Original Article

Evaluation of the facial profile by alteration of lip position in Indian Maratha male and female population

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ABSTRACT

Aim: The aim of the study was to evaluate the esthetic preferences of lay persons and orthodontists about lip position in Indian Maratha males and females. **Materials and Methods:** The profile images of Indian Maratha males and females (Class I skeletal and dental) were digitally adjusted to the mean values found in Indian Maratha population. The lip profile was adjusted such that the upper lip (UL) and lower lips (LL) lie at a mean distance from Rickett's E-line. These images were used as baseline images, and the UL and LLs were altered such that they lay 0.5, 1.0 and 2.0 mm in front of or behind the E-line. The images were viewed and ranked by 10 orthodontists and lay persons each. Once the ratings were obtained, they were analyzed using ANOVA, followed by SPSS 16. **Conclusion:** The study found that both laypersons and orthodontists prefer a more retrusive profile in Indian Maratha males compared with females and were more likely to rate a protrusive profile as unacceptable with regard to lip position.

Key words: E-line, lip position, Maratha population

INTRODUCTION

Modern society places a strong emphasis on physical attractiveness and facial beauty. Facial esthetics is one of the main goals of orthodontic treatment, and increased emphasis has been placed on it in recent years by both patients and orthodontists.[1] When it comes to facial esthetics, not only should the tooth alignment and occlusion be closely monitored, but a thorough evaluation of the soft tissue-hard tissue relationship should also be included.[2] The dentoalveolar changes resulting from orthodontic treatment can affect the posture, position of the lip and also the nasolabial angle, both of which can affect the facial profile and attractiveness.[3] Lip position has an important influence on facial profile esthetics requiring orthodontists to align the teeth based on the patient's soft tissue preferences.[4,5] In the light of these developments, this study was aimed to determine the perceptions of lip position in Indian Maratha male and female population. Increasing internationalization in the recent years makes it inevitable that the future orthodontic community will consist of orthodontists and patients of various races or ethnicities in different countries.[5]

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MATERIALS AND METHODS

The profile images and lateral cephalograms of five untreated young adult males and females with Class I skeletal and dental profile were selected from Indian Maratha population. The original profile images were digitally manipulated with Dolphin software, Version 10.5, to obtain the mean antero-posterior and vertical values of an Indian Maratha adult profile. The Indian Maratha adult profile was based on the cephalometric norms established by Atit *et al.*[6] in 2013.

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This was done by adjusting the point A to nasion perpendicular and pogonion to nasion perpendicular distances and lower anterior facial height to Indian Maratha mean values.

The lip profile was also adjusted with the upper lip (UL) and lower lip (LL) at the mean distance (in millimeters) from the Ricketts' E-line (UL-E line, LL-E line).

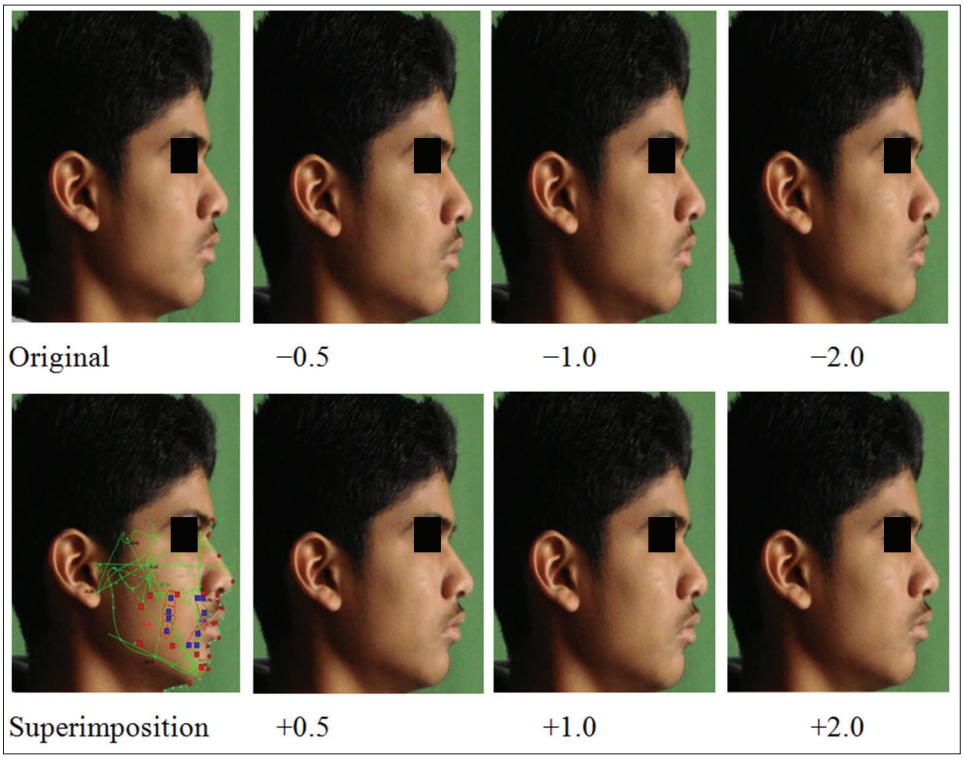
These images were used as baseline images and they were then further digitally manipulated to generate six additional images such that the UL and LL lay 0.5, 1.0, and 2.0 mm in front of or behind the E-line.

