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Research Report

Comparison of esthetic smile perceptions among male and female Indonesian dental students relating to the buccal corridors of a smile

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ABSTRACT

Background: *A smile constitutes a form of measurement as to whether or not an orthodontic treatment has proved successful. A smile is said to be ideal if a balance exists between the shape of the face and teeth. One benchmark used to assess the quality of an ideal smile is that of buccal corridors. These are formed of the black space between the lateral edge of maxillary posterior teeth and the corner of the lip which appears during the action of smiling. Evaluating the contrasting perceptions of male and female smiles based on buccal corridor aspects is considered important to identifying the specific qualities an ideal smile.* ***Purpose:*** *The purpose of this study was to determine the difference between the perceptions of an ideal smile held by Indonesian dental students of both genders based on buccal corridors.* ***Methods:*** *A total of 36 dental students, equally divided between male and female students and ranging in age from 18-21 years old, were enrolled in this study. The smiles of all subjects were photographed from the front for later assessment by the subjects themselves. Assessment was undertaken twice, with a two-week interval between the first and second, by comparing subjects' photographs with reference pictures of buccal corridors. Data gathered were analyzed by using kappa-statistic and U-Mann Whitney.* ***Results:*** *The results indicated that all the subjects showed a good level of coincidence in their analysis (κ=0.76). Statistical analysis showed that the score of 0.123 (p>0.05) was shown in U-Mann Whitney.* ***Conclusion:*** *Indonesian male and female dental students have the same perception of an aesthetic smile with regard to its buccal corridor.*

Keywords: *buccal corridors; ideal smile; perception*

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INTRODUCTION

The main objective of orthodontic treatment is to correct malocclusion in order to achieve appropriate occlusion and optimum dentofacial function.[1] Although the principal goal remains the restoration of oral health and function, the importance of facial esthetics and their psychological impact is increasing to the point of their becoming a necessity.[2] The perception of facial esthetics plays a significant role in a person's decision to seek orthodontic treatment and, furthermore, contributes greatly to facial attractiveness. A smile represents a facial expression which communicates feeling, friendship or a desire to reward an individual's achievements.[3] The perfect smile is said to exist when there is harmony and balance between the shape of the face and teeth.[4] A smile constitutes one of the main criteria for patients when measuring the success of orthodontic treatment. Forming an ideal smile requires analysis and evaluation of the face, lips, gingival tissue, shape and color of the teeth and the combination of these components. The components of a smile considered to be important include: buccal corridors, the extent of incisor and gingival display and the existence of a midline and diastema.[5] Buccal corridors constitute an important aspect to be considered when measuring a smile and can be defined as the dark area or black space (lateral negative space) between the

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lateral edge of the maxillary posterior teeth and the corner of the mouth which appears when someone smiles (Figure 1).[6] Buccal corridors occur in the dark background inside the mouth depending on the shape and width of the upper tooth curve and the facial muscles which determine the width of an individual's smile.[7] Buccal corridors disappear when the lips are in a closed position since their existence are the products of facial and perioral muscular activity.[8] The assessment of a smile can be completed by evaluating photographs of buccal corridors and will be conducted using a range of six classifications of buccal corridors, including: extra-broad (0% buccal corridors), broad (5% buccal corridors), medium-broad (10% buccal corridors), medium (15% buccal corridors), medium-narrow (20% buccal corridors) and narrow (25% buccal corridors) (Figure 1).[8] A broad smile with a minimum of buccal corridors (0% buccal corridors) possesses greater aesthetic value than a narrow smile with wide buccal corridors.[3,9]

Perception is a process through which one chooses, organizes and interprets the stimuli which are accepted as making up a picture representing their world. This process is mostly influenced by consciousness, memory, mind, and language which involve individual interpretation of a specific object. Thus, each individual will have a different perception, although these perceptions deal with the same object.[10] Research conducted at a dental school in Brazil showed that as far as perceptions of a positive aesthetic smile are concerned, women feel less satisfied with their smiles compared to men.[11] Women tend to think more that the aesthetic appearance of their teeth is important than do men.[12] This is influenced by many factors which differ from one another and which influence individuals in contrasting ways according to their age, gender, marital status, social and economy condition, education, profession, family, friends, culture, and the mass media. Similarly, younger individuals pay more attention to the aesthetic appearance of their teeth than the elders.[11] Previous research revealed a difference with regard to confidence in that men are more self-confident than women.[13] From the previous research, it could be said that further investigation needs to be conducted into how the relationship between the aesthetic charm of a smile, tooth size and form, lip curve, gingiva form, and the display of buccal corridors compares to individual perceptions of a smile.[11] This present study was carried out to compare Indonesian male and female dental students' perceptions of esthetic smiles based on buccal corridors.

