Current perception of optimal lip protrusion among African American laypersons

Drs. Moshood B. Martins, Daniel Rinchuse, Lauren S. Busch, Anthony L. Farrow, and Thomas Zullo discuss the subtle differences in people’s esthetic preferences

Abstract

**Objective:** Patients of different races, genders, and generations have subtle differences in their esthetic preferences. The objective of this pilot study was to evaluate the preferred amount of facial protrusion among 21st century African American laypersons.

**Methods:** Profile photographs of a male and female subject were digitally altered using Adobe Photoshop to create three different profile types by manipulating the amount of lip protrusion in 3-mm increments. Lip protrusion amount was measured from glabella perpendicular to the outermost part of the upper and lower lip. Each photograph was rated based on level of attractiveness by 40 African American laypersons.

**Results:** The profiles most preferred by the African American laypersons were profiles with natural lip position (0.0 mm-3.0 mm) and mild protrusion (3.1 mm-6.0 mm). There was no difference in preference between natural lip position (0.0 mm-3.0 mm) and mild protrusion (3.1 mm-6.0 mm). However, both were preferred over the more protrusive profiles (6.1 mm-9.0 mm and 9.1 mm-12.0 mm). A few raters preferred the most protrusive profiles to the profiles with natural lip position and mild protrusion.

**Conclusion:** This pilot study was designed after a study conducted by Farrow, et al., in 1993 that investigated optimal levels of lip protrusion among African Americans. The laypersons in Farrow’s study found mild protrusion to be the most favorable profile. In this pilot study, the layperson raters did not distinguish between mildly protrusive profiles and profiles with natural lip position. Results from this pilot study suggest that African American laypersons prefer different levels of lip protrusion than they did 20 years ago.

Educational aims and objectives

**Expected outcomes**
Orthodontic Practice US subscribers can answer the CE questions on page XX to earn 2 hours of CE from reading this article. Correctly answering the questions will demonstrate the reader can:

- Realize that patients of different races, genders, and generations have subtle differences in their esthetic preferences.
- Recognize the characteristic beauty and exceptional beauty of African Americans.
- Realize that esthetic preferences have changed from the early 90s to the current time.
- Realize the importance of understanding the patient’s preference regarding the protrusion threshold when planning orthodontic treatment.

**Introduction**

Upon initial examination and consultation with a patient, the astute orthodontist envisions the patient’s optimal facial esthetic end result. 1 Facial esthetics influence an individual’s ability to integrate with society as well as his/her level of self-esteem and psychological well-being. 2,3 Today’s orthodontic patients are becoming increasingly aware of the significance of a beautiful smile and overall facial beauty. 2,4 In order to conceptualize the patient’s optimal end result, the practitioner should interview the patient. 5-10 The patient has his/her own generational, racial, and cultural perceptions of beauty. During treatment planning, the orthodontist may need to set aside his/her own generational, racial, and cultural biases of beauty and treat to the patient’s preferences if it does no harm. 4 Orthodontists must consider the role race plays in soft tissue profile preferences.

Traditionally, African American patients with bimaxillary protrusion and dentoalveolar flaring of the upper and lower teeth would have been treatment planned for extraction of four first premolars, producing a more straight facial profile. 11,12 Possibly, this treatment plan may have led to disappointing results for an African American who would have preferred to maintain his/her protrusive profile.

African Americans’ perception of beauty has been briefly characterized in the orthodontic literature, but as a whole the literature is limited. 11 African American anatomical features lend them to having more protrusion and thicker lips than their Caucasian counterparts. 11 In a study using 100 different photographs of African American soft tissue...
profiles, Sushner demonstrated that Ricketts’ esthetic plane, Holdaway’s “H line,” and Steiner’s “S line” were not applicable to African Americans because of their naturally fuller profiles. Further, cephalometric norms for African Americans also reflect more protrusive soft tissue profiles than Caucasians. While normative values of African American protrusion may remain relatively constant over time, the practitioner must constantly weigh what their African American patients consider to be the minimum and maximum threshold of esthetic facial protrusion. In a cephalometric study deriving soft tissue norms from 82 African American adolescents with Class I occlusions and well-balanced faces, Dr. Larry White concluded that the absence of strain in and around the lips when the patient is in centric occlusion translates into favorable soft tissue contour irrespective of lip thickness. He also found the range of acceptable African American soft tissue measurements between patients to be greater than in Caucasian patients.

