

ORIGINAL ARTICLE

Perception about Importance of Buccal Corridor and its Width in Smile Esthetics

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ABSTRACT

Aim: To assess the perception of dental students and house officers regarding role of buccal corridor in smile esthetics and to determine the most esthetically pleasing buccal corridor width.

Methods: A photograph of the patient's face, smiling with the teeth visible up to the first molar was modified digitally to create smiles with no buccal corridor, increasing buccal corridors widths of 5%, 10%, 15%, 20 % and 25% respectively compared with the width of inner oral commissure. A total of 376 dental students and HO's participated in the study and data was collected in questionnaires.

Results: Buccal corridor is considered to affect the smile esthetics of an individual by 72.4% of house officers, 67.6% of second year students, 48.7% of 3rd year students and 52.4% of fourth year students (P value: 0.002). Visibility of around 5-10% of buccal corridor was considered most esthetically pleasing, however, the result was not significant.

Conclusion: Buccal corridor is an important component in smile esthetics considered by students and house officers of dental colleges. Buccal corridor width of 5-10 % was considered most esthetically pleasing among participants.

Keywords: Buccal corridor, Esthetics, perception

INTRODUCTION

A successful dental treatment requires the establishment of an esthetic smile. Facial esthetics play a vital role in an individual's quality of life and improves psychological and social wellbeing. With an increase in desire for a youthful smile, esthetic considerations in treatment planning have become extremely important.¹ A well-balanced, attractive smile is considered one of the major treatment objectives in rehabilitating patient's occlusion along with creating a functional occlusion. Culture, level of education attained and the kind of social life an individual maintains all have a great effect on his or her perception. Dental esthetics is a dynamic entity whose parameters change over time.² The standards of beauty and esthetics vary among different regions³.

Presence of various factors in harmony results in esthetically pleasing smile. Smile esthetics is influenced by teeth, gums and spaces present. Factors affecting a person's smile include smile arc, symmetry, gingiva design and exposure, buccal corridor, midline, maxillary teeth angulation, shade and lip volume.⁴ Buccal corridor is the space present bilaterally between vestibular surface of posterior teeth and commissure of lip during smiling. According to some studies, buccal corridor is not an important aspect of smile esthetics whereas, according to others, the opposite is true.⁵ Nascimento et al⁶ and Abu Alhaja⁷ et al concluded that buccal corridor plays a vital role in smile esthetics whereas, according to studies conducted by Roden-Johnson et al⁸ and Ritter et al⁹. Buccal corridor width was not a critical issue for evaluating smile esthetics. Buccal corridor can be broadly classified in to wide, intermediate and narrow. No consensus is found

regarding amount of esthetically pleasing buccal corridor which is most appealing.⁵

The importance and effect of width of buccal corridor on smile esthetics is controversial and needs to be further investigated. Beauty lies in the eyes of beholder. There is a need to conduct a study in our population to determine their perception regarding buccal corridor so that treatment plans for patients can be modified to fulfil their esthetic needs.

The aims of this study were to determine the esthetic importance of buccal corridor in an individual's smile and the amount of width considered most esthetically pleasing by dental students and house officers of two dental colleges of Pakistan.

MATERIAL AND METHODS

This "Cross sectional Analytical study" was conducted at Sardar begum Dental College (SBDC) and Khyber College of dentistry (KCD), Peshawar, Pakistan. Sample size was calculated with estimation of standard deviation of 14¹⁰ at significance level of 95% and margin of error of 1.4%. A total of 376 dental students and house officers were enrolled in the study using simple random sampling. Students and house officers with weak eyesight were excluded. Study objective was explained to them and informed consent was taken after taking approval from ethical committee. The same set of pictures was used to evaluate most aesthetically pleasing buccal corridor width from all participants. A facial photograph (Figure 1) of a patient smiling and teeth displayed up to first molar was modified digitally to create smiles with buccal corridors of six different widths, which are as follows.

a) Extra broad smile (No buccal corridor) (Figure 1, a)

- b) Broad smile (5% Buccal corridor) (Figure 1, b)
- c) Medium Broad (10% buccal corridor) (Figure 1, c)
- d) Medium (15% buccal corridor) (Figure 1, d)
- e) Medium-narrow (20% buccal corridor) (Figure 1, e)
- f) Narrow (25% Buccal corridor) (Figure 1, f)



Figure 1: Photograph of a patient modified digitally to create six pictures with different buccal corridor widths in increasing order

These images were arranged in order of increasing width of buccal corridor and displayed on A-4 size paper to evaluate the participant's opinion using questionnaires having questions regarding role of buccal corridor in smile esthetics and most esthetically pleasing buccal corridor width. SPSS version 17.0 was used for data analysis. Frequency distribution of all variables were determined. Categorical variables like gender and educational level in terms of most esthetically pleasing buccal corridor was analysed through Chi-square test using P value < 0.05 as significant.

