

The Korean American Woman's Nose

An In-depth Nasal Photogrammatic Analysis

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Objectives: To assess the differences in nasal anthropometric measurements between Korean American women and North American white women and to perform an in-depth nasal index calculation.

Methods: This anthropometric survey included a volunteer sample of Korean American women (n=72) aged 18 to 35 years with Korean parents and no previous nasal surgery or trauma to the nose. Standardized and referenced frontal, lateral, and basal photographs of the nose were taken of the subjects and 22 standard anthropometric measurements of the nose were determined. Results were compared with published standards for North American white women. In addition, 18 nasal indices were calculated and compared with the published standards for North American white women.

Results: The Korean American woman's nose did not fit the neoclassic facial canons. Compared with North American white women, 20 of 22 nasal measurements in Korean American women were found to be significantly different. Nasal indices also revealed significant differences in 16 of the 18 that were calculated. The Korean American woman's nose exhibits less rotation, has a flatter dorsum, and is more flared at the alae, with less definition of the nasal tip.

Conclusions: The average Korean American and North American white female nasal anthropometric measurements are very different. As cosmetic surgery becomes more popular among Asian Americans, our findings bolster the need for a broader view of facial analysis and trans-cultural aesthetics.

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AS THE INTEREST IN COSMETIC rhinoplasty has increased in the past several decades, much research has been performed to examine and refine the canons by which beauty may be measured. Much of this work has dealt with the facial architecture of the North American white population¹⁻³; in recent years, however, there has been a substantial increase in the number of cosmetic surgical procedures being performed on patients of other racial/ethnic groups. It has become readily apparent to practitioners that most of these patients place great importance on maintaining their core ethnic features while achieving cosmetic enhancement. Applying the traditional white-based concepts of facial beauty to patients of other racial/ethnic groups has limitations.

The last several years have seen increased interest in examining the concept of beauty in various racial/ethnic groups, including African American,⁴⁻⁷ Hispanic,^{8,9} and Asian¹⁰⁻¹² populations. Facial analysis has been performed in these

various groups, but only 1 previous study has focused on the Korean American population.¹³ While there are obvious nasal morphologic differences between noses of whites and Koreans, a dedicated anthropometric study of the Korean American nose would enable a more descriptive and accurate guideline with which to perform cosmetic rhinoplasty in this ethnic group. The purpose of this study was to delineate the anthropometric differences between the noses of Korean American and North American white women.

METHODS

The study group consisted of 72 Korean American women in whom a complete set of 22 nasal anthropometric variables was measured. The women's ages ranged from 18 to 35 years (mean age, 25 years). All subjects were of full Korean descent, and none had a history of previous facial trauma or cosmetic surgery. Demographic data obtained included age, place of birth, and parental heritage.

Digital photographs (Sony Mavica-300; Sony Corp, Tokyo, Japan) of the face (of models) were obtained in frontal, left lateral, and