Of the various soft tissue parameters, the E-line was used as a baseline because it was widely used in studies on esthetic preferences and hence can provide interpretation and comparison with previous studies.[7] Computer generated profile photos and silhouettes are commonly used in orthodontic research to evaluate patient profile esthetics.[8,9]

The survey was conducted in Department of Orthodontics at M A Rangoonwala Dental College, Pune. The images were evaluated by orthodontists and laypersons as judges. The laypersons were university students from non-dental related faculties. The seven profile images for each gender were randomly placed on a single slide and shown to the judges in the form of a Microsoft Office PowerPoint presentation. Prior to viewing the images the judges entered their age, gender, and dental experience on the data-collection form. The survey consisted of three components. First, the judges were asked to rank the seven profiles from the most attractive to the least attractive without repeating a rank. As the judges were required to give a unique rank for each profile image, this was useful to determining the order of preference. In the second part of the survey, the judges were asked to mark their preference on a visual analog scale (VAS). As the judges were allowed to mark the same score for different profile images, this helped to determine whether their preferences over other profiles were significant. In this study, we used the ideal profile as the control image for comparison. In the last part of the survey, the judges had to classify the profiles as either "acceptable" or "unacceptable."

Sample Size

A total of 10 subjects (5 males and 5 females) meeting the above criteria were selected from patients who visited our institution for orthodontic treatment. A total of 70 images of subjects was assessed by each member of 10 laypersons and 10 orthodontists. Age of the judges was between 20 and 35 years.



Data Analysis

Generalized estimating equations (GEE) models for ordinal data were constructed to analyze the ranks of the male and female profiles separately. GEE models for binary data were constructed to analyze the acceptability of male and female profiles separately. GEE models for Gaussian data were used to analyze the VAS scores of male and female profiles (Table 1). In each of the models above, an interaction term between the profile number was used to determine whether the outcome (rank, acceptability, or VAS score) differed for each profile between orthodontists and laypersons co-variants considered were judges, dental experience, age and sex and each of their interaction variables with profile. Each of the models was clustered by the judges. Once the ratings were obtained, they were analyzed using ANOVA, followed by SPSS 16.

RESULTS

Odds ratios adjusted for age and sex of the judges using GEE models for ordinal data. $P < 0.05$ is considered as significantly different statistically and vice-versa.

Values are mean±standard deviation of VAS. Higher the value of the mean indicate more attractiveness and vice-versa. *P* value-1 by paired *t*-test and *P* value-2 by one-way analysis of variance (ANOVA) after confirming the underlying normality assumptions. $P < 0.05$ is considered to be statistically significant for both Figures 1 and 2.

DISCUSSION

The perception of beauty is not only an individual preference, but it also has a cultural bias. The UL, LLs and chin were found to be the most important facial features influencing the perception of facial esthetics.

There was no comparable study evaluating the esthetic lip position in the Indian population. Maganzini *et al.*[10] and Soh *et al.*[11] found that normal and bimaxillary retrusive profiles were perceived to be the most attractive, while protrusive mandibles were perceived to be the least attractive.

Shimomura *et al.*[12] Found that Japanese patients receiving orthodontic treatment preferred a slightly more retruded lip position than was present in the average facial profile for both male and female. The study by Ioi *et al.*[13] showed similar preferences in Korean and Japanese dental students.