Farrow, et al.11 studied African American protrusion in 1993 and found that African Americans prefer slight bimaxillary protrusion over straight profiles. Farrow, et al.’s study also found African Americans do not find moderate to severe bimaxillary protrusion as attractive as mild bimaxillary protrusion.

Materials and Methods

This pilot study aims to add more information regarding African American esthetic preferences — specifically the facial profile — by comparing this study’s results to findings published by Farrow, et al., in 1993. Prior to the collection of any data, approval for this study was obtained from Seton Hill University’s Institutional Review Board.

The design of this pilot study was modeled after the study conducted by Farrow, et al.,11 which was published in 1993. This study differs from Farrow, et al.’s in three ways:

1. The scope was narrower since Farrow, et al., had layperson, orthodontist, and general dentist raters, whereas this study only had layperson raters.
2. More modern technology was used to digitally alter target person photographs. A professional graphic designer used Adobe Photoshop (Adobe Systems, San Jose, California) to manipulate lip protrusion and blend skin tone, providing a more natural appearance than Farrow, et al.’s black-and-white photos.
3. Era — Farrow, et al.’s study was conducted 21 years earlier.

Selection of the target persons

Two average level-of-attractiveness African American target persons were selected by one of the authors (MM). The author who selected the target persons (MM) is African American. Target person selection was based on the following inclusion criteria:

1. African American between the ages of 18 and 40
2. No obvious facial abnormalities

The target persons were asked to remove all facial jewelry (nose ring, earrings, necklaces, and glasses). Upon each target person submitting a signed consent-to-participate form, they were asked to identify their race and age.

Lateral photographs of the male and female targets were taken against a white-colored background using a Pentax Optio WG-1 camera. The protocol of a white background follows the standard of the American Board of Orthodontics photographic procedures. A fixed distance of 6 feet between the target person and the camera maintained consistency with each photograph taken.

Digital photographs of the target persons were sent in JPEG (Joint Photographic Expert Group) format to a professional graphic designer for alterations of the maxillary and mandibular lips. This study used color profile photographs for the evaluation, which allowed a more natural representation of facial esthetics than silhouettes and profile drawings. The graphic designer matched skin complexion and merged facial structures to mask the lips’ digital advancement.

Lip protrusion was measured in the same manner used by Farrow, et al. The glabella perpendicular line, which is a line from the soft tissue glabella drawn perpendicularly...
to Frankfort horizontal was measured to the most prominent point on the upper and lower lip. The target persons’ profiles each began in the natural (N) category, with the outermost portion of the lips measuring 0.0 mm-3.0 mm from glabella perpendicular. From the target photo’s natural (N) position, the lips were digitally advanced horizontally using Adobe Photoshop (Adobe Systems, San Jose, California) in 3-mm increments. Lips in the range of 0.0 mm-3.0 mm of the line glabella perpendicular were classified as normal (N). Lip protrusion from 3.1 mm-6.0 mm was classified as protrusive one (P1). Lips that measured 6.1 mm-9.0 mm from glabella perpendicular were classified as protrusive two (P2). Finally, lips that measured 9.1 mm -12.0 mm from glabella perpendicular were classified as protrusive three (P3) (Figures 1A-1D and 2A-2D).

Selection of the raters

Fifty African American laypersons were recruited from a Bible study group in Washington, D.C., to evaluate four profile photos of the two target persons. Raters had to meet the following inclusion criteria in order to qualify to participate in the study:

1. African American male or female between the ages of 25-40
2. Identify themselves as African American
3. No experience in the field of dentistry. From the group, 40 individuals (24 males and 16 females) met the inclusion criteria and agreed to participate in the study.