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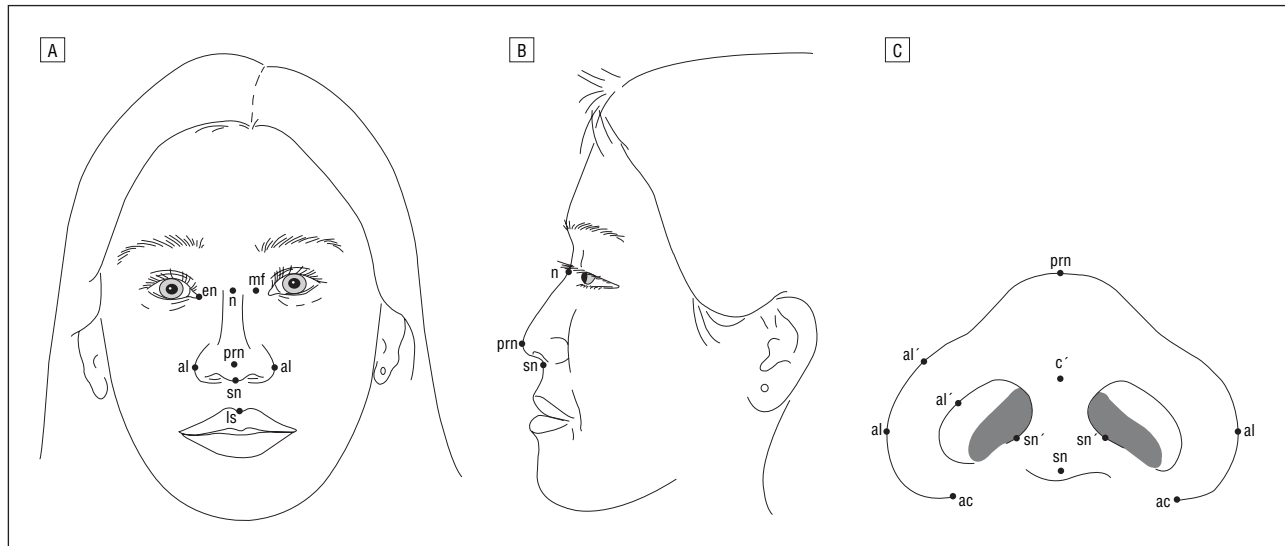


Figure. Frontal (A), lateral (B), and basal (C) views of the average Korean American woman's nose, with soft tissue landmarks: ac indicates alar curvature point; al, ala; al', alar rim; c', highest point of columella; en, endocanthion; ls, labiale superio; mf, maxillofrontale; n, nasion; prn, pronasale; sn, subnasale; sn', subnasale (lateral).

Table 1. Comparison of Anthropometric Nose Measurements in Korean American Women and North American White Women

Anthropometric Measurement*	Korean American Women, Mean (SD) (n = 72)	North American White Women, Mean (SD) (n = 200)†	Mean Difference	P Value
Nasal height	51.8 (4.3)	50.6 (3.1)	1.2	.01
Nasal bridge length	43.5 (3.9)	44.7 (3.4)	-1.2	.01
Nasal width	35.5 (3.4)	31.4 (2.0)	4.1	<.001
Alar length	29.9 (3.1)	31.5 (1.8)	-1.6	<.001
Alar width	4.5 (0.8)	5.3 (0.7)	-0.8	<.001
Nasal root	21.1 (4.1)	18.4 (1.9)	2.7	<.001
Nasal root slope length	18.0 (2.1)	21.9 (1.6)	-3.9	<.001
Columella width	7.3 (1.1)	6.8 (0.7)	0.5	<.001
Columella length	7.5 (1.1)	11.5 (1.7)	-4.0	<.001
Nasal base	37.2 (3.3)	30.5 (2.2)	6.7	<.001
Cutaneous upper lip	14.3 (1.9)	13.8 (4.6)	0.5	.37
Tip protrusion	19.6 (1.4)	19.7 (1.6)	-0.1	.64
Nasal root depth	6.1 (1.2)	14.0 (1.7)	-7.9	<.001
Nasofacial angle	32.3 (5.1)	29.9 (3.9)	2.4	<.001
Nasofrontal angle	136.8 (6.4)	134.3 (7.0)	2.5	.008
Glabellonasal angle	157.0 (6.6)	164.9 (5.6)	-7.9	<.001
Nasolabial angle	92.1 (9.2)	104.2 (9.8)	-12.1	<.001
Nasomental angle	128.0 (4.1)	130.0 (4.3)	-2.0	<.001
Nasal tip angle	78.5 (7.1)	67.4 (7.4)	11.1	<.001
Nasal alar slope angle	81.9 (9.7)	59.4 (5.3)	22.5	<.001
Alar slope line incline	48.3 (4.8)	63.1 (4.5)	-14.8	<.001
Nostril axis incline	49.2 (8.9)	63.5 (7.2)	-14.3	<.001

*Height, width, and length measurements are given in millimeters; angle and incline measurements are given in degrees.

