Soft tissue evaluation of contemporary Caucasian and African American female facial profiles

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Orthodontists learn to critically evaluate the face from various perspectives and, as a result, develop personal biases as to what is considered an esthetic profile. These biases are influenced in part by studies examining the Class I face, with results that have often been used as norms or goals for treatment. It has been suggested, however, that what is "normal" is not necessarily beautiful, and perhaps it would be better to strive for beauty rather than normalcy. Because successful orthodontic treatment includes achieving the most esthetic profile possible, the orthodontist should be aware of the general public's perception of beauty before commencing treatment.

Does an esthetic face differ from an average face? Peck and Peck[1] suggested in 1970 that the esthetic Caucasian face demonstrated fuller lips than the norm for its race, and Auger and Turley[2] demonstrated a continued increase in lip prominence in Caucasian models' profiles over the last century. In contrast, studies suggest the esthetic

Abstract

Previous studies suggest that esthetic Caucasian profiles exhibit fuller lips than the norm for their race, while esthetic African American profiles are similar to those of esthetic Caucasians. The present study was undertaken to compare the profiles of female Caucasian and African American models and their nonmodel counterparts. Four groups of 30 subjects were evaluated: Caucasian models [CM], Caucasian controls [CC], African American models [AM], and African American controls [AC]. The models' profiles were photographed from current fashion magazines, the photos were scanned, and 17 landmarks were digitized. Each profile was standardized for size and oriented along the N'-Sn' line on a Macintosh 6115CD computer. Control photographs were processed in a similar manner. Twenty-six variables were measured for each profile. Means, ranges, and standard deviations were computed along with unpaired, two-tailed Student's *t*-tests ($p<0.05$) to evaluate group differences. The results showed that for the AM and AC profiles, all but two of the 26 variable were similar. For the CM and CC profiles, eight variables demonstrated significant differences. Between-race comparisons demonstrated greater numbers of parameters that were significantly different: CM/AM with 18 and CM/AC, CC/AC, and CC/AM with 22 each. Most of the differences involved the lips. Vertical soft tissue proportions for the four groups did not follow a 40/20/40 ratio. Caucasian and African American models displayed significantly different profile characteristics. The African American models and controls showed similar profile features, whereas greater differences were observed between Caucasian models and controls. Based on our study, the African American profile currently presented in the mass media is not "Caucasian-like." In fact, it appears that Caucasian models display more ethnic features than African American models do Caucasian features, suggesting that previously held concepts of facial beauty may no longer apply.

Key Words

Facial profile • Soft tissue • Caucasian • African American • Beauty

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Figure 1
Soft tissue landmarks

Table 1
Sources for model photographs

African Americans
Blac Tress
Black Beauty & Hair
Black Elegance
Coiffure Q
Ebony
Essence
Hype Hair
Jet
Modern Bride
Pride
Sophisticate's Black Hair Style
Styles & Stylists
Top Model
Working Mother
African Americans and Caucasians
Best Weddings
Bride
Dresses for Brides
Redbook
Vogue
Your New Home
Caucasians
Glamour
Good Housekeeping
Seventeen
Victoria's Secret
Wedding Gown Guide

African American face is flatter or more "Caucasian-like" than the normal African American face, when studied subjectively[3-5] and quantitatively.[4,5] If the esthetic Caucasian face shows fuller lips than the average Caucasian face, and the preferred African American face is more Caucasian-like in appearance, are these two profiles then similar? If they are in fact similar, might they be more alike than their respective nonmodel counterparts? To answer these questions, this study attempted to determine if (1) Caucasian and African American models have profile characteristics that are more similar to each other than to their nonmodel counterparts, (2) African American models have a flatter profile than the norm for their race, or (3) Caucasian models have fuller profiles than the average Caucasian face.

Materials and methods

One hundred and twenty profile photographs of African American and Caucasian models and