MATERIALS AND METHODS

Thirty six photographs were obtained from 36 subjects (consisting 18 males and 18 females) for use in this study. The subjects consisted of current, 18 to 21 year old dental students of the Faculty of Dentistry, Universitas Gadjah Mada, Indonesia who had never undergone orthodontic treatment, had Angle class I relation, no craniofacial anomalies or missing teeth and no evident asymmetry. This research has already been passed by the eligible ethics sub-committee of the Universitas Gadjah Mada ethics commission and assigned the number 00958/KKEP/FKG-UG/EC/2017. This research project employed the use of a digital camera (Canon, EOS 700D (18.0 megapixels, ISO 200, Tokyo, Japan), a printer (HP® DeskJet Ink Advantage 2135, USA), and a Laptop (HP® Notebook Series, USA). Afterward, explanations of the research procedure were given to subjects who, subsequently, signed the consent form, thereby confirming their agreement. The data were in the form of photographs taken of the subjects using a tripod-mounted camera, with an object-to-lens distance of

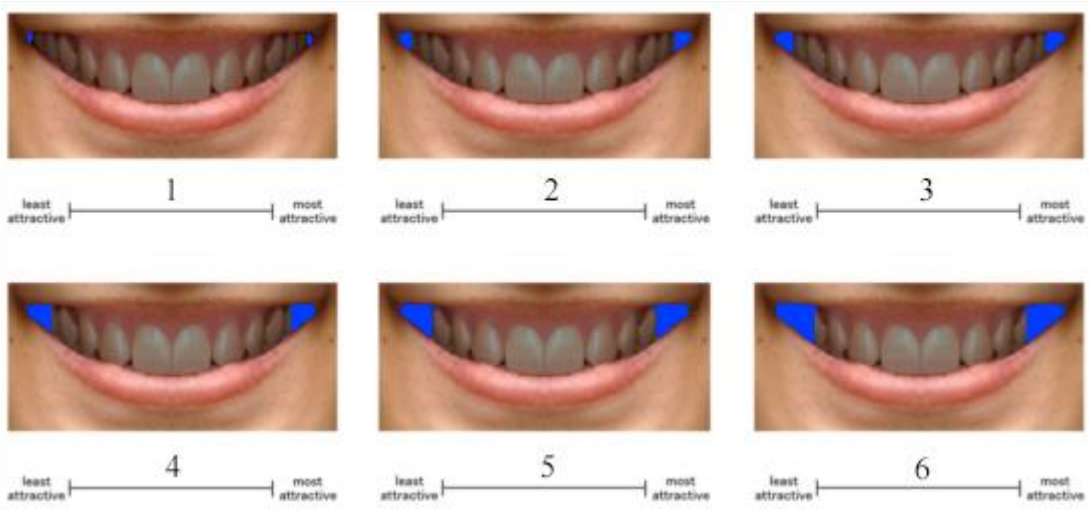

Figure 1. Series reference images illustrating the range of buccal corridors (blue area): (classification 1) extra broad (0% buccal corridor), (classification 2) broad (5% buccal corridor), (classification 3) medium-broad (10% buccal corridor), (classification 4) medium (15% buccal corridor), (classification 5) medium-narrow (20% buccal corridor), and (classification 6) narrow (25% buccal corridor).[5]

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30 inches (91 cm). The camera was set at ISO 200 in auto focus mode. Subjects were positioned in an upright seated position, with an unsmiling face and instructed to look through a point at their eye level during the image capture in order to ensure natural head posture (Figure 2). Subjects were instructed to say "cheese" in order to ensure that they showed their teeth for two seconds, while looking straight at the camera.

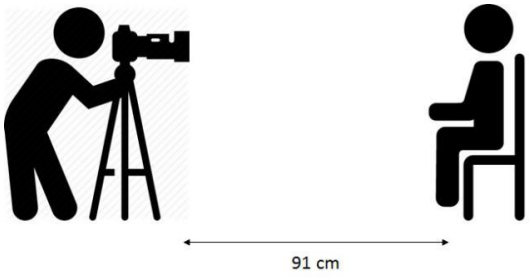

Figure 2. Photoshoot technique.

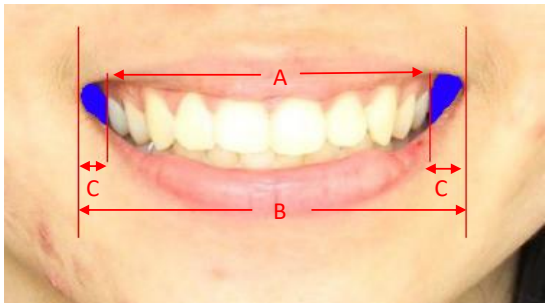

Figure 3. Regio of interest: (A) the number of maxillary teeth; (B) outer commissure; (C) buccal corridor (blue area).

Table 1. Percentage on value of buccal corridors for each group and and results of the U Mann-Whitney test comparing 2 groups tested

Classification of buccal corridors	Number of choice ± Percentage of classification of buccal corridors (%)		*P*-value
	Male	Female	
1	2 (5.56)	1 (2.78)	0.123
2	2 (5.56)	2 (5.56)	
3	4 (11.11)	4 (11.11)	
4	8 (22.2)	9 (25)	
5	11 (30.56)	12 (33.3)	
6	9 (25)	8 (22.2)	
Total	36 (100)	36 (100)	

Notes: 1) extrabroad buccal corridor; 2) broad buccal corridor; 3) medium-broad buccal corridor; 4) medium buccal corridor; 5) medium-narrow buccal corridor; 6) narrow buccal corridor.

