	17–24	2D	132.6± 9.06	138.7 ±7.51	100.99±15.33	98.97±9.7				
Wang et al.[41]	Korean	M:11 F:10	25–31	2D	126.0±6.3	133.6±5.2			78.5±11.1	82.7±12.7		
Ballin[25]	Caucasian	M:37 F:63	18–55	2D	133.71±6.43	139.14±8.17			107.75±9.82	104.03±10.65		
Youn and Seo[42]	Korean	F:242	22–40	2D		138.7±6.1		30.2±4.6		87.4±10		95-100
Mulafikh et al.[7]	Arabian	F:150	18–50	2D		145.9 ±6.1		33.3±4.1		102.3±11		
Brown and Guyuron[14]	Multi ethnical	M:10 F:10	37–38	2D							95.6 ± 2.7	98.5±2.6
Bahşi et al.[4]	Turkish	M:100 F:100	18–25	2D	135.66±9.70	142.95±6.62	36.75±4.95	35.07±3.73	102.92±10.91	104.03±10.35		
Our study	**Turkish**	**M:71 F:71**	**18–35**	**2D**	**138.49 ±9.29**	**141.64±8.10**	**32.35 ±3.44**	**32.54±3.17**	**99.51±9.51**	**100.49±9.37**	**94.78**	**91.32**

F: female; **M:** male; **NFA:** nasofrontal angle; **NfcA:** nasofacial angle; **NLA:** nasolabial angle.

results are similar. Only Leong et al.[33] from their chinese study and Ofodie et al.[36] from their african-american study have relatively lower results of nasolabial angle and two korean studies of Wang et al.[41] and Youn and Seo[42] have lower results of all three angles than our results. A wider nasolabial angle might cause the nostrils to be more apparent from the front and cause an undesirable appearance. A lower nasofrontal angle is associated with a low radix and also contributes to a nasal profile that appears short. On the other hand, a greater nasofrontal angle could make the nose seem too long in some situations.[43] The current study has similar results with the other studies which evaluated the Turkish population too.[4,8,26,30,40] Only Uzun et al.[40] have lesser than average nasolabial angle results which is because they just made the measurements on male participants (**Table 5**). Most of the previous studies were evaluated the angles with digital photogrammetry. The angles were also measured directly or manually in present study. Even though manual measurements are more subjective than digital measurements on photographs, there was no statistically significant differences between the results. This reveals that digital plannings can be correlated with intraoperative manuel measurements. We believe that we present a comprehensive study to the literature.

Previous rhinoplasty surgery did not change the choice of the ideal nasolabial angle. Due to the small number of participants with previous surgery, the results may be the same as in the non-operated group. We also found age and gender differences in ideal nasolabial angle preference, which may be useful for planning a personalized surgery.

Most surgeons change the patient's nasolabial angle on a photograph via digital applications before surgery and ask the patient if this is suitable for them. After surgery, they can check the result with the same method. Therefore, manual control techniques during surgery are still common. This study has shown that digital and manual measurements of nasolabial and nasofrontal angles are similar, so whether or not one of these techniques is used may obscure the results. However, the difference in nasofacial angle is statistically significant. If the two techniques could be used together for nasofacial angle measurement, the results would be more confidential. The difference between these two angles and the nasofacial angle may be due to the fact that the nasofacial angle is very difficult to measure manually. In our opinion, digital measurement is more reliable for nasofacial angle because of this situation.

This study has some limitations. We did not investigate preferences for nasofrontal and nasofacial angles in our questionnaire. Also, although we studied angles, there are other important components that contribute to the aesthetic appearance of the nose, such as length and width.[4,10] Another limitation is the total number of participants. Although our data supports our hypotheses, this may be the reason why some of our hypotheses were not statistically significant. Further studies are needed to investigate ideal nasal measurements and preferences in a larger population.

Conclusion

It is widely recognized that nasal distances and angles vary widely by population and ethnicity. It is important to understand the effects of demographic characteristics on ideal nasolabial angle preference. The rhinoplasty surgeon plays a crucial role in satisfying patients by identifying and understanding the specific nasal angle characteristics desired. Although there are studies on these lengths and angles in the literature, there are no standardized values related to varying aesthetic opinions and different preferences. In this study, the average nasal angle anthropometric values and ideal nasolabial angle of the Anatolian population were determined. We believe that our results will be useful in rhinoplasty preparation and planning.

Conflict of Interest

The authors declare that they have no conflict of interest.

Author Contributions

NPÇY: project development, data collection and management, data analysis, manuscript writing; CB: data collection and management, data analysis, manuscript writing; İNY: data collection, manuscript writing; OK: data collection, manuscript writing FNO: data collection, data analysis; AA: data collection, data analysis; ED: data collection; İT: project development, manuscript editing.

Ethics Approval

Informed consent was taken from each patient. Ethical permission was obtained from the Ankara University Faculty of Medicine Human Research Ethics Committee (Approval code: 2023/250).