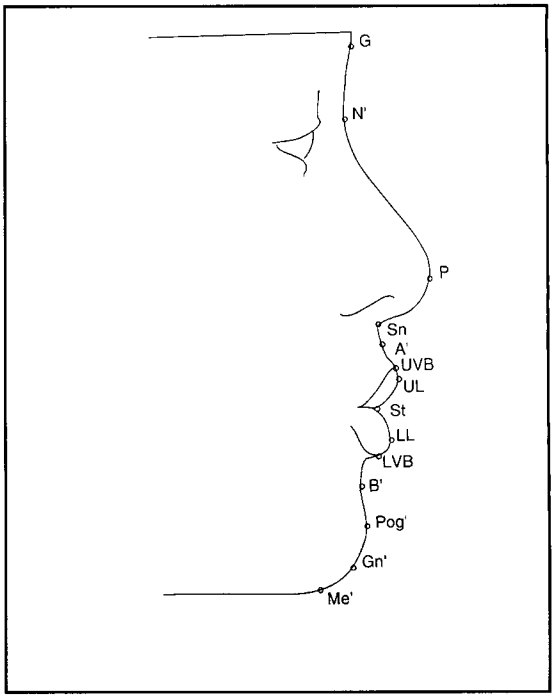

Figure 1

controls (30 in each group) were used. Photographs of models were taken at random from various fashion magazines from the 1990s (Table 1). Because the photographs were selected without knowing the models' racial makeup, this study represented the best visual estimates of race for each sample. Photographs of the African American (AM) models that met the inclusion criteria (listed below) were harder to find than those of Caucasian models (CM), thus some of the African American photographs were taken from magazines that do not cater specifically to the African American population. The control samples were selected randomly from the pretreatment records of patients at the UCLA orthodontic clinic as well as from staff of the dental school. All controls had a Class I molar relationship and their photographs met the same criteria as the models: (1) Females estimated to be between 18 and 35 years of age, (2) profile photo showing the head anterior to the ear, (3) <2 mm of opposite eyebrow and or eyelash visible, (4) one philtral column visible, and (5) lips closed. No silhouettes or photographs with observable facial strain or expression were used.

The profile pictures were photographed using a copy stand with a mounted Nikon F3 camera and a 90-180 mm zoom lens to produce 35 mm slides. To help eliminate shadows, two 200-watt studio cross-lighting lamps were used. The original pictures were held flat under a quarter-inch glass plate and made to fill the viewfinder as completely as possible to include all the neces-