†Adapted from Farkas.¹

basal views. A ruler was included in each image for calibration. Photographs were analyzed with Mirror Image software (Canfield Corp, Fairfield, NJ), and photogrammetric measurements were obtained based on nasal landmarks (**Figure**). All measurements were obtained by the same investigator (J.A.L.). The characteristics measured were nose height, nasal bridge

length, nasal width, alar length, alar width, nasal root, nasal root slope length, columella width, columella length, nasal base, cutaneous upper lip, tip protrusion, and nasal root depth (**Table 1**). Angles measured included nasofacial, nasofrontal, glabellonasal, nasolabial, nasomental, nasal tip, nasal alar slope, alar slope line incline, and nostril axis incline. Angle measurements were obtained by taking a complete nasal photographic series (frontal, left lateral, and basal views) and measuring the angle using Mirror Image software. From the data accrued, several nasal indices were examined (**Table 2**).

The results were compared with previously published standards for North American white noses.^{1,3} Data were analyzed using the unpaired *t* test if the variables were equal or the unpaired *t* test with the Welch correction if the variables of 2 samples were unequal as a result of unequal population size. We assessed the differences between our results and those of others, with the overall chance of type I error at *P* < .05. The study was approved by the Institutional Review Board for Human Experimentation of the New York Eye and Ear Infirmary, New York.

RESULTS

DEMOGRAPHIC DATA

Seventy-two Korean American women were enrolled in the study. All subjects met the criteria for the study. The women ranged in age from 18 to 35 years (mean age, 25 years). Most subjects were born in South Korea (90%), and the remaining subjects were born in the United States (10%). All subjects were of purely Korean descent.

ANTHROPOMETRIC MEASUREMENTS

Comparison of anthropometric nasal measurements in Korean American women and published norms for North American white women¹ are summarized in Table 1. A

Table 2. Comparison of Nasal Indices in Korean American Women and North American White Women

Portion of Nose and Index (Calculation)*	Korean American Women, Mean (SD) (n = 72)	North American White Women, Mean (SD) (n = 200)†	Mean Difference	P Value
Nasal (al-al × 100/n-sn)	69.0 (8.7)	61.4 (5.1)	7.6	<.001
Nasal bridge (n-prn × 100/n-sn)	83.9 (2.5)	87.8 (3.1)	-3.9	<.001
Nasal root width/height (mf-mf × 100/n-sn)	40.7 (7.4)	37.2 (3.7)	3.5	.01
Nasal root depth/height (en-se' × 100/n-sn)	11.9 (2.6)	29.1 (3.6)	-17.2	<.001
Nasal root depth/width (en-se' sag × 100/mf-mf)	30.0 (7.5)	78.5 (11.1)	48.5	<.001
Nasal root depth/height (en-se' sag × 100/en-se)	34.4 (7.0)	65.4 (6.1)	-31.0	<.001
Alar length/nasal height (ac-prn × 100/n-sn)	58.1 (7.0)	61.2 (4.1)	-3.1	<.02
Nasal tip protrusion/width (sn-prn × 100/al-al)	55.7 (7.3)	62.2 (5.5)	-6.5	<.001
Nasal tip protrusion/length (sn-prn × 100/n-sn)	38.0 (3.9)	62.7 (4.3)	-24.7	<.001
Columella/nasal width (sn'-sn' × 100/al-al)	20.5 (2.4)	21.4 (2.5)	-0.9	.08
Nasal width/alar length (al-al × 100/ac-prn)	59.6 (5.9)	50.3 (3.5)	-9.3	<.001
Columella length/tip protrusion (c'-sn × 100/sn-prn)	38.3 (4.3)	58.2 (7.8)	-19.9	<.001
Nasal root depth/tip protrusion (en-se' sag × 100/sn-prn)	31.4 (6.3)	76.6 (10.0)	-45.2	<.001
Nasal root/width (mf-mf × 100/al-al)	59.6 (12.1)	60.8 (6.0)	-1.2	.59
Nasal root slope/alar length (en-se × 100/ac-prn)	60.3 (6.8)	72.9 (3.9)	-12.6	<.001
Simon ratio (sn-prn/sn-ls)	1.4 (0.2)	1.0 (0.2)	0.4	<.001
Modified Baum ratio (n-sn/prn-x)	2.9 (0.4)	2.8 (0.3)	0.1	.23
Nasal II (al-al × 100/n-prn)	82.3 (11.2)	70.0 (6.3)	12.3	<.001

