ORIGINAL ARTICLE

Perception of Smile Attractiveness Associated with Buccal Corridor Space Among Orthodontists and Laypersons Visiting de' Montmorency College of Dentistry in Lahore, Pakistan

Hareem Sultan[1] **BDS, FCPS**
Muhammad Ilyas[2] **BDS, FCPS**
Asmi Shaheen[3] **BDS, FCPS, M.Phil**
Afsheen Ghani[4] **BDS, DCPS-HCSM, MSc**

OBJECTIVE: To determine the frequency based on the acceptance of absent, presence or excessive buccal corridor space that maybe required for a smile to be apprehended as attractive among orthodontists and laypersons visiting de' Montmorency College of Dentistry in Lahore, Pakistan.
METHODOLOGY: A descriptive cross sectional design was conducted to assess the perception of smile attractiveness among orthodontists and laypersons visiting de' Montmorency College of Dentistry in Lahore, Pakistan from July 2019 to January 2020. Both male and female participants with age ranging between 25 - 50 years were included in the study. Each participant was shown 6 digitally altered images of a female patient after which they were asked to rate whether the portrayed smile among the images was acceptable or not. All the collected information was entered and analyzed using the SPSS version 20.0 software.
RESULTS: A combined total of 220 participants (110 Orthodontist and 110 Laypersons) who met the inclusion and exclusion criteria were registered in this study. Among the orthodontists the mean age was 28.58±5.96 years and for the layperson was 23.38 ± 2.96 years. The mean total score for orthodontists was 33.28±7.08 and for layperson was 33.50±7.29. A statistically insignificant difference was found between the two study groups when stratified according to gender, however a significant difference was seen upon stratifying on acceptance of smile i.e. p-value = < 0.005
CONCLUSION: Both orthodontists and layperson do perceive that the buccal corridor space does have an impact on smile attractiveness and its acceptance.
KEYWORDS: Esthetics, Dental*, Orthodontists, Perception, Smiling*.
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INTRODUCTION

Since ancient times smile in its own entity has been the most basic and oldest medium for human communication. A smile tends to amplify a person's facial expression and beauty by enhancing features thus overall affecting human beings' qualities and virtues of one's personality.[1] On the other hand, its impact is not only associated directly to dental esthetics; in fact a pleasant smile is linked - beyond the boundaries of just appearance of teeth and gums - it is the amalgamation with not only structural beauty but also with the harmonious balance between the lips and teeth and their combination into the facial configuration.[1]

Multiple studies have demonstrated that people formulate assumptions based on physical appearance, and then use these assumptions to judge that person in regards to intelligence level, employability, and relationships, among other traits. Alley and Hildebrant suggest that the face is the most important contributor to physical attractiveness, and subsequently has a major influence on social interactions and an individual's development.[1]

The perception of smile esthetics is subjective and is influenced by personal experiences and social environment. However, smile is anatomically assessed on certain components or parameters i.e. smile arc, buccal corridor space which refers to dark space (negative space) visible

1. Assistant Professor, Department of Orthodontics, Dow International Dental College, Dow University of Health Sciences, Karachi.
2. Associate Professor, Department of Orthodontics, de'Montmorency College of Dentistry, Lahore.
3. Assistant Professor, Department of Orthodontics, de'Montmorency College of Dentistry, Lahore.
4. Lecturer, Department of Community Medicine, Fazaia Ruth Pfau Medical College, Karachi.

Corresponding author: "Dr. Hareem Sultan" < drhareemsultan@gmail.com >

during smile formation between corners of mouth and buccal surfaces of maxillary teeth, midline diastema, tooth with gingival display, centerlines, and axial inclination of teeth.[3] In this study,we assessed how the presence and absence of buccal corridor influenced the perceived acceptance of smile attractiveness among dental healthcare professionals i.e. Orthodontists and laypersons.

Wider smiles were more favored by laypersons than small and narrow smiles. According to a study by Parekh et al 4,80.1% of laypersons found absent buccal corridor acceptable; 82.3% of laypersons found ideal buccal corridor acceptable; 71.9% of laypersons found excessive buccal corridor acceptable. The study also indicated that amongst Orthodontists, 83.8% found absent buccal corridor acceptable; 82.8% found ideal and 71.3% found excessive buccal corridor acceptable, respectively.The conclusion of this study was that there is no clinical difference between orthodontic and laypersons raters for smile attractiveness.[4] Another study performed by Roden Johnson and a few other studies also found no difference among rater groups.[5-8]

Our study will be the first of its kind to be carried out among the Pakistani population and will immensely help in determining and comparing perception of laypersons and Orthodontists regarding one of the most important aspects of smile esthetics. It will assist Orthodontists in achieving esthetically pleasing treatment outcomes which are acceptable to their patients (mostly laypersons) who have the right to decision making in their treatment and who ultimately have to be satisfied.