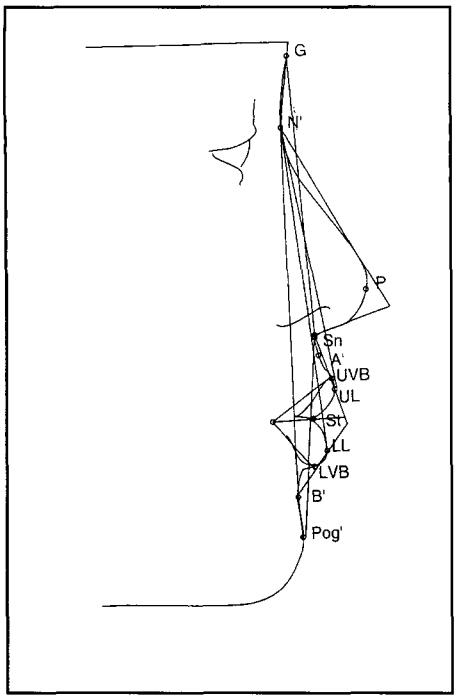

Figure 2

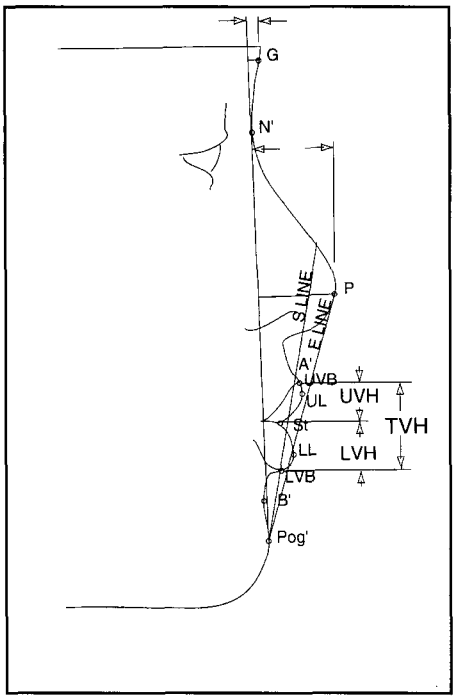

Figure 3

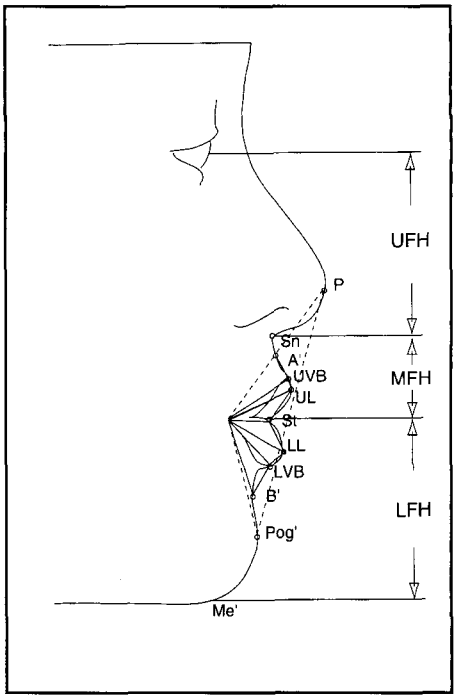

Figure 4

sary landmarks. The 35 mm slides were scanned using a Polaroid SprintScan 35 onto a Macintosh 6115CD computer, and 17 soft tissue landmarks were digitized (Figure 1). The points where the curvature of the nasal tip diverges from tangents to the superior and inferior borders of the nose were digitized to help calculate the nasal tip and nasolabial angles. A linear profile tracing was computer-generated by connecting the points and copying into Adobe Illustrator 5.0. Each tracing was enlarged to 54 mm N' to Sn', the average length based on the Bolton standard for 18-year-olds, oriented along the N'-Sn' line, and printed. A total of 26 angular, linear, and proportional measurements were calculated (Figures 2, 3, and 4). A standard protractor and millimeter ruler were used for all measurements, along with a mechanical pencil using 0.05 mm lead. Angular measurements were made to the nearest 0.5 degree and linear measurements were taken to the nearest half millimeter. Profiles, based on the average values of the 26 measurements for each group, were superimposed using Adobe PhotoShop 3.0 and PageMaker 5.0 to visually demonstrate the differences between groups and races (Figures 5, 6, and 7).

Dahlberg's formula was used to determine the error standard deviations for the variables in each data set. Ten profiles were selected at random and these profiles were retraced, digitized, and the error determined. Linear measurements had errors less than 1.4 mm, and angular measurements had errors less than 1.9 degrees. The standard deviation error was ±0.709° for angular measurements, 0.167 mm for the linear values, and 0.187% for the proportional values.

Results

The means, ranges, and standard deviations for all measurements for each group were computed and are listed in Tables 2 and 3. An unpaired, two-tailed Student's *t*-test was used to determine differences between groups (Table 4).

The comparison of AM/AC demonstrated only two significantly different measurements. ILA was more obtuse in the controls ($p<0.05$), indicating a tendency for flatter lips, and NTA ($p<0.001$) was more obtuse in the models, indicating a more gentle nasal form.

Comparing CM and CC, eight measurements showed significant differences. FNA and NLA were greater for the controls ($p<0.05$), enhancing the prominence of the nose. G-NPo and UFH were greater for the models, indicating a more prominent forehead and increased soft tissue upper face height. LMA and ILA were significantly greater ($p<0.01$) in the controls, demonstrating less lip prominence. Total and lower vermilion heights were significantly different ($p<0.001$), with the models showing a greater amount of vermilion display. There was no statistical difference in upper vermilion height between these groups.

Between-race comparisons demonstrated greater numbers of variables with statistically significant differences. The CM/AM group had

