

Anthropometric Measurements of the Nose and Nose Types

Burun Antropometrik Ölçümleri ve Burun Tipleri

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Abstract

Background: In this study, the purpose was to obtain normal anthropometric data of the nose, and to determine the changes in age and gender.

Materials and Methods: For this purpose, the nose anthropometric measurements were made with a caliper in 874 healthy individuals who were between the ages of 5 and 64, and the nose types were determined for adults. The individuals were divided into 8 groups as 5-7, 8-9, 10-11, 12-13, 14-15, 16-17, 18-40, and 41-64-year-old. The nasal length, nasal height, morphological nasal width, anatomical nasal width, nasal root width, nasal depth, lengths, nostril widths, face width, and face heights of the individuals were measured; and the external nasal surface area, nasal volume, nasal index, nasofacial index, and nose-face width index were calculated. According to Martin and Sallar, the types of noses were classified in adults. The SPSS 20.0 Program was used for the statistical analysis of the data.

Results: The most common type of nose was determined to be Mesorrhine. Statistically significant differences were detected between the genders in all measurements except nasal depth. Statistically significant differences were detected in all groups in terms of all length and height measurements, morphological and anatomical nasal width values, external nasal surface areas, and nasal volume and indices.

Conclusions: It is expected that detailed data about age-sex-related nose morphometry in our study will contribute to the creation of a database of our population. It is thought that these detailed data will be helpful in the determination of age and gender in forensic medicine, the reconstruction studies in anthropology, and the treatment plan and post-surgery evaluation to surgeons.

Key Words: Anatomy, Anthropometry, Nose

Öz

Amaç: Bu çalışmada; burun ile ilgili normal antropometrik verilerin elde edilmesi, yaş ve cinsiyet ile ilgili değişikliklerin belirlenmesi amaçlanmıştır.

Materyal ve Metod: Bu amaç doğrultusunda 5-64 yaş arası 874 sağlıklı bireyde kaliper ile burun antropometrik ölçümleri yapılmıştır ve yetişkinlerde burun tipleri belirlenmiştir. Bireyler yaşlarına göre 5-7, 8-9, 10-11, 12-13, 14-15, 16-17, 18-40, 41-64 yaş olmak üzere 8 gruba ayrılmıştır. Bireylerde nazal uzunluk, nazal yükseklik, morfolojik nazal genişlik, anatomik nazal genişlik, nazal kök genişliği, nazal derinlik, nostril uzunlukları ve genişlikleri, yüz genişliği ve yüz yüksekliği ölçülmüş; eksternal burun yüzey alanı, nazal hacim, nazal indeks, nazofasiyal indeks ve burun-yüz genişlik indeksi hesaplanmıştır. Yetişkinlerde Martin ve Sallar'a göre burun tipleri sınıflandırılmıştır. Verilerin istatistiksel analizi için SPSS 20.0 programı kullanılmıştır.

Bulgular: En çok görülen burun tipi mesorrhine olarak belirlenmiştir. Nazal derinlik hariç tüm ölçümlerde cinsiyetler arasında istatistiksel olarak anlamlı derecede farklılık görülmüştür. Tüm uzunluk ve yükseklik ölçümleri ile morfolojik ve anatomik nazal genişlik değerleri, eksternal burun yüzey alanı, nazal hacim ve indekslerin hepsinde tüm gruplarda istatistiksel olarak anlamlı derecede farklılık görülmüştür.

Sonuç: Çalışmamızda yer verilen burun ve burun tipi ile ilgili detaylı bilgilerin toplumumuza ait veri bankası oluşturulmasına katkı sağlayacağı düşünülmektedir. Bu detaylı verilerin adli tıpta yaş ve cinsiyet tayininde, antropolojide yeniden yüzlendirme uygulamalarında, cerrahlara tedavi planında ve cerrahi sonrası değerlendirilmede yardımcı olacağı düşünülmektedir.

