Original Article

Evaluation of Buccal Corridor Effects on Smile Esthetics Among the Patients Seeking Orthodontic Treatment: A Cross Sectional Study

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ABSTRACT

Objective: The objective of this study was to determine the effect of buccal corridors preferred by orthodontists and post graduate residents.

Study Design: cross sectional study

Place and Duration of Study: This study was conducted at the Department of Orthodontic, Liaquat University of Medical and health Sciences, Jamshoro from 01-12-2016 to 08-11-2017.

Materials and Methods: Total 58 subjects were included in this study. All subjects were with normal morphology of dentition with the possible exception of 3rd molars. Full face frontal smiling view photographs were taken with Samsung digital camera at standard setting of 10 mega pixels. The buccal corridor was measured as the difference of the visible maxillary dentition and inner commissural width. Each slide of every photograph that was the buccal corridor edited in 5 sub titles such as Broad Buccal Corridor, Medium Broad Buccal Corridor, Medium Buccal Corridor, Narrow Medium Buccal Corridor, and Narrow Buccal Corridor. All photographs were shown by power point through laptop to a consultants and residents of orthodontics for independent evaluation of photographs and aesthetic acceptability. The participants were asked to select preferred buccal corridor. Data was analyzed using SPSS version 18.

Results: The mean age was 30.28±5.251. The medium broad buccal corridor was 19%, medium buccal corridor was 32.8 %. Medium Narrow broad buccal corridor was 10.3% and narrow buccal corridor was 37.9%. The preferred choice is highest in narrow buccal corridor that is 37.92 among others. The preferred choice of area was selected as 50% in LUMHS Jamshoro followed by 45% in University of Lahore. The preferred choice was statistically insignificant with specialty (p-0.308) and gender (p-0.555).

Conclusion: This study concluded that there is no significant difference when judging the effects of buccal corridors on the smile attractiveness between the male and female raters, for both the consultants and residents. Both preferred narrow buccal corridor to medium and broader buccal corridors.

Key Words: Buccal corridor, esthetics, smile perception

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INTRODUCTION

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Facial esthetics is a subjective and it vary from person to person and with different cultures.[1] The smile is very important for every individual and in every culture and it must be respected and measured, there is literature that smile has the most important role in the facial esthetics.[2]

There are multiple features which are assessed in a smile such as smile arc[3], incisal and gingival show, alignment of dentition, tooth color and shape[4,5,6], and buccal corridor[4]. Out of all these feature buccal corridor has important effect on smile. Buccal corridor also named as lateral dark space or lateral negative space. It is the space that appears during smiles between the maxillary posterior teeth and corners of the mouth and cheeks[7]. The space depends on width of the upper dental arch and the facial soft tissues responsible for the breadth of the smile[8].

The actual size of buccal corridor available in literature is based on clinical observations[9]. In most of studies it is showed that narrow buccal corridor has positive effect on smile esthetics. Some researchers noted that buccal corridor width does not affect the smile attractiveness. A very low significance of transverse features on smile esthetics has been shown by Isiksal et al[10]. While some researchers believe that lateral negative space effects smile esthetics when it becomes excessively wide[4]. In orthodontics there is "paradigm shift" which focus on facial esthetics[11]. Edward Angle believed that ideal occlusion would result in ideal facial esthetics. Despite importance to occlusion on smile there is very little literature on esthetic smile[12]. The perception of smile is very important to orthodontists, orthodontic patients are very anxious about smile along with their static appearance. Literature has shown that importance of smile esthetics has enforced orthodontists to make treatment plan based on facial profile and smile. The purpose of this study was to evaluate the buccal corridor effects on smile esthetics among the patients seeking orthodontic treatment in Jamshoro[13].