Abbreviations: ac, alar curvature point; al, ala; al', alar rim; c', highest point of columella; en, endocanthion; ls, labiale superio; mf, maxillofrontale; n, nasion; prn, pronasale; sag, sagittal; se', sellion (lateral); sn, subnasale; sn', subnasale (lateral); x, facial plane.

*Height, width, and length measurements are given in millimeters; angle and incline measurements are given in degrees.

†Adapted from Farkas et al.³

statistically significant difference was found for 20 of 22 compared measurements. Both vertical nasal measurements showed statistically significant differences; the Korean American women's average nasal height was greater than the norm for North American white women, but the Korean American women's nasal length was less than the mean for North American white women.

Eight of 9 horizontal nasal measurements exhibited statistically significant differences between the 2 groups. The Korean American women had greater measurements for nasal width, root width, columella width, and nasal base. The same group of women, however, had lesser values for ala length, ala thickness, and nasal root slope length. The difference between the cutaneous upper lip height in the 2 groups did not reach statistical significance.

Although the Korean American women had lesser values for all 3 sagittal nasal measurements, only 2 of the 3 sagittal measurements showed a statistically significant variation between the Korean American women and the North American white women. Nasal root depth and columellar length are both less in Korean American women. The smaller degree of tip protrusion in Korean American women was not statistically significant.

All 8 of the measured angles and inclinations exhibited statistically significant differences between the 2 groups of women. Korean American women demonstrated a larger angle for nasal tip, nasofacial, and nasofrontal angle measurements. The published norms for North American white women revealed greater glabellonasal, nasolabial, and nasomental angles. The North American white group also had greater alar slope and nostril axis inclines.

A nasal index analysis was performed for the Korean American women using the nasal measurements collected, and these indices were also compared with nasal

indices previously published for North American white women (Table 2).³ Sixteen of 18 calculated Korean American nasal indices were significantly different from those in their North American white counterparts. The Korean American women had greater values for nasal index, nasal root width–height index, and Simon ratio. The remaining 13 indices were greater for the North American white women.

COMMENT

Recent trends in facial cosmetic surgery reveal an increasing interest in cosmetic procedures among various racial/ethnic groups other than white. As the number of cosmetic surgical procedures being performed on persons from these various racial/ethnic groups increases, it has become evident that the philosophy of traditional concepts of beauty needs to be revisited. Much work has been done to provide the facial cosmetic surgeon with guidelines to aid in appropriately restoring facial harmony in the patient who wants cosmetic enhancement. Most of this work, however, was based on the neoclassic canons of facial symmetry and beauty as applied to a white population. Although certain aspects of facial symmetry and harmony are universal, many differences exist between the inherent facial structures of white populations and those of various other racial/ethnic populations. Many of these differences seem obvious; however, only recently have these issues been examined formally for facial cosmetic surgery. The importance of this work is evident in most nonwhite patients who desire facial cosmetic enhancement without sacrificing their ethnicity. The import of this issue is perhaps no more apparent than in rhinoplasty in white persons.

Nasal analysis is arguably the most important step in performing cosmetic rhinoplasty. Much work has been done to delineate norms and averages for various nasal measurements in white persons. In the last decade, however, several studies have offered anthropometric nasal analysis of noses in racial/ethnic groups other than white. Appreciating the details of nasal analysis for any particular ethnic group will enable the surgeon to offer a better cosmetic result without compromising the patient's desire to maintain his or her cosmetic ethos. Studies dealing with noses in African American, Hispanic, and Asian populations have been performed, but, to date, to our knowledge, there has not been any published work dealing with nasal analysis in the Asian American population. This study examined many anthropometric measurements of the Korean American woman's nose. This study attempted to not only reaffirm the limitations of the neoclassic canons of facial beauty as applied to persons of racial/ethnic groups other than white but also to provide useful data with which more appropriate nasal analysis can be performed in planning rhinoplasty in the Korean American woman.