Anahtar Kelimeler: Anatomi, Antropometri, Burun

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Introduction

The nose is an olfactory and respiratory tract organ with functions such as drainage of the paranasal sinuses, smelling, providing particle filtration, creating a defense for the lower respiratory tract, and humidifying the inhaled air (1,2). The nasal skeleton consists of bone and cartilage. The width, shape, and size of the nasal cartilage vary considerably (2, 3). Anthropometric data differ according to various ethnic groups, different socio-cultural and socio-economic societies, and gender (4). Anthropometric characteristics and symmetry of the face are among the determinants of beauty (5). Since the nose is located in the center of the face, its shape and proportion make an important contribution to facial aesthetics. Because of all these characteristics, the nose is one of the organs that undergo surgery in aesthetic surgery. Interest in aesthetic and medical operations of the nose is increasing with each passing day (6, 7). There are studies in the literature reporting that nasal anthropometric measurements vary according to age (8, 9), gender (9-11), ethnicity (6,7), climate, and region (10,11), and studies that measure with shorter age intervals in individuals below the age of 18 are relatively rare (9). It is considered that the present study will fill this lack of data in the literature. In the present study, the purpose was to obtain normal anthropometric data about the nose and to determine the changes related to age and gender.

Materials and Methods

A total of 874 participants (449 males-425 females) who were aged between 5 and 64, selected by random sampling method, were included in the present study. Nasal anthropometric measurements of these individuals were made. Additionally, age and gender-related changes were determined by comparing age groups. The individuals participating in the study were divided into eight groups [Group 1 (5-7 years), Group 2 (8-9 years), Group 3 (10-11 years), Group 4 (12-13 years), Group 5 (14-15 years), Group 6 (16- 17 years), Group 7 (18-40 years), Group 8 (41-64 years)]. However, although structural changes continue throughout life, nasal development and modifications progress at a slower rate in adulthood. For this reason, larger intervals were used for adult subjects (9, 12). The approval of the Non-Interventional Clinical Research Ethics Committee (Cukurova University, 2 March 2018, No: 39) was obtained for the study. Not to affect the measurements, the individuals to be measured were selected from those who did not have any trauma or anomaly related to the face, and who had not had any aesthetic and surgical procedures before. After the necessary explanations were made and permission was obtained before the measurements, the "Informed Consent Form" was signed by the participants before the measurements. Written permission was obtained from the relevant individuals for the drawings and photographs used in the present study. Measurements performed directly on the nose of the individuals were recorded

with a Yamayo Vernier Caliper (300 mm) that had a sensitivity of 0.1 mm, repeated three times by a single researcher, and averaged. Measurements were taken under the same conditions and when the subjects were sitting comfortably with the head in a neutral anatomical position (neck in the middle of flexion and extension). In the present study, all measurements were taken in the morning with the assumption that individuals are calmer in the morning. Also, to obtain more accurate values, care was taken not to make any gestures that could affect the face dimensions of each individual, such as a smile, while measuring. The reference points used in the measurements are shown in Figure 1.



Figure 1. Image of the reference points used in the measurements (n: nasion, ac: alar curvature, prn: pronasale, s: subnasale, gn: gnathion)

The parameters measured in the present study were; nasal length (n-prn), nasal height (n-sn), nostril length (maximum length from lateral wall), face height (n-gn), face width (zy-zy), nasal depth (prn-sn), morphological nasal width (measured maximum width between right and left ala), anatomical nasal width (ac-ac), nasal root width (measured at the intersection of maxillo-frontal and nasofrontal sutures), nostril width (mediolateral maximum nostril width is measured).

The following calculations were made based on the measurements abovementioned:

Nasal Index: Nasal Width/Nasal Height x 100

Nose-Face Width Index: Nasal Width/Bizygomatic Width x 100

Nasofacial Index: Nasion-Subnasale/Nasion-Gnathion x 100

External Nasal Surface Area (mm²): This is measured by summing the area between the nasion, pronasale, right alar curvature, the area between the nasion, pronasale, and left alar curvature, the area between the pronasale, subnasale, and the right alar curvature, the area between the pronasale, subnasale and left alar curvature (8).

Nasal Volume (mm³): The approximate volume was calculated by taking the sum of the volumes of the two tetrahedra.

The first and second tetrahedrons consist of a plane of pronasale-right and left alar curvature. The first plane's vertex is nasion and the second plane's vertex is subnasale (8). According to Martin & Saller (1957), nose types in individuals were classified according to Nasal Index Values (13) (Table 1).