MATERIALS AND METHODS

The approval was obtained from ethical review committee of institute. An informed consent was taken from raters which were part of my study. A cross sectional study was conducted from 01-12-2016 to 08-11-2017 at Department of Orthodontics, Institute of Dentistry LUMHS Jamshoro. The patients were recruited with simple random sampling technique. Sample size was calculated using the W.H.O calculator version 2.2 a, by taking the prevalence 76.72% of buccal corridor chosen by the Dentist[10] at 95% confidence interval and 11 % margin of error. The sample size calculated by this statistic was (n=58). The inclusion criteria were participants with age ranges from 20-60 years, both male and female, participants in normal skeletal class 1,SNA =82 Degree, SNB 80 degree ,Dental class 1, normal over jet (2mm) and normal overbite (33.3 %) and the consultants and trainees having minimum experience of 2 years in orthodontics. The exclusion criteria were participants having missed teeth affecting the appearance during smile, those who were not available at the day of visit, those who were not giving consent and orthodontic treatment before study.

Data collection procedure: All participants with normal morphology of dentition with the possible exception of 3rd molars full face frontal smiling view photographs were taken with Samsung digital camera at standard setting of 10 mega pixels, at auto mode, at a distance of 2 feet. A pure white back ground was used for the pictures. The cropping and editing of all the photographs were made using Adobe Photoshop Version 7.0. Calculation of smile fullness was defined as the visible maxillary dentition width divided by the inner commissural width, while buccal corridor is measured as the difference of the visible maxillary dentition and inner commissural width. Each slide of every photograph that was the buccal corridor edited in 5 sub titles such as Broad Buccal Corridor, Medium Broad Buccal Corridor, Medium Buccal Corridor, Narrow Medium Buccal Corridor, and Narrow Buccal Corridor. All (as per operational definition) photographs were shown by power point through laptop to a consultants and residents of orthodontics for independent evaluation of photographs and aesthetic acceptability. The purpose and the procedure of the study were explained to the participants and asked to select preferred buccal corridor. The data of gender, age, qualification and the institute were recorded in proforma.

Data Analysis: The analysis was conducted by using SPSS version 18. Mean and standard deviation were calculated for quantitative variables like age. Frequency and percentages were presented for qualitative variables like gender, type of institute, city, and preferred buccal corridor. Chi-square was applied to check the statistical difference. p value <or equal to 0.05 was considered as significant.

RESULTS

The male and female were 33% and 67% respectively. The medium broad buccal corridor was observed 19%, Medium buccal corridor as 33% Medium narrow buccal corridor as 10% and narrow buccal corridor as 38%.

Table No.1: Descriptive statistics of preferred choices, specialty, Duration of experience and type of institutes

Characteristics	Frequency	Percent
Preferred choice		
Medium Broad Buccal Corridor (MBBC)	11	19.0
Medium Buccal Corridor (MBC)	19	32.8
Medium Narrow Buccal Corridor (MNBC)	6	10.3
Narrow Buccal Corridor (NBC)	22	37.9
Specialty		
Residents	44	75.9
Consultants	14	24.1
Duration of experience of residents and consultants		
Less than 3 year	1	1.7
Less than 5 years	44	75.9
Less than 10 years	9	15.9
Less than 15 years	2	3.4
More than 15 years	2	3.4
Institutes		
University of Lahore	26	44.8
LUMHS Jamshoro	29	50
Bhittai Dental College	3	5.2
Total	58	100

The residents and consultants were 76% and 24% respectively. According to experience the participants having experience less than 3 year (2%) less than 5 year (77%), less than 10 years (16%) and less than 15 years (3%) and more than 15 years (3%). The preferred choice of area was selected as 50% in LUMHS Jamshoro followed by 45% in University of Lahore and 5% in Bhittai Dental College (Table-1).

According to preferred choice of Residents chosen MBC as 34%, MNBC as 11% and NBC as 32%, whereas consultants chosen MBBC (7%), MBC (29%), MNBC (7%) and NBC (57%). The relationship was not statistically significant (p-0.308) as shown in Table-2

According to the gender based preferred choice the male chosen MBC and NBC (37%), whereas the female chosen MBC (31%), NBC (39%). The relationship was not statistically significant (p-0.555) as shown in Table-3.