Assessment of the photograph was undertaken after the result had been printed. The assessment was conducted by trained and calibrated examiners (who also act as subjects in a process of self-assessment) when they were both healthy and emotionally stable. Before completing the self-assessment, examiners were given an explanation of the criteria of smiles based on buccal corridors and then given training. Each examiner assessed the photographs from all previous research by comparing them to six reference pictures of buccal corridors (Figure 1). The examiners were instructed to choose one of six reference pictures, which they thought similar to their own and focus on the region of interest (Figure 3). The results of the examiners' assessments were returned via the assessment form and consisted of awarding a score from the buccal corridor classification reference 1, 2, 3, 4, 5, or 6 on each subject. The examiners assessed the photograph twice with an interval of two weeks between assessments. This approach aimed to minimize potential bias in the observation by reducing the effect of examiner subjectivity and focusing the study on the effect of the experience.[14] The average score taken after the final assessment was subsequently analyzed by means of kappa analysis statistics to identify the level of agreement between examiners. A Mann-Whitney U test was employed to know whether any difference between male and female perceptions existed regarding their buccal corridors (Table 1).

RESULTS

The results provided by the subjects formed two sets of assessment data, perception assessments I and II, relating to their perceptions of an ideal smile based on buccal corridors. The kappa statistic was employed in order to establish the reliability between intra-examiner and inter-examiner results of assessment I and II, calculated as the number of agreement scores divided by the total number of scores. All examiners demonstrated an extremely high level of agreement in both their intra-examiner and inter-examiner analysis ($\kappa = 0.76$). The result confirms that there was no difference between the first and the second assessment. Thereafter, a U Mann-Whitney test was conducted to establish whether there was any contrast between male and female perceptions with regard to their buccal corridors. The U Mann-Whitney test value was 0.123, meaning that there was no male-female difference (Table 1). This result, in turn, implies that no difference exists between the perceptions of members of the two genders. Based on the contents of Table 1, the responses of males were similar to females in that their assessment of subjects' smiles in classification 5 was 30.56%, while that of their female counterparts was 33.3%.

DISCUSSION

The Kappa statistic results indicate that there was no difference between perception assessments I and II. These

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might have been influenced by several factors including: the sharing information about buccal corridors and their classification in the form of audio (utterances) and visual (reference) buccal corridors by the researchers. Before the subjects provided assessment I and assessment II they shared a common educational background in that they were all students of the faculty of dentistry. This is in line with the statement that perceptions can be influenced by an object that has previously been encountered. Words, colors, shapes, and location can be easily remembered and familiarity may with an object that has been seen or heard.[15] Results of the frequency calculation based on the percentage on each classification of buccal corridors, together with the mode of each group, confirm that males give more weight to classification 5 and less to classification 1. Those two groups (male and female) appear to have the same mode of perception with regard to classification 5. This is supported by the theory stating that males and females tend to have the same interest in the similar smile (the same mode in classification 5).[16] Age and gender are not influenced by one perception in assessing the size of buccal corridors. Males and females have the same opinion about the aesthetic factors which influence an attractive smile, related to buccal corridors but females tend to be more sensitive to changes in those factors.[17] Another theory also argues that males and females have the same interest in a similar smile based on the same mode. Therefore, it can be argued that gender does not appear to influence the perception of buccal corridors assessment.[18]

Another piece of research into the perception of smiles based on teeth and face displays revealed that males are less critical than females when assessing a photograph. This probably occurs because printed photographs of the subjects' smile display buccal corridors indistinctly due to the inferior quality of photographic techniques related to brightness and photoshoot.[17] Prior research on buccal corridors indicates that the broader a smile on buccal corridors, the greater its aesthetic quality compared to a narrower one.[9] The results of this research are different to that conducted by Faculty of Dentistry, Universitas Gadjah Mada students into perceptions of an ideal smile based on buccal corridors. This research shows that dentistry students of both genders choose classification for those buccal corridors considered to be better for one's smile. This demonstrates the need to classify the buccal corridors which suit Indonesian society. The transversal dimension is one of the basic aspects of a smile in relation to buccal corridors which can be assigned to one of six classifications: 1 (extrabroad); 2 (broad); 3 (medium-broad); 4 (medium); 5 (medium-narrow), and 6 (narrow).[5]

There was no difference between males and females' perception of the ideal buccal corridor-based smile which was influenced by several factors, one of them being background knowledge. The research subjects were Faculty of Dentistry students enrolled on dental anatomy and orthodontics courses during the years 2014 and 2015. This factor might influence the similarity of one subject's perception to that of another. Individual perception of smile is based on education, gender, friend, and profession.[11] Moreover, one's perception can be influenced by the social environment.[15] All research subjects were current faculty of dentistry students in the sense that they inhabited the same social environment and, as a result, the perception of male and female subjects were similar. It can be concluded that Indonesian male and female dental students have the same perception of an aesthetic smile with regard to its buccal corridors.

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