Table 1. The classification of nose types (Martin & Saller)

Nose type	Nasal Index
Hyperleptorrhine	x – 54,9
Leptorrhine	55 - 69,9
Mesorrhine	70 - 84,9
Platyrrhine	85 - 99,9
Hyperplatyrrhine	100-x

In evaluating the data obtained in the study, the IBM SPSS Statistics 20.0 (Statistical Package for Social Sciences) program was used for statistical analysis. The compliance of numerical data

with normal distribution was tested with the Kolmogorov-Smirnov Test. The Student t-test was used to compare normally distributed variables between genders, and the One-Way ANOVA (Analysis of Variance) and the LSD (Least Significant Difference) Multiple Comparison Tests were used for the comparisons between age groups. In summarizing the numerical data, descriptive statistical methods (mean, standard deviation, frequency, percentage, minimum, and maximum value) were used. For categorical variables, numbers and % values are given. The results were evaluated at the 95% confidence interval (CI), with a significance level of $p < 0.05$. The Pearson Correlation Coefficient was used to examine the relationship between height and other measurement parameters. The significance level was taken as $p < 0.05$.

Results

The mean values of the individuals who participated in the study according to gender and age are shown in Tables 2 and 3.

Table 2. The mean and standard deviation values of the male in the study according to age groups

Measurement	Unit	Age	5-7 n=48	8-9 n=72	10-11 n=65	12-13 n=56	14-15 n=62	16-17 n=56	18-40 n=45	41-64 n=45
Body height	cm	Mean	121.98	135.60	143.72	152.54	171.18	177.79	178.04	172.44
		SD	7.80	6.46	8.46	8.92	8.22	6.10	6.13	7.23
Nasal length	mm	Mean	30.63	33.61	35.44	38.04	42.11	45.55	46.21	47.71
		SD	3.61	3.15	3.19	4.13	4.67	4.95	4.85	4.38
Nasal height	Mm	Mean	37.97	41.61	43.64	45.66	50.32	52.5	53.78	54.16
		SD	3.86	2.92	2.58	3.83	4.33	3.21	3.82	4.2
Face height	mm	Mean	95.52	100.49	103.19	107.7	116.56	119.38	123.78	125.32
		SD	6.68	5.58	5.56	6.79	7.74	6.56	8.74	8.13
Morphologic nasal width	mm	Mean	30.03	31.02	31.48	32.68	35.36	36.54	37.87	40.34
		SD	2.49	2.15	2.58	2.51	3.26	2.48	3.5	3.9
Anatomic nasal width	mm	Mean	26.57	28.83	29.01	30.2	32.65	32.62	33.06	37.47
		SD	3.29	3.87	3.38	3.31	3.85	4.47	4.54	4.33
Face width	mm	Mean	104.44	109.43	111.2	113.78	118.82	119.8	123.11	125.14
		SD	6.15	8.18	7.78	6.84	8.71	7.2	8.56	6.7
Nasal root width	mm	Mean	16.23	16.23	16.14	16.78	16.48	17.37	17.89	17.52
		SD	3.08	2.02	1.71	1.86	1.68	1.82	2.79	1.98
Nostril length (left)	mm	Mean	8.77	9.26	10.27	11.17	11.03	12.35	14.7	13.97
		SD	1.75	1.6	2.23	2.13	2.23	2.39	2.72	2.9
Nostril length (right)	mm	Mean	8.64	9.14	10.13	10.92	11.1	12.4	15.08	13.7
		SD	1.55	1.57	2.18	1.95	2.02	2.36	3.01	2.7
Nostril width (left)	mm	Mean	5.69	5.45	6.22	6.28	6.27	6.74	7.82	7.36
		SD	1.19	1.01	1.18	1.38	1.26	1.49	1.82	1.61
Nostril width (right)	mm	Mean	5.57	5.49	6.24	6.16	6.15	6.74	7.78	7.27
		SD	1.02	0.98	1.05	1.32	1.2	1.34	1.88	1.29
Nasal depth	mm	Mean	18.2	18.47	18.52	20.18	21.25	22.42	23.57	25.8
		SD	1.99	2.19	2.06	2.31	2.19	2.31	2.74	2.52
External nasal surface area	mm ²	Mean	807.0216	910.4	1.001.31	1.156.36	1.351.67	1.519.82	1684.77	1.917.15
		SD	169.85	148.67	145.29	175.22	202.47	199.26	269.95	303.89
Nasal volume	mm ³	Mean	4.249.51	5.471.14	6.042.92	7.087.32	9.626.69	10.269.6	10.859.59	1.3049.5
		SD	1.094.31	1.000.56	1.198.34	1.595.55	2.176.66	1.876.16	2.180.24	2.958.42
Nasal index	-	Mean	79.94	74.85	72.45	72.04	70.79	69.9	70.67	74.77
		SD	10.91	6.76	8	7.91	9.05	7.49	7.11	8.09
Nose-Face Width Index	-	Mean	28.86	28.5	28.42	28.79	29.84	30.58	30.87	32.25
		SD	3.01	2.84	2.79	2.44	2.77	2.42	3.21	2.81
Nasofacial Index	-	Mean	39.78	41.45	42.35	42.47	43.2	44.09	43.58	43.28
		SD	3.35	2.7	2.58	3.41	2.88	2.73	3.48	2.96