Funding

No funds, grants, or other types of support was received for his manuscript. The authors have no relevant financial or non-financial interests to disclose.

References

1. Ozdemir F, Uzun A. Anthropometric analysis of the nose in young Turkish men and women. J Craniomaxillofac Surg 2015;43:1244–7.
2. Uzun A, Ozdemir F. Morphometric analysis of nasal shapes and angles in young adults. Braz J Otorhinolaryngol 2014;80:397–402.
3. Patel PN, Most SP. Concepts of facial aesthetics when considering ethnic rhinoplasty. Otolaryngol Clin North Am 2020;53:195–208.
4. Bahşi I, Orhan M, Kervancioğlu P, Karatepe Ş, Sayin S. External nose anthropometry of healthy Turkish young adults. J Craniofac Surg 2021;32:2226–9.
5. Piombino P, Zace P, Grassia MG, Cataldo R, Marino M, De Riu G, Testa D, Bonavolontà P, Califano L. Anthropometric parameters for nose evaluation and nasal surgery planning. J Craniofac Surg 2020; 31:1620–4.
6. Toriumi DM. Commentary on: facial surface anthropometric features and measurements with an emphasis on rhinoplasty. Aesthet Surg J 2022;42:149–50.
7. Mulafikh D, Assiri H, Alfallaj R, Alqabbani AA, Bafaqeeh S. Facial angles in Arabian women seeking rhinoplasty. J Craniofac Surg 2023; 34:1001–3.
8. Maral F. Üç boyutlu görüntüleme cihazı ile genç yetişkin Türk toplumunda nasolabial alanın kapsamlı morfometrik analizi. İstanbul Medipol Üniversitesi Sağlık Bilimleri Enstitüsü 2020.
9. Topsakal KG, Nisa G. Doğal baş pozisyonu ve belirleme yöntemleri: literatür derlemesi. Selcuk Dental Journal 2018;5:103–10.
10. Farkas LG, Kolar JC, Munro IR. Geography of the nose: a morphometric study. Aesthetic Plast Surg 1986;10:191–223.
11. Alharethy S. Preferred nasolabial angle in Middle Eastern population. Eur Arch Otorhinolaryngol 2017;274:2339–41.
12. Alshawaf SM, McGuire C, ElAbd R, Fakih-Gomez N, Williams J, AlYouha S, Samargandi OA. Preferred nasolabial angle in rhinoplasty: a cross-sectional analysis. Aesthet Surg J 2023;20:sjad309. Online ahead of print.
13. Armijo BS, Brown M, Guyuron B. Defining the ideal nasolabial angle. Plast Reconstr Surg 2012;129:759–64.
14. Brown M, Guyuron B. Redefining the ideal nasolabial angle: Part 2. Expert analysis. Plast Reconstr Surg 2013;132:221–5.
15. Sinno HH, Markarian MK, Ibrahim AM, Lin SJ. The ideal nasolabial angle in rhinoplasty: a preference analysis of the general population. Plast Reconstr Surg 2014;134:201–10.
16. Leong SC, White PS. A comparison of aesthetic proportions between the healthy Caucasian nose and the aesthetic ideal. J Plast Reconstr Aesthet Surg 2006;59:248–52.
17. Patel AA, Gordon AR, Townsend AN, Shah J, Garfein ES, Tepper OM. Current trends in ıdeal nasal aesthetics show younger patients have a preference toward longer augmented noses. Aesthet Surg J Open Forum 2023;ojad069.
18. Patel SM, Daniel RK. Indian American rhinoplasty: an emerging ethnic group. Plast Reconstr Surg 2012;29:519–27.
19. Tavakoli K, Sazgar AK, Hasanzade A, Sazgar AA. Ideal nasal preferences: a quantitative investigation with 3d imaging in the Iranian population. Arch Plast Surg 2023;50:340–47.
20. Al-Qattan MM, Alsaeed AA, Al-Madani OK, Al-Amri NA, Al-Dahian NA. Anthropometry of the Saudi Arabian nose. J Craniofac Surg 2012;23:821–4.
21. Amini F, Mashayekhi Z, Rahimi H, Morad G. Craniofacial morphologic parameters in a Persian population: an antropometric study. J Craniofac Surg 2014;25:1874–81.
22. Anibor E, Okumagba MT. Photometric facial analysis of the Urhobo ethnic group in Nigeria. Arch Appl Sci Res 2010;2:28–32.
23. Aung SC, Liam FC, Teik LS. Three dimensional laser scan assessment of the oriental nose with a new classification of oriental nasal types. Br J Plast Surg 2000;53:109–16.
24. Baik HS, Jeon JM, Lee HJ. Facial soft-tissue analysis of Korean adults with normal occlusion using a 3-dimensional laser scanner. Am J Orthod Dentofacial Orthop 2007;131:759–66.
25. Ballin AC, Carvalho B, Dolci JEL, Becker R, Berger C, Mocellin M. Anthropometric study of the caucasian nose in the city of Curitiba: relevance of population evaluation. Braz J Otorhinolaryngol 2018;84:486–93.
26. Borman H, Özgür F, Gürsu G. Evaluation of soft-tissue morphology of the face in 1,050 young adults. Ann Plast Surg 1999;42:280–8.
27. Choe KS, Yalamanchili HR, Litner JA, Sclafani AP, Quatela VC. The Korean American woman's nose. Arch Facial Plast Surg 2006;8: 319–23.
28. Elsamny TA, Rabie AN, Abdelhamid AN, Sobhi EA. Anthropometric analysis of the external nose of the Egyptian males. Aesthetic Plast Surg 2018;42:1343–56.
29. Fariaby J, Hossini A, Saffari E. Photographic analysis of faces of 20-year-old students in Iran. Br J Oral Maxillofac Surg 2006;44: 393–6.
30. Gode S, Tiris FS, Akyildiz S, Apaydin F. Photogrammetric analysis of soft tissue facial profile in Turkish rhinoplasty population. Aesthet Plast Surg 2011;35:1016–21.
31. He SJ, Jian XC, Wu XS, Gao X, Zhou SH, Zhong XH. Anthropometric measurement and analysis of the external nasal soft tissue in 119 young Han Chinese adults. J Craniofac Surg 2009;20: 1347–51.
32. Husein OF, Sepehr A, Garg R, Sina-Khadiv M, Gattu S, Waltzman J, Wu EC, Shieh M, Heitmann GM, Galle SE. Anthropometric and aesthetic analysis of the Indian American woman's face. J Plast Reconstr Aesthet Surg 2010;63:1825–31.
33. Leong S, White P. A comparison of aesthetic proportions between the Oriental and Caucasian nose. Clin Otolaryngol Allied Sci 2004; 29:672–6.
34. Li KZ, Guo S, Sun Q, Jin SF, Zhang X, Xiao M, Wang CC, Sun X, Lv MZ. Anthropometric nasal analysis of Han Chinese young adults. J Craniomaxillofac Surg 2014;42:153–8.
35. Mohammed Ali MH. External nasal parameters in Egyptians: an in-depth nasal photogrammatic analysis. Surg Radiol Anat 2014;36: 633–41.
36. Ofodile FA, Bokhari F. The African-American nose: part II. Ann Plast Surg 1995;34:123–9.
37. Oghenemavwe E, Osunwoke A, Ordu S, Omovigho O. Photometric analysis of soft tissue facial profile of adult Urhobos. Asian Journal of Medical Sciences 2010;2:248–52.