A cursory glance at the acquired data reveals differences in almost all of the nasal measurements between the Korean American women and the previously published norms for North American white women. Indeed, statistical analysis revealed that 20 of 22 standard anthropometric nasal measurements were significantly different between the Korean American group and the North American white group. Several trends could be discerned from these data. As to the horizontal aspect of the nose, Korean American women tend to have a wider nose and nasal root but shorter and thinner alae compared with North American white women. Although the Korean American group demonstrated a greater average nasal height, the dorsal nasal length was shorter than in the North American white women. This is compounded by the nasal profile as seen in a sagittal view: the Korean American women had a more shallow nasal root depth and shorter columella length.

The differences in the measured angles and inclinations were substantial between the 2 groups and reflect the different effects that the Korean American woman's nose has on her profile as compared with that of the North American white woman. The more acute nasolabial angle in the Korean American woman leads to decreased tip rotation, in contrast to the nose of the North American white woman. The greater nasofrontal angles seen in the Korean American group underscores the concept of a "flatter" nose in the Asian population. However, greater nasofacial angle and equal tip protrusion length as contrasted with the nose of the North American white woman seem to contradict this notion. Closer examination of the Korean American woman's nose resolves the apparent discrepancies. The flatter appearance of the Korean American nose is largely the result of the wide upper two thirds of the nose and the flatter dorsum. When combined with decreased rotations, rounder and fuller tip, and a lower takeoff point of the nose, these findings give the appearance of a smaller dorsal profile of the nose in this group.

The calculated nasal indices also reveal substantial disparity between the 2 groups of women. Although the ac-

tual values of the indices carry no inherent significance, the indices can be used to quantify anthropologic trends across different racial/ethnic groups.¹⁴ Sixteen of 18 nasal indices are significantly different between the Korean American and North American white women. The Korean American women have greater values for nasal index, nasal root width–height index, and Simon ratio; the remaining 13 indices are greater in the North American white women.

These results substantiate the great variation between the typical Korean nose—and the Asian nose, in general—with the white nose. In our study, the Korean American woman's nose exhibited a dorsum that is wider and rounder than the North American white woman's nose. This flattening of the nose likely accounts for the great popularity of alloplastic implants being used in Asian countries to augment the nasal dorsum.^{15,16} The nasal tip also could be characterized as broader, underprojected, and underrotated compared with the norms for the North American white nose. The alae are flared, in conjunction with a thicker columella and a significantly wider nasal base. These characteristics result in the Korean American nose exhibiting a more horizontally oriented ellipsoid appearance from the submental view of the nose, as opposed to the more triangular architecture of the white nose seen in the same view.

We compared our data with those published by Farkas,¹ who used direct anthropometric methods. Technically, our data are photogrammetric, taken from referenced digital photographs. We believe that a digital view provides an accurate and reliable set of measurements. While there may be some differences between photogrammetric and true anthropometric measurements, our data were highly reproducible between observers (H.R.Y. and A.P.S.). Systemic errors introduced into our photogrammetric measurements would be nullified in the nasal indices; the differences noted in these values (Table 2) remained highly significant.

CONCLUSION

The average Korean American woman's nasal anthropometric measurements are significantly different from those of the North American white woman. With the increased demand for cosmetic rhinoplasty in the Korean American population, as well as in many other racial/ethnic populations, the cosmetic surgeon must incorporate racial/ethnic differences into the planning and execution of rhinoplasty. The results of this study represent objective average nasal measurements in young Korean American women. The "ideal" nose has yet to be defined for this ethnic group. As an initial foray into examining the Korean American nose, the findings of this study support the need for nasal canons based on race/ethnicity in conjunction with individualized and culturally sensitive surgical alteration of the nose.

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