Table 3. The mean and standard deviation values of female in the study according to age groups

Measurement	Unit	Age	5-7 n=46	8-9 n=60	10-11 n=61	12-13 n=46	14-15 n=62	16-17 n=54	18-40 n=51	41-64 n=45
Body height	cm	Mean	122.28	133.82	144.16	157.54	162.94	164.07	164.25	161.53
		SD	7.43	6.17	8.80	7.83	6.24	5.77	6.03	6.287
Nasal length	mm	Mean	29.17	32.24	36.46	39.95	38.44	38.52	40.39	41.06
		SD	2.92	3.63	3.68	4.09	3.34	3.26	3.58	3.8
Nasal height	Mm	Mean	37.39	40.66	43.63	47.73	46.62	46.49	48.43	48.62
		SD	3.61	3.2	3.34	3.57	3.45	3.57	2.97	3.92
Face height	mm	Mean	91.92	97.46	102.22	107.85	108.44	107.32	111.04	113.69
		SD	6.06	5.87	6.04	6.56	6.17	4.73	5.22	5.95
Morphologic nasal width	mm	Mean	29.43	29.98	31.16	32.74	33.17	33.71	33.65	34.69
		SD	1.79	2.18	2.41	2.45	2.31	2.5	2.7	2.56
Anatomic nasal width	mm	Mean	27.04	28.53	28.56	30.09	31.54	31.94	32.39	34.27
		SD	2.55	3.22	3.29	3.41	2.39	2.39	3.34	3.7
Face width	mm	Mean	103.98	107.8	108.81	115.88	116.01	116.33	116.95	121.49
		SD	5.7	8.13	6.5	6.94	5.17	6.42	7.13	6.11
Nasal root width	mm	Mean	15.91	15.72	16.51	16.94	16.02	16.54	16.29	17.02
		SD	1.8	1.87	3.48	2.52	1.8	1.69	1.96	2.05
Nostril length (left)	mm	Mean	8.04	8.13	9.22	9.98	10.5	11.46	11.62	10.33
		SD	1.31	1.82	1.96	1.85	1.8	2.24	2.34	2.67
Nostril length (right)	mm	Mean	8.07	8.18	9.26	9.93	10.47	11.28	11.74	10.32
		SD	1.3	1.85	1.81	1.76	1.72	1.8	2.47	2.56
Nostril width (left)	mm	Mean	5.26	5.11	5.6	5.53	5.58	5.95	6.49	6.14
		SD	1.06	1	1.28	1.38	1.09	1.59	1.35	1.49
Nostril width (right)	mm	Mean	5.2	5.14	5.6	5.58	5.61	6	6.41	6.27
		SD	0.98	0.93	1.16	1.22	1.05	1.46	1.41	1.5
Nasal depth	mm	Mean	16.9	19.1	20.1	21.68	21.17	20.72	21.96	22.8
		SD	1.74	2.99	2.72	2.35	2.31	2.15	2.54	2.58
External nasal surface area	mm ²	Mean	732.97	891.54	1.056.19	1.275.47	1.222.21	1.238.29	1.325.11	1.421.76
		SD	121.01	156.07	178.84	192.64	152.42	139.67	184.44	218.15
Nasal volume	mm ³	Mean	4.171.19	5.383.75	5.864.35	6.930.92	8.160.91	8.427.81	8.881.9	8.930.91
		SD	863.62	1.018.17	1.071.02	1.307.56	1.247.64	1.271.7	1.691.82	2.120.14
Nasal index	-	Mean	79.36	74.09	71.7	68.95	71.52	72.97	69.7	71.79
		SD	8.23	7.19	6.43	7.12	7.15	8.17	6.71	7.69
Nose-Face Width Index	-	Mean	28.38	27.9	28.73	28.35	28.62	29.03	28.83	28.61
		SD	2.27	2.29	2.73	2.67	1.94	2.33	2.37	2.38
Nasofacial Index	-	Mean	40.75	41.81	42.7	44.34	43.02	43.35	43.68	42.8
		SD	3.8	3.42	2.4	3.37	2.49	3.13	2.95	3.19