Figure 2
Eleven angular measurements calculated for each profile tracing

Figure 3
Eleven linear measurements calculated for each profile tracing

Figure 4
Four proportional measurements calculated for each profile tracing

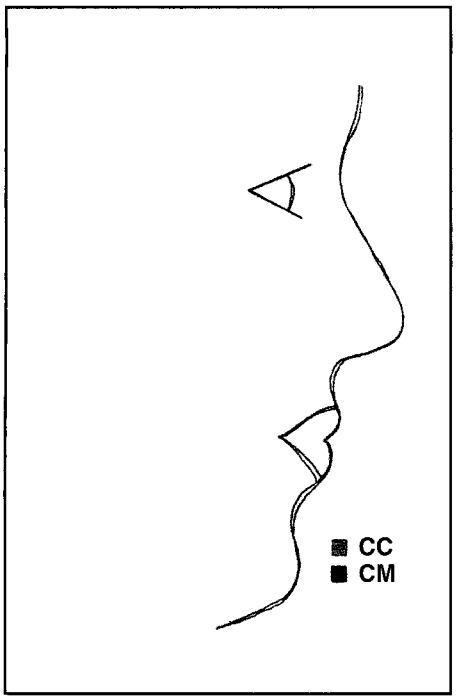

Figure 5

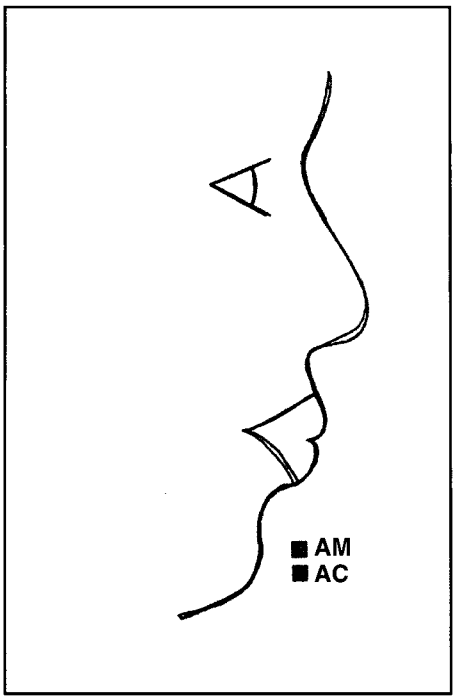

Figure 6

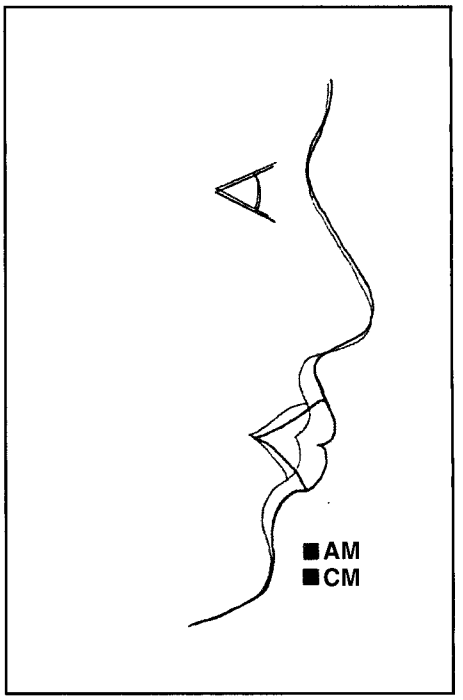

Figure 7

Figure 5
Superimposed mean profiles of Caucasian controls (CC) and models (CM)

Figure 6
Superimposed mean profiles of African American controls (AC) and models (AM)

Figure 7
Superimposed mean profiles of Caucasian models (CM) and African American models (AM)

the fewest differences of the between-race comparisons, with a total of 18. All but two of the significantly different measurements involved the lips, and indicated fuller, more prominent lips in African Americans.

CM/AC had 22 measurements that were significantly different. Twenty of the differences involved the lips, and of those, 14 were at the $p<0.001$ level. In each instance, the African Americans had fuller, more prominent lips than the Caucasian models. CC/AC and CC/AM also demonstrated 22 significant differences. All but three of the measurements in each group comparison showed more pronounced lips in the African Americans.

Finally, the only measurement significantly different between all groups, with varying probability levels, was interlabial angle (ILA). This between-group difference indicated more pronounced lips in the African Americans, with the greatest fullness in the AC group.

To visually demonstrate the differences discussed, superimposed tracings of the average profiles for each race, along with a superimposition of two races, are shown in Figures 5, 6, and 7.

Discussion

Studies have shown that significant differences exist between average Caucasian and African American profiles.[7-11] Other research, however, has demonstrated the esthetic profile may be significantly different from the average profile for a given race. For example, the esthetic Caucasian female profile[1,2] has been shown to have fuller lips than the average Caucasian female, while the preferred African American face has been found to be flatter than the norm for that race.[3-5,12] If these observations are accurate, might the esthetic Caucasian and African American faces be more similar to each other than to their nonmodel counterparts? Our results indicate a definite distinction in the profile features of Caucasian and African American models. However, although 18 of 26 facial parameters were statistically different, the Caucasian and African American models did share the most similarities of the inter-race comparisons. These similarities were not due to flatness in the African American profiles but increased lip prominence in the Caucasians. This may suggest that even though there were major differences between them, the esthetic profiles of these two races have a tendency to be more similar than average profiles. Perhaps esthetic faces have a propensity for certain defining characteristics as compared with average faces. Our results support the findings of Auger and Turley,[2] who found that lip projection for Caucasian female models increased during the 1900s.