METHODOLOGY

A descriptive cross - sectional study design was selected for this study. Non-probability consecutive sampling technique was used to enroll the .participants. Both male and female between the ages 25 - 50 years were included from de' Montmorency College of Dentistry from July 2019 to January 2020.

These participants were then divided into two groups i.e. Orthodontists and laypersons. All laypersons had received a minimum of twelve years of education with no previous orthodontic treatment and belonging to professions other than dentistry were included in the study. The orthodontists were selected based on the criteria of having minimum 5 years of experience in their respective field.

We estimated a sample size of 220 cases keeping confidence level at 95% along with a margin of error of 6% and considering expected percentage of acceptance of excessive buccal corridor space i.e. 71.3% (least among all) half of the sample size that would be orthodontists and other half as laypersons. Individuals who did not give consent or were unable to answer correctly either due to visual imparity or mental disability were excluded from the study.

Data was collected by using a self - structured questionnaire and included well-edited colored photographs of a female individual of age range 20-28 years on a photographic paper, with good exposure taken from a digital camera showing bilaterally symmetrically aligned teeth and esthetic lips on close up was shown to each participant.

The photograph was digitally manipulated using (Photoshop 7.0 Adobe) software, which is a valid technique to manipulate photographs to create ideally aligned teeth and esthetic lips. The original photograph had no buccal corridor space; digital modification was then applied to enhance the dark space gradually by 5% thereby increasing the dark space from 0 to 25% to produce a total set of six images. There were 2 separate images with absent buccal corridors, 1 image of ideal and 3 images of excessive buccal corridors.

All the participants were then asked to designate if the portrayed smile was according to their acceptable standards or not. Each image was assigned a score based on the Likert scale i.e. from 1 to 10 where 1 represented the least attractiveness and 10 being the most attractive. Informed consent was acquired from all participants prior to data collection along with the approval from the hospital's ethical committee. All the data was entered and analyzed using STATA version 15.0 Quantitative variables like age were reported as mean and standard deviation while qualitative variables such as gender and acceptance of absent, ideal and excessive buccal corridors was reported as frequency and percentages. Data was later stratified for smile acceptability and gender to address effect modifiers. Inferential statistics was calculated using independent t test along with stratification, with p-value<0.005 to be considered statistically significant.

RESULTS

A total number of 220 participants i.e. 110 orthodontists and 110 laypersons were included in the study. Out of which, 44 (20%) were males and 176 (80%) were females. Among the orthodontist 24 were males and 86 were females and among the laypersons 20 comprised of males and 90 of females.

The mean (SD) age for the orthodontic group was 28.58 ± 5.96 and for layman group was 23.38 ± 2.96. The minimum and maximum score values were 14 & 52 respectively and the mean (SD) score was 33.55±7.63.

The total mean (SD) score for both study groups along with their respective p-value is given in Table 1.

The mean (SD) score among the

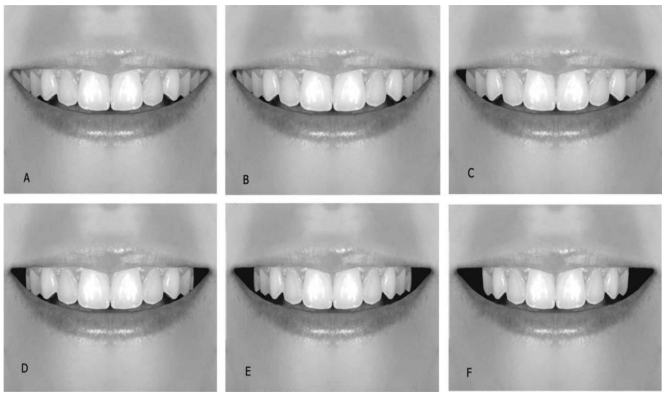

Figure 1: A: No buccal corridor space, **B:** 5% increase in buccal corridor space, **C:** 10% increase in buccal corridor space, **D:** 15% increase in buccal corridor space, **E:** 20% increase in buccal corridor space, **F:** 25% increase in buccal corridor space