Following signed consents, a folder was handed to each rater with detailed instructions. Raters were asked to report their age, race, and sex. Raters were given a two-page composite of eight randomly manipulated photographs of the male and female African American target persons to rank. The first page displayed the male target with four different profiles. (Figures 1A-1D) The second page displayed the female target person with four different profiles. (Figures 2A-2D) The raters were asked to rank each composite from one through four based on level of attractiveness. One was labeled as most unattractive, two unattractive, three second-most attractive and four most attractive. The raters were told to assign only one number per profile. Rating was requested in this particular manner to eliminate any mutual rating of any photographs. All data was collected and tabulated for statistical evaluation.

Results

Analysis of variance showed that the only statistically significant difference was for the level of lip protrusion (F = 47.69, P< .0004). There were no statistically significant inter-action effects for target photo gender versus rater gender (F = .661, P = 0.421) or gender of target photo versus lip protrusion (F = 1.187, P< 0.318).

Pairwise comparison demonstrated no differences between the natural lip position (0.0 mm-3.0 mm) and protrusion one (3.1 mm-6.0 mm). The natural lip protrusion (0.0 mm-3.0 mm) is significantly more attractive than both protrusion two (6.1 mm-9.0 mm) and protrusion three (9.1 mm -12.0 mm). Pairwise comparisons also revealed that protrusion one (3.1 mm-6.0 mm) was viewed as more attractive than protrusion two (6.1 mm-9.0 mm) and protrusion three (9.1 mm-12.0 mm). Additionally, protrusion two (6.1 mm-9.0 mm) was viewed as significantly more attractive than protrusion three (9.1 mm-12.0 mm) (Tables 1 and 2). However, four raters found protrusion three to be most attractive, and 10 raters found protrusion two to be the most attractive.

Discussion

Darwin once wrote17: “It is certainly not true that there is in the mind of man any universal standard of beauty with respect to the human body. … The men of each race prefer what they are accustomed to behold.” Race plays one of the most central roles in patient esthetic preferences.

However, orthodontic literature on esthetics is heavily Caucasian-centered with fewer studies on minority races. Therefore, when treating minority populations such as African Americans, the orthodontist may need to better familiarize himself/herself with the African American esthetic literature, interview the patient regarding esthetics, and set aside his/her racial preferences in order to properly treat the patient.16-20

Racial esthetic preferences are dynamic. Caucasian models from the early 1900s have straighter profiles than today’s super models, who have fuller profiles with more protrusive lips.16 African American optimal esthetics may be even more complex and changing than other races, as their makeup has so drastically changed in the past few decades, including a rise in the number of interracial children.30

Soft tissue profile preference among African American patients is further complicated by the fact that the term African American is an ambiguous term. The Census Bureau, for instance, identifies Black or African American according to the Office of Management and Budget’s definition as a “person having origins in any of the Black racial groups of Africa.”31 However, the Black category also includes respondents who report African American, Sub-Saharan African, and Afro-Caribbean entries. However, in the Census, an individual can

Table 1: Lip Position Means

<table>
<thead>
<tr>
<th>Lip Position</th>
<th>Mean</th>
<th>Standard Error</th>
<th>95% Confidence Interval</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-3.0 mm</td>
<td>3.229</td>
<td>.120</td>
<td>2.985</td>
<td>3.473</td>
</tr>
<tr>
<td>3.1-6.0 mm</td>
<td>3.104</td>
<td>.113</td>
<td>2.875</td>
<td>3.333</td>
</tr>
<tr>
<td>6.1-9.0 mm</td>
<td>2.354</td>
<td>.092</td>
<td>2.167</td>
<td>2.541</td>
</tr>
<tr>
<td>9.1-12.0 mm</td>
<td>1.302</td>
<td>.116</td>
<td>1.067</td>
<td>1.538</td>
</tr>
</tbody>
</table>