When comparing groups of the same race, similarities far outweighed differences. Most surprising was the similarity of the two African American samples, contrary to what the literature suggests, and the greater differences between the Caucasian groups. Our results showed

Table 2
Mean, range, and standard deviations of measurements made on Caucasian models (CM) and controls (CC)

Measurements	Caucasian models (CM) Mean (°)	Max/Min (°)	S.D. (±)	Caucasian controls (CC) Mean (°)	Max/Min (°)	S.D. (±)
Angular						
FNA	136.6	117.2-151.0	7.8	140.7	112.5-151.0	7.8
NLA	108.3	85.0-129.5	10.4	114.6	98.0-141.5	10.3
LMA	130.7	105.5-150.0	10.1	136.9	121.5-154.5	9.0
NTA	79.7	64.0-91.0	7.0	82.0	63.5-91.0	6.7
ILA	12..9	100.0-157.0	11.9	131.8	111.0-155.0	9.6
TFA	168.1	158.5-177.0	4.1	166.2	154.5-179.0	6.4
T.V.A.	61.7	43.5-94.5	12.2	59.1	41.5-87.0	10.6
U.V.A.	20.1	7.0-43.5	7.9	18.9	9.5-37.0	6.1
L.V.A.	41.6	25.0-78.5	11.9	39.6	22.0-56.0	7.5
UL-PROJ.	7.7	4.0-11.0	1.6	6.9	2.0-11.5	2.5
LL-PROJ.	4.3	2.5-6.5	1.0	4.0	0.0-7.0	1.9
Linear						
T.V.H.	22.0	17.0-28.5	2.7	18.4	13.0-25.5	3.0
U.V.H.	8.9	1.0-14.0	2.4	7.7	3.0-11.0	1.8
L.V.H.	12.5	10.0-19.0	2.2	10.6	7.5-15.5	1.8
UL-S.	-2.8	-6.5-1.5	2.0	-2.3	-6.0-2.0	2.2
LL-S.	-0.9	-4.0-1.5	1.5	-0.8	-6.0-5.0	2.4
UL-R.	-5.2	-9.5-(-1.0)	2.2	-4.7	-9.0-(-0.5)	2.5
LL-R.	-2.8	-6.0-0.0	1.5	-2.5	-8.0-3.5	2.5
UL-NPO.	8.7	5.0-13.0	2.2	8.2	2.0-13.5	3.1
LL-NPO.	6.0	3.0-9.0	1.5	5.6	-0.5-11.0	2.6
G-NPO.	3.7	-0.5-9.0	2.2	2.4	-2.5-6.0	1.9
PR-NPO.	23.5	16.0-30.5	3.0	23.4	18.0-29.5	3.0
Proportional						
UFH	45.0	39.0-50.0	3.0	43.2	37.0-49.0	2.9
MFH	17.6	14.0-20.0	1.6	18.6	14.0-23.0	2.0
LFH	37.4	34.0-41.0	2.3	38.2	35.0-43.0	2.2
Lip area	0.5	0.33-0.3	0.1	0.4	0.31-0.75	1.0

large ranges for numerous facial parameters, which agrees with previous cephalometric studies of Class I Caucasian normals. For example, Casko and Shepherd[13] studied untreated Caucasians and found large ranges for ANB (-3 to +8 degrees) and IMPA (83 to 106 degrees). Bacon et al.[10] compared cephalometric values of African Bantu and Caucasians and found wide ranges of variation in both groups. Caucasians had a range similar to Casko and Shepherd's value for ANB (-2 to +8 degrees); the range for soft tissue lower lip to E-line was -11 mm to 1 mm. Our range for lower lip to E-line was smaller (-6 mm to 0 mm) for models but larger (-8 mm to +3.5 mm) for controls, suggesting more consistency in lip position for the models. No Caucasian model had lips ahead of the E-line, whereas a few Caucasian controls did. This finding suggests that esthetic faces are more similar to each other than are average faces.

Previous studies evaluating African American profiles showed a preference for straighter or more Caucasian-like features. Martin[3] used subjective responses to photographs taken from magazines as his data, Thomas[4] evaluated profile tracings taken from photographs of North American African females, and Sushner[12] obtained measurements directly from photographs of actual profiles. Farrow et al.[5] evaluated computer-altered photographs of African Americans and concluded that, "black Americans prefer a straighter but not necessarily white profile." Polk et al.[14] evaluated profile preferences of African Americans using silhouettes and concluded that African American female subjects preferred a "relatively flat profile" with varied fullness of the lips. Recently, Olsen et al.[15] compared esthetic evaluations of "generic," artificially altered Caucasian and African American profiles by professionals and lay people. They found a more retruded African American profile was preferred over a more protrusive profile. Our results do

Table 3
Mean, range, and standard deviations of measurements made on African American models (AM) and controls (AC)