Table 1: Characteristics of Participants

Baseline Characteristics of Participants (n=220)			
Variables	*Orthodontist n=110*	*Layperson n=110*	*P – value*
Age			-
Mean (SD)	28.58 (5.96)	23.38 (2.96)	
Gender			-
Male	24 (22.82%)	20 (18.18%)	
Female	86 (78.18%)	90 (81.82%)	
Overall Smile Acceptability			-
No	40 (36.40%)	29 (26.40%)	
Yes	70 (63.60%)	81 (73.60%)	
Comparison of total score within the study groups			
Mean (SD)	33.25 (6.46)	33.54 (6.69)	0.814
Comparison of Mean (SD) score among study groups			
Image A			
Image B	5.40 (1.69)	5.75 (1.91)	0.147
Image C	5.74 (1.95)	5.89 (1.86)	0.549
Image D	5.70 (1.81)	5.4 (1.81)	0.220
Image E	4.75 (2.01)	4.69 (2.00)	0.840
Image F	4.41 (2.16)	4.51 (2.44)	0.748
	7.26 (2.16)	7.3 (2.19)	0.901

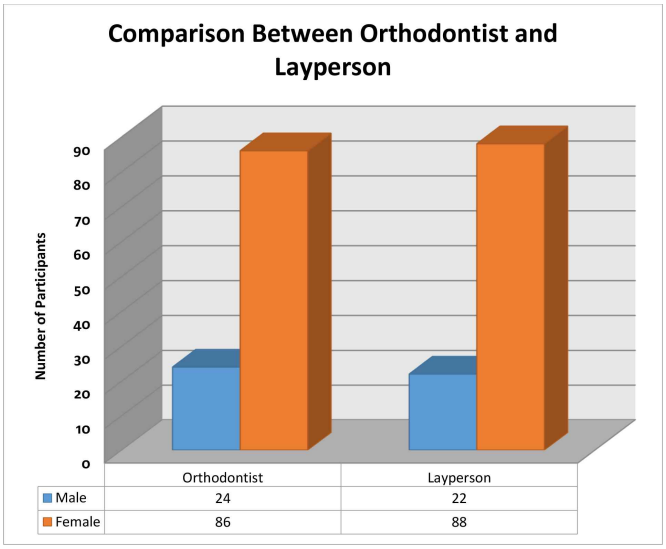

Figure 2: Distribution of Males and Females among Orthodontists and Laypersons

Table 2: Test Statistics

Test Statistics[a] (n=220)			
Variables	*Group*	*P – value*	*Confidence Interval*
Comparison of total score within study groups stratified by smile acceptability		< 0.005*	
No Mean (SD)	25.93 (3.964)		-12.039, -9.595
Yes Mean (SD)	36.74 (4.371)		
Comparison of total score within study groups stratified by gender			
Gender		0.931	
Male Mean (SD)	33.48 (6.144)		-2.282, 2.089
Female Mean (SD)	33.38 (6.681)		

** Significant P - Value*
a. Independent T - Test

orthodontist group for image A was 5.40 ± 1.69, for image B was 5.73 ± 1.95, for image C was 5.70 ± 1.81, for image D was 4.74 ± 2.01, for image E was 4.40 ± 2.16 and for image F was 7.26 ± 2.16 respectively.

The mean (SD) score among the layperson group for image A was 5.75 ± 1.91, for image B was 5.89 ± 1.86, for image C was 5.4 ± 1.81, for image D was 4.69 ± 2.00, for image E was 4.50 ± 2.44 and for image F was 7.3 ± 2.19 respectively.

The two study groups were then stratified on the basis of gender and the total mean score for male participants was 33.48 ± 6.144 while for the females was 33.38 ± 6.681. An insignificant p-value of 0.931 was noted along with an insignificant confidence interval of -2.282, 2.089.

Upon stratifying both the groups on the basis of smile acceptance it was seen that those participants who answered "No", the total mean score among the group was 25.93 ± 3.964 and for those participants, who responded "Yes", the total mean score was 36.74 ± 4.371.

A statistical significant difference of < 0.005 was seen between the two study groups with a confidence interval -12.039, -9.595. Table 2

DISCUSSION

"Smile is our business card" ---- a popular quote which signifies importance of physical appearance on our day to day lives. Physical attraction is a multifaceted concept and can be defined differently depending on cultural norms and individual subjective preferences.[8]

In this age and era an individual's outlook plays a huge role in their sustenance and well - being and for this reason the pre - perceived concept of physical attractiveness greatly influences and creates potential biases in terms of social decision - making. Because of this attitude people often tend to pursue social acceptance by means of improving facial harmony and thus overall appearance using different orthodontics and orthognathic surgery treatment modalities for altering or modifying a person's facial features.[9,10]

The main objective of this study was to understand how

smile attractiveness is affected by buccal corridor space as perceived by dental health professional i.e. Orthodontists and laypersons.