Table 2: Pairwise Comparisons of Lip Positions

<table>
<thead>
<tr>
<th>(f) Lip Position</th>
<th>(J) Lip Position</th>
<th>Mean Difference (f-J)</th>
<th>Standard Error</th>
<th>Sig.</th>
<th>95% Confidence Interval for Difference</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-3.0 mm</td>
<td>3.1-6.0 mm</td>
<td>.125</td>
<td>.151</td>
<td>.414</td>
<td>-.181</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.1-9.0 mm</td>
<td>.875*</td>
<td>.197</td>
<td>.000</td>
<td>.476</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.1-12.0 mm</td>
<td>1.927*</td>
<td>.212</td>
<td>.000</td>
<td>1.497</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1-6.0 mm</td>
<td>6.1-9.0 mm</td>
<td>.750*</td>
<td>.180</td>
<td>.000</td>
<td>.385</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.1-12.0 mm</td>
<td>1.802*</td>
<td>.213</td>
<td>.000</td>
<td>1.370</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1-9.0 mm</td>
<td>9.1-12.0 mm</td>
<td>1.053*</td>
<td>.113</td>
<td>.000</td>
<td>.824</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
report more than one race that refers to the multiple-race Black population. Those who identify with the Black alone category number is 38,929,319 while those who identify as combination is 1,330,180. African Americans combined make up 13.6% of the U.S. population. The total African American population alone or in combination was 15.4% in 2010. Moreover the African American in combination has risen 75% from 2000-2010. Therefore, Blacks who reported themselves as combination grew at a faster rate than the Black alone population.

Because of the high number of Blacks who identify themselves as multiracial, the definition of African American esthetics may become more intertwined with other populations as more persons identify themselves as African Americans in combination. The black and white population was reported as the most frequent combination. Therefore, an orthodontist who is treating an African American may need to discuss with patients not only which race they identify with, but also if they identify themselves as being part of multiple races. Once an orthodontist determines which race patients are, he/she should ask which origin and then delve into that origin’s esthetics. Further, it is possible that a patient prefers a different race’s esthetic norm. This should also be discussed before treatment planning.

This pilot study highlights the fact that within a minority race, esthetic preferences may have changed from the early 1990s to now. Farrow, et al.’s study found African American laypersons to prefer a mildly protrusive profile, comparable to this study’s protrusive one category (P1). However, while Farrow, et al., raters found the straight profile to be less desirable than P1, in this study, African American laypersons did not distinguish between N and P1. The most attractive profiles were those in which the lips were <6.1 mm from glabella perpendicular. Perhaps raters in this study are reflective of the more recent African American preferences, which likely come from a more mixed population than homogenous population. One of the limitations of this pilot study is that it did not ask raters to specify whether or not they considered themselves 100% American or of multiple races.

This pilot study is important to any orthodontic practitioner treating minority patients, particularly treating African American patients. It demonstrates that an orthodontist must evaluate the protrusion threshold of his/her patients through communication and not assumption. The orthodontist can theoretically influence the soft tissue profile through various techniques and procedures such as lip reduction through extraction of the maxillary and mandibular first premolars and/or surgery in extremely protrusive patients. However, treatment to enhance soft tissue profile in one patient could potentially detract from the esthetics of the optimal soft tissue profile in another patient. A few raters preferred the most protrusive of profiles (P3 and P4). To achieve the best esthetic final outcome in these outlier raters, an orthodontist treating these types of individuals needs to know that their protrusion threshold is higher by questioning them about their preferences about facial profiles.

Conclusions
1. Raters agreed upon the optimal level of lip protrusion (<6.1 mm from glabella perpendicular) irrespective of target photo gender or rater gender.

2. African American laypersons raters found natural lip position and slight protrusion to be the most attractive profiles when compared to profiles of greater protrusion, and found no difference between these two profile variations.

3. The results of this pilot study have similar findings to those published by Farrow, et al., in 1993. However, raters in this pilot study found the straight profile to be more acceptable than the layperson raters in 1993. This pilot study too small to reflect a trend; however, a larger sample may also show that in the past two decades, African Americans find less protrusion more acceptable/attractive than they did 20 years ago. Continued research is recommended to follow changes in esthetic preferences among the African American race.

REFERENCES