Measurements	African American models (AM) Mean (°)	Max/Min (°)	S.D. (±)	African American controls (AC) Mean (°)	Max/Min (°)	S.D. (±)
Angular						
FNA	136.4	120.0-148.0	6.3	135.8	117.0-157.0	8.2
NLA	99.5	77.5-129.0	12.7	96.4	66.5-122.0	11.9
LMA	133.7	93.5-160.0	14.2	138.4	111.5-161.0	10.7
NTA	82.7	60.5-115.0	11.7	73.2	50.0-91.0	9.0
ILA	111.5	68.0-129.0	12.8	117.9	100.0-137.0	9.8
TFA	169.0	163.0-178.0	3.6	167.5	160.5-176.5	4.4
T.V.A.	69.9	44.0-108.0	13.5	76.7	44.0-116.0	14.4
U.V.A.	23.8	8.5-53.0	9.4	26.2	13.0-46.0	6.5
L.V.A.	46.1	19.0-74.0	11.5	50.6	31.0-79.0	10.9
UL-Proj.	11.6	7.5-17.0	2.0	11.6	6.5-16.0	2.2
LL-Proj.	7.4	4.0-10.0	1.6	7.4	4.0-12.0	1.9
Linear						
T.V.H.	27.1	15.5-39.5	4.7	26.0	18.5-33.0	3.5
U.V.H.	11.6	5.5-18.0	2.9	11.1	7.5-15.5	1.8
L.V.H.	15.9	10.0-27.5	3.4	14.8	9.5-20.0	2.3
UL-S.	3.4	-2.5-10.5	2.8	3.4	-3.0-9.0	2.7
LL-S.	5.3	-0.5-10.5	2.8	5.3	-1.0-16.0	3.4
UL-R.	0.5	-5.5-7.0	3.1	1.1	-5.0-7.5	2.7
LL-R.	3.4	-4.0-10.0	3.3	3.5	-3.0-13.0	3.4
UL-NPO.	14.6	10.5-23.0	2.8	14.8	7.5-21.0	2.9
LL-NPO.	12.0	6.5-17.0	2.7	11.6	6.5-21.0	3.5
G-NPO.	4.9	0.0-9.0	2.2	4.8	0.5-14.5	3.2
PR-NPO.	23.7	19.5-28.5	2.5	24.6	19.5-29.5	2.1
Proportional						
UFH	43.1	34.0-52.0	3.6	42.5	37.0-49.0	2.5
MFH	20.5	14.0-25.0	2.6	21.4	17.0-26.0	2.0
LFH	36.5	33.0-45.0	2.5	36.1	29.0-41.0	2.4
Lip area	0.8	0.46-1.3	0.2	0.8	0.36-1.43	0.2

not support the findings of the literature cited above. This difference may be due to the subjective nature of the cited studies, along with the use of altered or artificial faces versus obtaining objective data from photographs. Our findings demonstrate that in this decade, a flatter African American profile is not necessary to be considered beautiful. Profiles of the African American models were as full as their respective controls, yet the faces were esthetically pleasing, as judged by the mass media and the public. Although the literature reports a preference for flatter facial features in African Americans, our results indicate that statistically, esthetic and average African American profiles are similar. Perhaps this discrepancy between what is a preferred African American profile and what was found in our study may be due to the general public being conditioned by the mass media's historical use of Caucasians more than African Americans.

Do the few differences between the two African American groups indicate less variability within the facial features of this race? Previous studies suggest that a range, similar to that of Caucasians, exists for various parameters in African American faces. Jacobson[11] studied the skeletal pattern of the South African Negro and found a range of -1 to +10.5 degrees for the ANB angle; no soft tissue values were given. Bacon et al.[10] found a range of -0.5 to +9 degrees for ANB, and -1 to +10 mm for lower lip to E-line in the Bantu population. In regard to the latter measurement, our results show a similar range between the African American models (-4 mm to +10 mm) and controls (-3 mm to +13 mm). The range for the models was slightly less protrusive than that of the controls, which would support the findings of studies already cited. However, this value was not statistically different between the two groups.

Our findings that African Americans have fuller, more procumbent lips than Caucasians

agree with previous studies.[5,16] Fonseca and Klein[17] established hard- and soft tissue values for a sample of 40 African American women, and they compared these values with a control sample of 20 Caucasian women. Upper and lower lip projection, measured from hard tissue facial plane, was significantly greater in African Americans (7.1 mm for the upper lip and 7.4 mm for the lower). Their remaining soft tissue values were within 2.0 mm of each other, which indicates the major difference between the two races is due to lip position. However, the soft tissue thickness of the upper and lower lips, measured from the facial surface of the upper and lower incisors, was "essentially the same" when their African American sample was compared with the Caucasian control group and the Caucasian females used in Burstone's study.[18] This suggests that the African American profiles are more protrusive than the Caucasian profiles due to the underlying hard tissue. Fonseca et al.[17] state, "what clinically appears to be an increase in lip thickness in the Negro woman is probably an eversion of the lips revealing more lip tissue between upper and lower vermilion borders." Our results support the difference in protrusion of the lips and the increase in vermilion display of the lower lip in African Americans as compared with Caucasians.