In this study insignificant difference was seen between the two study groups based on gender which demonstrated similar findings to another study conducted in Indonesia in 2015 in which dental health professionals were asked to assess smile esthetics based on gingival display.[11] Both male and female participants provided similar results. However, this study also suggested that as compared to males, females tend to pay more attention towards maintaining an esthetically pleasing smile and this in turn directly influences their confidence and self - consciousness level.

Another study by Amjad Al Taki and Amina Guidoum[12] concluded that healthcare professionals belonging to the dental community, and laypersons had similar preferences regarding trends among both genders; laypersons had a more tolerable attitude towards profiles with bi-maxillary retrusion. On the other hand, when smile acceptability was estimated we observed that both groups preferred more visible buccal corridor space and that it made the smile more pleasant. Our findings coincide with another study conducted in India, in which the presence or absence of buccal corridor space on smile esthetics was assessed among not only laypersons and orthodontists but also among prosthodontists.[13] The dental health professionals were able to better apprehend the appearance of black spaces at the corner of the mouth which according to their opinion made the smile more pleasing as compared to laypersons.

Similarly, in a study by Kokich et al. found all participants which included (laypersons, dentists and orthodontists) all had various levels of observations when it came to smile characteristics and that laypersons were the most accommodating and were the least criticizing among the participant groups.[14] Another study carried out in India in a medical institute also displayed similar results where orthodontists and prosthodontists perceived smile based on buccal corridor space differently from laypersons who on contrary could not appreciate the significance of buccal corridor space in assessing smile attractiveness.[15]

Our results are however reciprocal to Parekh SM et al4who depicted that both laypersons and orthodontists preferred smiles with smile arc that runs parallel to the lower lip and the amount of visible buccal corridors are minimal. The attractiveness ratings were found to be the lowest among smiles with flat smile arcs and excessive buccal corridors. Presences of flattened smile arc have seen to overcome the undesirable effects of excessive buccal corridors on attractiveness ratings.

Another study by Loi et al used a single digital photograph and altered the buccal corridor digitally in 5% increments ranging from 0 to 25 %. Their results also showed that both orthodontist and laypersons preferred broad smiles with less buccal corridors.[16]

Other aspects that have been seen to influence perception of smile attractiveness, is the facial type of individuals based on their ethnicity. A study by Nimbalkar et al16were able to evaluate that statistical difference was seen with individuals with long and short faces as compared to normal faces. Our study was assessed using photographs of a single person this makes it one of the strengths.

Age has also been seen to be a factor that determines the criteria for smile attractiveness. A study was also done based on the position and amount of gingiva visible around the maxillary central incisors along with the incisal edge of these teeth. The absence and presence of a black triangle between the maxillary central incisors also contributed to the level of acceptability of the smile.[18]

These findings can be due to a lot of reasons for instance, a study by Rabia Bilal[19] demonstrated that there was no significant difference in the perceptions of smile between laypersons and orthodontists. However, laypersons mean scoring was significantly higher in few photographs. The preference for various smile attributes showed variation between the groups.

Orthodontists rated smile arc while laypersons rated incisal show as the most preferred attribute. Other studies have also shown that orthodontists are more critical when it comes to a gummy smile compared with laypeople. It is seen that orthodontists observe and treat patients based on their theoretically achieved knowledge i.e. with a more academic perspective however a layperson has a more subjective view and therefore analyzes according to it.[20-22]

Our future recommendation would be to perform repeated testing in order to estimate the reliability of the study along with consideration to the facial type and age of the participants, so that a broader overview of smile attractiveness can be achieved.

CONCLUSION

There is a significant difference in the perceived notion of the acceptability of a person's smile related to the amount of buccal corridor space visible by both dental health professionals and laypersons.

It is evident that physical appearance has a huge impact on a person's psychological behavior. Facial symmetry and types along with the amount of visible buccal corridor space also have a significant association that would make a smile attractive. And though orthodontist assesses the perfect smile based on certain assumptions such as the anatomy of the jaw, angulations of teeth and the amount of gums visible

among other factors; it is necessary to consider what a layperson interprets as a beautiful smile.

CONFLICT OF INTEREST

The authors declare that there is no Conflict of interest.

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