

RESEARCH AND EDUCATION

Smile attractiveness related to buccal corridor space in 3 different facial types: A perception of 3 ethnic groups of Malaysians

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The smile is one of the most effective means by which people convey their emotions.¹ A smile ranks second only to the eyes as the most important feature of facial attractiveness.² Buccal corridor space is an important element of the smile attractiveness that has received attention in recent years.^{1,3} It is defined as the bilateral negative spaces between the buccal surface of maxillary posterior teeth and the inner mucosa of the cheek, equivalent to the commissure of the lips when an individual is smiling.^{1,3} The presence of the buccal corridors added the illusion of a natural dentition, whereas its absence gives the patient an artificial appearance.³ Hence, it is an important factor for orthodontists and prosthodontists to create an appropriate buccal corridor width. Many studies have concluded that not only laypersons but also dental professionals preferred broader smiles with minimal buccal corridor space.⁴⁻⁸ However,

several studies have concluded that the buccal corridor spaces have little influence on smile attractiveness.⁹⁻¹¹ There is still ambiguity regarding influence of buccal

ABSTRACT

Statement of problem. Buccal corridor space and its variations greatly influence smile attractiveness. Facial types are different for different ethnic populations, and so is smile attractiveness. The subjective perception of smile attractiveness of different populations may vary in regard to different buccal corridor spaces and facial patterns.

Purpose. The purpose of this study was to determine esthetic perceptions of the Malaysian population regarding the width of buccal corridor spaces and their effect on smile esthetics in individuals with short, normal, and long faces.

Material and methods. The image of a smiling individual with a mesofacial face was modified to create 2 different facial types (brachyfacial and dolichofacial). Each face form was further modified into 5 different buccal corridors (2%, 10%, 15%, 22%, and 28%). The images were submitted to 3 different ethnic groups of evaluators (Chinese, Malay, Indian; 100 each), ranging between 17 and 21 years of age. A visual analog scale (50 mm in length) was used for assessment. The scores given to each image were compared with the Kruskal-Wallis test, and pairwise comparison was performed using the Mann-Whitney *U* test ($\alpha=.05$).

Results. All 3 groups of evaluators could distinguish gradations of dark spaces in the buccal corridor at 2%, 10%, and 28%. Statistically significant differences were observed among 3 groups of evaluators in esthetic perception when pairwise comparisons were performed. A 15% buccal corridor was found to score esthetically equally within 3 face types by all 3 groups of evaluators. The Indian population was more critical in evaluation than the Chinese or Malay populations. In a pairwise comparison, more significant differences were found between long and short faces and the normal face; the normal face was compared with long and short faces separately.

Conclusions. The width of the buccal corridor space influences smile attractiveness in different facial types. A medium buccal corridor (15%) is the esthetic characteristic preferred by all groups of evaluators in short, normal, and long face types. (*J Prosthet Dent* 2017;■:■-■)

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Clinical Implications

The perception of smile attractiveness is different among different ethnic populations. The knowledge of perception of smile attractiveness may affect the esthetic outcome of an individual during orthodontic, prosthodontic, or restorative treatments. The study results may assist the dental clinician to think from the patients' perspectives of different ethnic populations depending upon a person's facial pattern and buccal corridor space.

corridor on smile esthetics. The buccal corridor is a mini-esthetic feature of the smile that is affected by a person's facial pattern.¹ Thus, the evaluation of facial image and the types (brachyfacial, mesofacial, dolichofacial) instead of image of smile only may provide more reliable information for smile attractiveness. A brachyfacial individual is characterized by a broad square face with a strong chin, flat lip posture, low mandibular plane angle, and a straight profile. A mesofacial individual has well-balanced facial features. A dolichofacial individual has a long, narrow face with a high mandibular plane angle, convex profile, poor chin development, and an anterior-posterior face height imbalance. The authors are unaware of studies determining the influence of the buccal corridor in different facial types on smile esthetics among various ethnic groups living in Malaysia.

The purpose of the present study was to evaluate the esthetic perception of 3 main ethnic groups in Malaysia regarding the buccal corridor in dolichofacial, brachyfacial, and mesofacial individuals and to understand patients' perception and then incorporate their preferences into orthodontic treatment. The null hypothesis was that no influence would be found of either buccal corridor space size or the facial pattern type on smile attractiveness according to the perception of the 3 ethnicities of the Malaysian population.

MATERIAL AND METHODS

Institutional ethical committee approval was obtained for the study. A 23-year-old woman with a mesofacial pattern who had previously received orthodontic treatment and had well-aligned anterior teeth was selected for this study. The individual signed an informed consent form authorizing her image to be used and modified for the purposes of the present study. A frontal picture was made using a digital camera (EOS 5D Mark III; Canon) with shutter speed of 1/60th of a second, an aperture of f8.0, at a speed of ISO 1250, and a 24- to 105-mm focal distance lens. Photo editing software (Photoshop v7.0; Adobe Systems) was used to correct slight imperfections or asymmetries that could influence the assessment of

attractiveness. The image was modified into 3 different facial types: brachyfacial, mesofacial, and dolichofacial. Five different buccal corridors (2%, 10%, 15%, 22%, 28%) were modified for each facial type, creating a series of 15 different smiles (Fig. 1).

A total of 300 students from the 3 major ethnic population groups of Malaysia (Chinese, Malay, and Indian; 100 each) were recruited as evaluators. Ethnicity was determined based upon students' self-reported information, maximum up to 2 generations. The sample size ($n=300$) was calculated with a 5% margin of error and 95% confidence interval from a pool of 1350 students from 3 ethnic groups (studying in different healthcare disciplines in the university) by using an online sample size calculator (Raosoft Inc). The measurement of the buccal corridor was calculated as the difference between the visible maxillary dentition width and inner commissural width divided by the inner commissural width multiplied by 100. The ratio was reported as a percentage.

Fifteen images were used for evaluation purposes as shown in Figure 1. Presentation software (PowerPoint v16; Microsoft Corp) was used to project the images to all the evaluators. The 15 images were randomly organized by using computer-generated random numbers from 1 to 15. Each image was shown for 15 seconds and was followed by a black, blank screen for 3 seconds. Return to the previous image was not allowed.

All evaluations were done individually without discussion with other evaluators. A 50-mm-long visual analog scale (VAS) was used, anchored at the left "0," indicating the least attractive smile and the right "50," indicating the most attractive smile. Instructions were provided to the evaluators to mark the scale to record their perception of an attractive smile, farther to the left for less attractive or to the right for more attractive. After recordings had been made, the marks were measured to determine their location on the 50-mm-long VAS line, and the means of those scores were calculated (Table 1). The scores given to each image were compared by using the Kruskal-Wallis test, and pairwise comparison was performed using the Mann-Whitney U test ($\alpha=.05$).

RESULTS

Chinese, Malay, and Indian evaluators showed statistically significant differences in smile perception with respect to the 2% and 10% buccal corridor in all 3 facial types; 22% in the long face and 28% in the short and normal face types. However, only 15% buccal corridor in all 3 face types showed no significant differences among the 3 groups (Table 1). Statistically significant differences were found in the esthetic score among the Chinese evaluators with respect to face types with 2% ($P=.02$) and 15% ($P<.001$) buccal corridors and the Malay evaluators with respect to face types with 10% ($P=.04$) and 15%

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