The soft tissue lateral cephalometric norms are specific for the racial group and cannot always be applied across different racial types, an aspect that was also reported by many researchers.[14]

In our study, both orthodontists and laypersons rated all profiles almost same with no significant difference. Most attractive to least attractive male profiles were −2.0SD, −1.0SD, −0.5 SD, N, +0.5 SD, +1 SD and +2.0 SD While most attractive to least attractive female profiles were −1.0 SD, −2.0 SD, −0.5 SD, N, +0.5 SD, +1 SD and +2.0 SD. This means retrusive profiles were preferred more over protrusive profiles by

Table 1: Analysis of ranks for all male and female profiles (orthodontists versus laypersons)

Profile	Odds ratio	Lower 95% CI	Upper 95% CI	*P* value
Normal	0.34	0.14	0.57	0.741
−2.0 SD	0.29	0.11	0.49	0.847
−1.0 SD	0.37	0.20	0.63	0.778
−0.5 SD	0.83	0.59	1.47	0.321
+0.5 SD	0.80	0.53	1.29	0.334
+1.0 SD	0.77	0.51	1.22	0.308
+2.0 SD	0.88	0.57	1.32	0.209

CI: Confidence interval

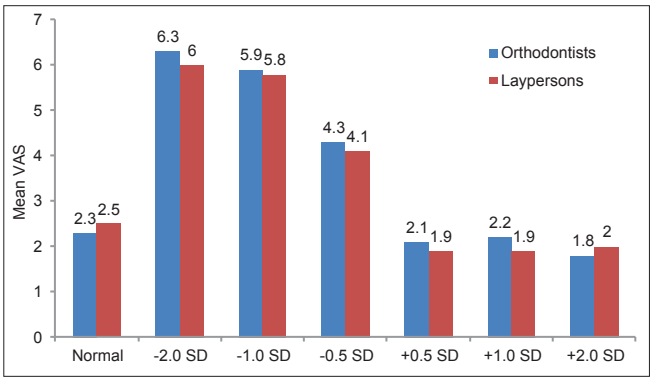


Figure 1: Analysis of most acceptable profiles for both orthodontist and layperson judges

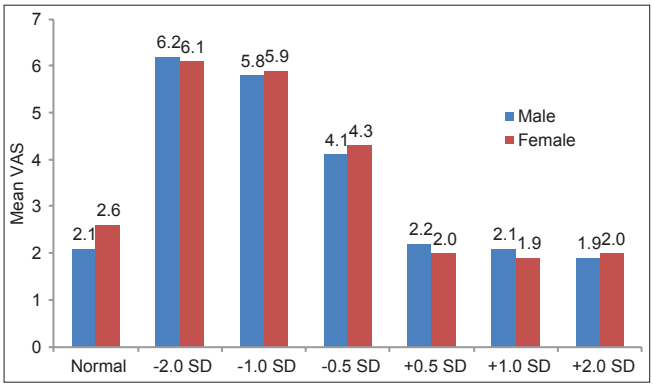


Figure 2: Analysis of most acceptable profiles for male and female subjects (both judges combined)

both orthodontists as well as lay persons, but between male and female profiles retrusive profile in males was more acceptable than for females. These findings were consistent with our results, in which Indian Maratha males and females significantly preferred more retrusive profiles over their population norm. The results of this study have clinical significance with regard to the justification of orthodontic extraction therapy in skeletal Class I Indian patients with a protrusive lip profile. In the study by Xu *et al.*[15] comparing extraction versus non-extraction treatment outcomes for borderline Chinese patients, Chinese clinicians significantly preferred the facial profile of the extraction patients, but had no significant preference for tooth alignment, overbite, overjet, midline symmetry, or posterior occlusion.

Eugene K.M. Chan *et al.* (2008)[16] studies and preferred the normal Class I or bimaxillary retrusive profiles in both sexes; the male profile ranked the least attractive was the protrusive mandible, and the female profiles ranked the least attractive were the protrusive mandible and the retrusive mandible.

This study demonstrated strong cohesive trends in establishing ideal facial esthetics of Asian-Chinese profiles evaluated by white persons in a multi-ethnic metropolitan community.[17]

Jonathan *et al.* (2005)[18] evaluated the differences in preference for the AP position of the maxillary incisor between orthodontic and lay panels and concluded that Andrews' Element II provides an additional useful method to evaluate attractiveness relative to the maxillary incisor position.

An explanation suggested for this preference is that extraction treatment reduces protrusion of the LL compared with non-extraction. There were some limitations in this study that should be recognized. Although the study had digitally generated a Indian Maratha adult profile based on the cephalometric norms from established researchers, it should be taken into consideration that sample size was small compared to Maratha population size. In this study, the laypersons were mainly university students ranging in age between 20 and 35 years and may not be representative of the entire population.

CONCLUSION

The study found that both laypersons and orthodontists prefer a more retrusive profile in Indian Maratha males compared to females and were more likely to rate a protrusive profile as unacceptable with regard to lip position. There was significant agreement between laypersons and orthodontists.

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