When evaluating the average vertical soft tissue ratios for the four groups, the results differed between groups and from accepted norms. Worms et al.,[19] when discussing the soft tissue vertical dimensions of the face, reference Cutcliffe's 40/20/40 ratio. Although commonly cited, these ratios come from unpublished data. In this study, the Caucasian samples had greater upper face height (45.0% for CM, 43.2% for CC) with subsequent reductions in the middle (17.6% for CM, 18.6% for CC) and lower face (37.4% for CM, 38.2% for CC). In the African American samples, upper face height was also greater (43.1% for AM, 42.5% for AC), yet the middle third was at 20% or slightly more (20.5% for AM, 21.4% for AC), while the lower third was less than 40% (36.5% for AM, 36.1% for AC). Thus the Caucasians had the greatest upper and lower soft tissue face height, while the African Americans had the greatest middle face height. These values may tend to enhance the perception of lip prominence in the African American. Other vertical proportions are commonly used to evaluate the face, many of which date from the ancient Greeks. Farkas et al.[20] tested the validity of nine neoclassical canons of facial proportions by comparing them with measurements of North American Caucasian normals. One of the canons divides the face into three equal vertical proportions (Tr'-N', N'-S n', Sn'-Gn'). None of the samples conformed to these proportions, with N'-Sn' always shorter than Sn'-Gn'. Farkas et al. states that the upper lip length occupies about one-third of the lower facial height in the average young adult face. This would tend to support the 20/40 ratio in regard to middle and lower face height. In another study, Farkas et al.[21] found that upper lip height (Sn'-Sto') was just less than one-third (31.1%) of the lower face height (Sn'-Gn') for young Caucasian adult females. The authors also mentioned Francesca and Pacioli's neoclassical canon, which divides the lower face into three equal segments—upper lip, lower lip, and chin—which also corresponds to the 20/40 ratio of the lower face. In contrast to a 20/40 lower face height, Belinfante,[22] divides the lower third of the face equally, A'-St'/St'-Gn', indicating a 50/50 ratio of the lower face. None

Table 4
Between-group differences

	Group comparisons					
Measurements	CM/CC	CM/AC	CM/AM	CC/AC	CC/AM	AM/AC
Angular						
FNA	*	N.S.	N.S.	*	*	N.S.
NLA	*	***	**	***	***	N.S.
LMA	**	**	N.S.	N.S.	N.S.	N.S.
NTA	N.S.	**	N.S.	***	N.S.	***
ILA **	*	***	***	***	*	
TFA	N.S.	N.S.	N.S.	N.S.	*	N.S.
T. Verm. A.	N.S.	***	*	***	**	N.S.
U. Verm. A.	N.S.	**	N.S.	***	*	N.S.
L. Vema. A.	N.S.	**	N.S.	***	*	N.S.
UL-Proj. A.	N.S.	***	***	***	***	N.S.
LL-Proj. A.	N.S.	***	***	***	***	N.S.
Linear						
T. Vema. HT.	***	***	***	***	***	N.S.
U. Vema. HT.	N.S.	***	***	***	***	N.S.
L. Vema. HT.	***	***	***	***	***	N.S.
UL-Stein.	N.S.	***	***	***	***	N.S.
LL-Stein.	N.S.	***	***	***	***	N.S.
UL-Rick.	N.S.	***	***	***	***	N.S.
LL-Rick.	N.S.	***	***	***	***	N.S.
UL-NPO.	N.S.	***	***	***	***	N.S.
LL-NPO.	N.S.	***	***	***	***	N.S.
G-NPO.	*	N.S.	*	***	***	N.S.
PR-NPO.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Proportional						
UFH	*	***	*	N.S.	N.S.	N.S.
MFH	N.S.	***	***	***	**	N.S.
LFH	N.S.	*	N.S.	***	**	N.S.
Lip area	N.S.	***	***	***	***	N.S.