Table 4. The comparison of measurements according to gender in all population

Measurements	Unit	Male (n=449) Mean ± SD	Male (n=425) Mean ± SD	P
Body height	cm	155.55±20.90	151.30±16.27	0.001*
Nasal length	mm	39.45 ± 7.08	36.96 ± 5.19	0.001*
Nasal height	mm	47.06 ± 6.56	44.88 ± 5.02	0.001*
Face height	mm	110.65 ± 12.28	104.87 ± 8.78	0.001*
Morphologic nasal width	mm	34.1 ± 4.34	32.27 ± 2.93	0.001*
Anatomic nasal width	mm	31.08 ± 4.86	30.49 ± 3.73	0.045*
Face width	mm	115.23 ± 9.91	113.23 ± 8.42	0.001*
Nasal root width	mm	16.76 ± 2.19	16.34 ± 2.26	0.006*
Nostril length (left)	mm	11.24 ± 2.91	9.9 ± 2.38	0.001*
Nostril length (right)	mm	11.18 ± 2.92	9.9 ± 2.29	0.001*
Nostril width (left)	mm	6.39 ± 1.53	5.69 ± 1.34	0.001*
Nostril width (right)	mm	6.35 ± 1.44	5.72 ± 1.28	0.001*
Nasal depth	mm	20.78 ± 3.34	20.54 ± 2.95	0.262
External nasal surface area	mm ²	1258.64 ± 404.69	1140.03 ± 269.48	0.001*
Nasal volume	mm ³	1264.98 ± 405.28	1145.75 ± 269.81	0.001*
Nasal Index	-	73.09 ± 8.64	72.47 ± 7.8	0.268
Nose Face Width Index	-	29.62 ± 3.03	28.56 ± 2.38	0.001*
Nasofacial Index	-	42.5 ± 3.22	42.8 ± 3.22	0.170

Statistically significant differences were detected between the genders in all measurements except nasal depth (Table 4) The effects of age, gender, and the interaction of these effects were examined for all measurements. The One-Way ANOVA

(Analysis of Variance) and the LSD (Least Significant Difference) Multiple Comparison Tests were used for the comparisons between all age groups. Gender and age had a significant effect on all measurements (Table 5).

When the nose types of individuals were examined according to the Martin & Saller classification by gender, Hyperleptorrhine nose was not observed at all in males, but only 1% (n=1) in females. Leptorrhine nose type was seen in 41.1% (n=37) of males and 40.6% (n=39) of females. Mesorrhine nose was seen in 48.9% (n=44) males and 57.4% (n=55) females. Platyrhine nose was seen in 10% (n=9) of males and only 1% (n=1) of females. When considered in all adults, the most mesorrhine nose is seen in both males and females, followed by a Leptorrhine nose. Hyperplatyrhine nose was never observed in either group.

The correlation coefficients obtained between measurement parameters and height were found to be statistically significant. There were strong and positive correlations between nasal length, nasal height, face height, external nasal surface area, nasal volume, and height. A moderately significant and positive correlation was detected between morphological nasal width, anatomical nasal width, face width, nostril length (right and left), nasal depth, and height. A weak positive correlation was determined between nose-facial width index, nasofacial index, nostril width (right and left), nasal root width, and height. There is a weak negative relationship between the nasal index and height. Correlation coefficients are presented in Table 6.

Table 5. The effects of age, gender, and the interaction of age-gender

Measurements (mm)	P		
	Gender	Age	Age-Gender
Nasal length	0.001	0.001	0.001
Nasal height	0.001	0.001	0.001
Face height	0.001	0.001	0.001
Morphologic nasal width	0.001	0.001	0.001
Anatomic nasal width	0.002	0.001	0.001
Face width	0.001	0.001	0.001
Nasal root width	0.002	0.001	0.051
Nostril length (left)	0.001	0.001	0.001
Nostril length (right)	0.001	0.001	0.001
Nostril width (left)	0.001	0.001	0.088
Nostril width (right)	0.001	0.001	0.051
Nasal depth	0.003	0.001	0.001