38. Springer IN, Zernial O, Nölke F, Warnke PH, Wiltfang J, Russo PA, Terheyden H, Wolfart S. Gender and nasal shape: measures for rhinoplasty. Plast Reconstr Surg 2008;121:629–37.
39. Tabrizi R, Rezaie P, Sadeghi HM, Malekigorji M, Dehghanpour M. Patients satisfaction and nasal morphologic change after orthognathic surgery. World J Plast Surg 2022;11:135–43.
40. Uzun A, Akbas H, Bilgic S, Emirzeoglu M, Bostancı O, Sahin B, Bek Y. The average values of the nasal anthropometric measurements in 108 young Turkish males. Auris Nasus Larynx 2006;33:31–5.
41. Wang JH, Jang YJ, Park SK, Lee BJ. Measurement of aesthetic proportions in the profile view of Koreans. Ann Plast Surg 2009;62:109–13.
42. Youn SH, Seo KK. Filler rhinoplasty evaluated by anthropometric analysis. Dermatol Surg 2016;42:1071–81.
43. Suh MK, Atlas of Asian rhinoplasty. Singapoure: Springer Nature; 2018. p. 889.

ORCID ID:
N. P. Çavdar Yılmaz 0000-0002-9014-5638; C. Bay 0009-0003-4643-180X; İ. N. Yılmaz 0009-0006-3159-4835; O. Kelsaka 0009-0002-6293-5218; F. N. Ok 0009-0008-4247-5924; A. Ateş 0009-0004-2531-8338; E. Demirtaş 0009-0004-9371-1991; İ. Tekdemir 0000-0003-4856-0114

Correspondence to: Niymet Pelin Çavdar Yılmaz, MD
Department of Anatomy, Faculty of Medicine, Ankara University, 06100, Sıhhıye, Ankara, Türkiye
Phone: +90 312 595 82 50
e-mail: pelincavdar@gmail.com

Conflict of interest statement: No conflicts declared.

 How to cite this article: Çavdar Yılmaz NP, Bay C, Yılmaz İN, Kelsaka O, Ok FN, Ateş A, Demirtaş E, Tekdemir İ. Unlocking nasal angle anthropometry and nasolabial angle preferences: a key to achieve the perfect rhinoplasty. Anatomy 2023;17(2):70–81.