*p ≤ 0.05, ** p ≤ 0.01, ***p ≤ 0.001, N.S. = not significant).

of our groups followed the ratios listed above, indicating that accepted vertical proportions may need to be revised and established for each race, which would aid in diagnosis and treatment planning. In summary, our study found that esthetic faces had increased upper and decreased lower facial height percentages, with middle face height less than 20% for Caucasians and slightly more than 20% for African Americans. This is consistent with DeSmit and Dermaut,[23] who report a preference for the Class I deepbite profile second only to the normal Class I face in females. Also, Morris[24] found that upper lip height should occupy roughly 50% (48.89%) of the lower lip and chin height, with the range being 61% to 40%. Our results for Caucasians support these findings (47% for CM, 49% for CC), while the African Americans were at the high end of this range (59% for AC, 56% for AM).

The terms Caucasian and African American have been used in this article to denote people of European and African descent. As described in the materials and methods section, the racial grouping of facial profile photographs used in this study represented the best visual estimates of race for the photographic subjects, in the absence of specific information on the social identities and geographic origins of each. The authors recognize this deficiency in the experimental design of this study. The compromised sample also prevents analysis of group age differences and their impact on facial soft tissue differences. Studies have shown that the facial profile tends to flatten with age.[25-27] The sample's high soft tissue variability may be related to a broad age range, which could not be controlled due to lack of knowledge concerning age of the models.

Although some measurements differed significantly between the average and the esthetic Caucasian and African American faces, respectively, Figures 5 and 6 show that visually the difference is minimal when profiles of the same race are compared. The superimpositions might suggest that numerical values alone are poor determinants of beauty because visually the profiles are almost identical. Figure 7 shows a larger difference between races. Although studies suggest the esthetic Caucasian profile is becoming increasingly fuller with time and the preferred profile for African Americans is straighter and more "Caucasian-like," the two have not yet met in the middle. In fact, there is only a small tendency for either race to acquire facial characteristics of the other, suggesting that the inherent facial characteristics of either race seem to be preserved in esthetic faces.

Finally, it is important to acknowledge the standard deviations, which were large for most measurements, allowing for the possibility of overlap among the values, and more importantly, showing the great amount of variability that exists from one person to the next. Because the age of each model could not be determined, analysis of age differences and their influence on facial soft tissue parameters could not be taken into account. Also, the authors realize that when comparing measurements, angular and proportional values should be comparable with those of other studies, regardless of magnification differences, although linear values would be affected. Our study used photographs standardized to 54 mm N'-Sn', which was measured from the 18-year Bolton standard and has been verified as normal for adults in a cephalometric study.[28] This should allow for valid comparison with the values obtained from cephalometric studies.

Conclusions

Contrary to preferences discussed in the literature, esthetic African American profiles were as full as average African American faces. In fact, although African American models and controls had profiles that were more similar to each other than were those of the Caucasian models and controls, intrarace differences were minor in both cases. This indicates a distinction in various facial characteristics within each race. Although there was a tendency for esthetic faces of both races to be more homogeneous than average faces, in all comparisons the Caucasians had the straighter profile while the African Americans had fuller, more prominent lips. The Caucasian models displayed a profile that was fuller than their controls, but not as full as the profiles of either African American group.[1]

The vertical soft tissue ratios found in this study differed from a 40/20/40 proportion, and no group followed a 20/40 lower face ratio. At least two of the three vertical soft tissue values (UFH, MFH, LFH) were significantly different in any mixed race comparison. Our study showed that Caucasians are more brachyfacial than African Americans, as measured by vertical soft tissue proportions. Thus, the 40/20/40 ratio should not be taken as an absolute when assessing the vertical proportions of faces from various races.

While an understanding of what the general population considers esthetic can enhance orthodontic treatment planning, it is important to keep in mind the desires of each individual patient in regard to his or her treatment. Polk et al.[14] state, "Potential orthodontic patients will have varying profile preferences, and the orthodontist should elicit the patient's personal preferences when treatment is likely to alter the soft tissue "envelope," especially in borderline extraction/nonextraction cases." The results of this study demonstrated large standard deviations for many measurements, indicating much variability between the subjects studied. Orthodontic treatment often may not produce a facial profile that fits the esthetic parameters of the models presented in the mass media; sometimes other cosmetic procedures may be needed to achieve what would be considered an ideal result. Even if the patient's profile values do not approach those found for the models in this study, they may still be considered attractive.

There are several ways of strengthening this study. First, standardizing photographs to correspond to lateral cephalometric radiographs of all subjects would be beneficial. Second, assessing the subject's skeletal pattern would aid in "fine-tuning" the sample selection. Third, a personal interview could indicate prior orthodontic treatment and the subject's age, which would also allow for refining the sample in respect to these variables. And last, if the ethnic makeup of the subjects could be determined, then the samples used could be better defined as to racial identity.

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