Table 6. The correlations between height and independent variables

	Correlation coefficient (r)*
Nasal length	0.760
Nasal height	0.789
Face height	0.791
Morphologic nasal width	0.640
Anatomic nasal width	0.513
Face width	0.659
Nasal root width	0.167
Nostril length (left)	0.538
Nostril length (right)	0.561
Nostril width (left)	0.344
Nostril width (right)	0.357
Nasal depth	0.600
External nasal surface area	0.771
Nasal volume	0.759
Nasal Index	-0.282
Nose Face Width Index	0.204
Nasofacial Index	0.292

Discussion

Healthy participants were included in the present study. This study determines the mean anthropometric values of various parameters of the human external nose. There were various studies focused on racial, ethnic, age, gender, climatic, and regional differences in nose anthropometry (8-11).

In their longitudinal study conducted with a caliper to determine the linear change of nasal length and nasal depth values between 1-97 years of age, Zankl et al. found that men's nose sizes were larger than women's, and nose sizes continued to increase throughout life. They also reported that this result scientifically supported the relative idea of the nose appearing larger in the elderly (13). In their study conducted with age groups similar to our study, Sforza et al. reported that there was a gender difference in all measurements except nasal depth, and all measurements were higher in males than females. They also stated that there were significant changes between all groups with age (9). When we analyze studies conducted in our country, Bahşi et al. reported that all distance measurements were higher in males than females statistically significant in 18-25 (14). In a comprehensive study conducted on our population, Doğru et al. pointed out that several measurements of the nasolabial region increase with age (15). Özkoçak et al. indicated that several measurements (nasal bridge length, nasal tip protrusion, anatomic and morphologic nose width, and root width) were statistically different between age groups (16). However, although structural changes continue throughout life in the nose, nasal development and modifications progress at a slower rate in adulthood. For this reason, it was reported as a result of scientific studies that race and ethnicity comparisons should start in adult individuals (13, 17). These results are similar to our study results.

When we compare the results of our study with other studies of other populations, the mean nasal length in our study was 46.21 ± 4.85 and 40.39 ± 3.58 mm for 18-40-year-old, 47.71 ± 4.38 and 41.06 ± 3.80 mm for 40-64-year-old in male and female respectively. It was similar to Malaysia (46.86 mm in males and 41.13 mm in females), Egypt (47.0 mm in males), and Latvia (4.68 cm in males and 4.35 cm in females) mean nasal length (18-20). The nose length of our study is shorter than all of the mentioned ethnic groups, but it is longer than Korean (43.5mm in males and 38.4 mm in females) (8, 21-27). The mean nasal height in our series was 53.78 ± 3.82 and 48.43 ± 2.97 mm for 18-40-year-old, 54.16 ± 4.2 and 48.62 ± 3.92 mm for 40-64-year-old in males and females, respectively. In our study group, the mean value was similar to Colombian (52.39 mm in males and 48.66 mm in females), Mexican American (53.24 mm in males and 51.37 mm in females), and Malaysian (54.13 mm in males and 49.20 mm in female) (18, 21). Our study values were similar to the Egyptian population in females (19, 28) while longer in males. And also these values were similar to most of the studies conducted on the Anatolian population (29). The mean nasal height values are shorter than Spanish (56.94 mm in males and 56.17 in fe-

males) and Chinese (60.33 mm in males and 58.23 mm in females) (25, 26). It was longer than Nigerian (46.19 mm in males and 43.89 mm in females) and Indian (51.34 mm in males and 49.62 mm in females) (30, 31).

The mean morphologic nasal width was 37.87 ± 3.5 mm and 33.65 ± 2.70 mm for the 18-40-year-old group in males and females, respectively. It was 40.34 ± 4.33 mm in males and 34.27 ± 3.7 mm in females for the 40-64-year-old group. These results were most similar to the American (36.9 mm in males and 32.9 in females) and Albanian population (36.90 mm in males and 33.12 in females) (32, 33). The mean morphologic nasal width of our study are narrower than Nigerian (44.61 mm in male and 45.07 in female), Chinese (39.2 mm in male and 36.1 mm in female), Malaysian (39.59 mm in male and 36.67 in female), and Indian (37.42 mm in male and 35.77 in female) study results but wider than Spain (36.62 mm in male and 31.15 mm in female) and Latvia (3.13 cm in male and 2.81 cm in female) (18, 20, 25, 30, 31, 34).