Table No.2: Specialty based preferred choice

	Preferred Choice				Total	P-Value
Specialty	Medium Broad Buccal Corridor	Medium Buccal Corridor	Medium Narrow Buccal Corridor	Narrow Buccal Corridor		
Resident	10	15	5	14	44	
	22.7%	34.1%	11.4%	31.8%	100.0%	0.308
Consultant	1	4	1	8	14	
	7.1%	28.6%	7.1%	57.1%	100.0%	
Total	11	19	6	22	58	
	19.0%	32.8%	10.3%	37.9%	100.0%	

Table No.3: Gender Base Preferred Choice

	Preferred Choice				Total	P-VALUE
Gender	Medium Broad Buccal Corridor	Medium Buccal Corridor	Medium Narrow Buccal Corridor	Narrow Buccal Corridor		
Male	2	7	3	7	19	
	10.5%	36.8%	15.8%	36.8%	100.0%	0.555
Female	9	12	3	15	39	
	23.1%	30.8%	7.7%	38.5%	100.0%	
Total	11	19	6	22	58	
	19.0%	32.8%	10.3%	37.9%	100.0%	

DISCUSSION

Increasing numbers of adults are seeking orthodontic care[15]. In literature many researchers have compared smiles with different buccal corridor width[15-19] Some researchers customized the same smile by adding or reducing number of teeth,[15,17] changing the mesio-distal diameter of posterior teeth,[20] or modifying the transverse width of posterior teeth.

This study resulted that buccal corridor was altered by modifying tooth position of upper canines, although the dark space can only be shown distal to the canines. The position and angulations of these teeth effect the size and shape of space. This is the reason that canines have important role in forming the dental arch. The study conducted by Nascimento DC et al[4] compared modified pictures in Full-face and close-up of the mouth. Their study revealed no significant difference between the two views (p>0.05). In this research only close-up view of the mouth was assessed. This study noted difference in buccal corridor preference according to gender. Parekh et al[15] and Moore et al[17] also resulted same in comparison to our results. The results of this research confirmed that varying lateral dark space significantly affected smile esthetics. These results were affected by gender, differing with the findings of Moore et al[16] who found that male and female do not hinder with the decision of facial attractiveness. In this study the narrow buccal corridor (38%) was considered the most pleasant. This result was different from studies done by Gracco et al,[21] in which Buccal corridor equivalent to 18.46% of the width of the smile were found more acceptable. Such variations may have occurred due to the fact that in the study by Moore et al[16] the Buccal

corridor was measured on inner commissures and there may also be difference of population. This difference may need further research involving different esthetic parameters for individual. This research studied the effects of buccal corridors on smile attractiveness by orthodontics consultants and residents. Esthetic score did not show significant difference between the male and female raters for the orthodontics consultants and residents, which are in agreement with Moore et al[16] .

In this research, the orthodontics consultants and residents have same inclination in ranking the liking of lateral dark spaces. Parekh et al[15] resulted that lay person and orthodontists have same preferences when smile arcs and buccal corridors are considered together. Krishnan et al[3] also pointed that there was no difference between lay persons and dental specialists on smile evaluation. In this study orthodontics consultants preferred the narrow buccal corridor and residents preferred medium buccal corridor. Hulsey,[22] and Roden-Johnson et al [18] found that buccal corridor was not an important issue for assessing smile attractiveness. This study resulted that effects of buccal corridors on smile esthetics can be evaluated from mouth view. The exact cause of this difference is not clear. The raters may consider a 15% buccal corridor as less attractive. Orthodontists should keep in mind that small change in buccal corridor may considerably effect the perception of smile esthetics. During diagnosis and treatment planning it is important to assess not only the dental arch width but also the alveolar bone width. However, it is important to keep in mind that this study used artificial images and therefore should not be used for all patients.

The findings of this research are guidelines, and should be applied with vigilance, taking into consideration, the individual characteristics of every patient and their esthetic expectations.

CONCLUSION

This study concluded that there is no significant difference when judging the effects of buccal corridors on the smile attractiveness between the male and female raters, for both the consultants and residents. Both preferred narrow buccal corridor to medium and broader buccal corridors.

Author's Contribution:

Concept & Design of Study:	Abdul Jabbar
Drafting:	Nadeem Hussain, Irfan Ahmed Shaikh
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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