The mean anatomical nasal width was 33.06 ± 4.54 mm and 32.39 ± 3.34 mm for 18-40-year-old in males and females, respectively. These results were 37.47 ± 4.33 mm in males and 34.27 ± 3.7 mm in females for 40-64 years. These results were similar to Iran's population (32.3 mm for Sistan and 31.4 mm for Belucistan in females) (8). Our mean values are less than Chinese (39.30 mm in males and 34.75 in females) and greater than Egypt (38.0 mm in males) (19, 26). Anatomical nasal width values are less available in the literature compared to morphologic nasal width.

The mean nasal index in our study was 70.66 ± 7.11 and 69.69 ± 6.71 among males and females, respectively in the 18-40-year-old group. These values were 74.77 ± 8.08 in males and 71.79 ± 7.69 in females for 40-64 years. The nasal index is one of the most common methods for distinguishing races. Davies indicated in his study that the nasal index varies between individuals but when the group mean values are taken into account it gives important information about races. Davies pointed out that the nasal index value interval is 71-75 in his study for our region in 1932. These results support our study results for our region (35). In this study most common nose type is mesorrhine. The type of nose in African American, and Indians is mesorrhine (30, 36, 37). In Nigeria (31,38-40), it was platyrrhine, in Egypt (28) and Iran (8), and leptorrhine in Albania (32).

The mean right nostril length values in our series were 15.08 ± 3.01 in males and 11.74 ± 2.47 mm in females among 18-40-year-old. For the left side, these values were found as 14.70 ± 2.72 mm in males and 11.62 ± 2.34 mm in females for the same age group. The mean right nostril length was 13.70 ± 2.7 mm in males and 10.32 ± 2.56 mm for 40-64 years. For the left side, these values were found as 13.97 ± 2.9 mm in males and 10.33 ± 2.67 mm in females for the same age group. The mean right nostril width was 7.78 ± 1.88 mm in males and 6.41 ± 1.41 in females for 18-40-year-old. For the left side, it was found 7.82 ± 1.82 mm in males and 6.49 ± 1.35 mm in females for the 18-40-year-old group. The right nostril width is 7.27 ± 1.29 for males and 6.27 ± 1.5 mm in females additionally the

left nostril width is 7.36 ± 1.61 mm for males and 6.14 ± 1.49 mm in females for the 40-64-year-old group. These values are lower than Italian and Latvian populations and greater than Korean mean nostril values (9, 20).

The mean nasal depth was 23.57 ± 2.74 mm in males and 21.96 ± 2.54 mm in females for 18-40-year-old. In addition, 25.8 ± 2.52 mm in males and 22.85 ± 2.58 mm in females for 40-64 years. Our study results are similar to studies conducted in our country (29, 16). However, our study results are greater than studies conducted in Chinese (18.24 mm in males and 16.54 mm in females), Malaysia (17.26 mm in males and 16.11 in females), Korean (14.4 mm in males and 12.4 in females), Egypt (21.0 mm in males), Nigeria (1.86 cm in males and 1.72 cm in females), Colombian American (17.86 mm in male and 15.14 mm in female), Mexican American (17.5 mm in male and 16.14 mm in female) (19, 21, 26, 27, 40) The nasal root width mean values were 17.89 ± 2.79 mm in males and 16.29 ± 1.96 mm in females for 18-40-year-old individuals in our study. It was 17.52 ± 1.92 mm in males and 17.02 ± 2.05 mm in females for 40-64 years. The nasal root values are similar to American and Indian population mean values (30, 41).

When previous studies were analyzed, it was found that the morphometric characteristics of the nose vary according to gender, age, ethnicity, and race. However, meta-analysis is required to uncover the variations better. To do this, there is a need for multi-participant data banks. We think that obtaining a very comprehensive database can be important in the planning of surgical procedures of the nose, in the design and production of medical mask types and eyeglasses, or in the identification of the age, gender, and ethnicity in forensic medicine in a shorter time and in developing multi-purpose artificial intelligence applications. A large amount of data is required for Artificial Intelligence to work more accurately. With the storage of such a database, Artificial Intelligence algorithms can be created.

Conclusion

It is expected that detailed data about nose morphometry in our study will lead to the creation of a database of our population and that these data will be supported by more comprehensive studies across our country and will contribute significantly to the data bank to be created in the future in this regard.

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