RESULTS

Table 3: Educational Level versus most esthetically pleasing buccal corridor width in an individual's smile

Educational Level	Smile A(%)	Smile B(%)	Smile C(%)	Smile D%	Smile E (%)	Smile F (%)	Sig.
2nd Year	21(19.4)	30(27.7)	20(18.5)	16(14.8)	17(15.7)	4(3.7)	.187
3rd Year	16(20.5)	11(14.1)	20(25.6)	8(10.25)	13(16.7)	10(12.8)	
4th Year	23(22.3)	25(24.3)	22(21.3)	19(18.4)	10(9.7)	4(3.8)	
House Officer	15(17.2)	17(19.5)	25(28.7)	15(17.2)	10(11.4)	5(5.74)	

Table 4: Gender versus most esthetically pleasing buccal corridor width in an individual's smile

Gender	Smile A	Smile B	Smile C	Smile D	Smile E	Sig.
Male	32 (19.4%)	41 (24.8%)	34(20.6%)	21(12.7 %)	24(14.5 %)	.403
Female	43(20.4 %)	42(19.9 %)	53(25.1 %)	37(17.5%)	26(12.3 %)	

DISCUSSION

Prosthetic and orthodontic treatment and their success is mostly related to smile esthetics which require the precision of dental occlusion and hard tissues as well as that of soft tissues. However, determining the standard of beauty in a smile is quite difficult as it varies among individuals. In the present study, picture of only female smile is altered and used to determine perception of the participants, there are many studies, according to which gender of the patient in the pictures used for the study does not affect the results.¹¹ Ioi et al also used pictures of a female smile and the results were generalized.¹² Afsari et

Demographic data such as educational level, and Gender of participants was presented. According to educational level, 2nd years students were 28.7%, 3rd year students were 20.7%, 4th year students were 27.4% and house officers were 23.1% of entire data. In terms of gender, 43.9% were males and 56.1% females.

Buccal corridor is considered to have esthetic importance in an individual's smile according to majority of house officers (72.4%), the result is significant (P=.002). Overall, the dental students and house officers preferred smiles with narrower buccal corridors. Second year (27.7 %) and final year students (24.2%) chose a smile with 10% buccal corridor as more appealing, while 3rd year students (25.6%) and House officers (28.7%) voted in favor of a smile with 5% buccal corridor as most esthetic, however, the result is non-significant.

Table 1: Demographic variables

		Frequency (%age)
Educational level	2nd Year Student	108(28.7%)
	3rd Year Student	78(20.7%)
	4th Year Student	103(27.4%)
	House Officer	87(23.1%)
Gender	Male	165(43.9%)
	Female	211(56.1%)

Females (25.1%) considered medium broad smile with buccal corridor of 10% as most esthetically pleasing. 24.8% males regarded broad smile with buccal corridor of 5% as more pleasant. The result is not significant.

Table 2: Educational Level versus Assessment of esthetic importance of buccal corridor in an individual's smile

Educational Level	Yes (%)	No (%)	Sig.
2nd Year	73 (67.6)	35 (32.4)	.002
3rd Year Student	38 (48.7)	40(51.3)	
4th Year Student	54 (52.4)	49 (47.6)	
House Officer	63 (72.4)	24 (27.6)	

al used pictures of full face to determine perception and concluded that full face doesn't have significant impact on perception of participants.¹¹ Keeping this in mind, only pictures of smile were used in this study. This will also help participants to remain focused on the asked questions and not to pay attention to other details.

The present study showed that house officers considered buccal corridor as an important component in esthetics of an individual's smile. Similar to this, according to study conducted by Pisulkar SK et al, smiles with buccal corridor was considered more esthetically pleasing as compared to

smiles with no buccal corridor.⁴ The participants of this study had received no formal education of smile esthetics, however, as the clinical experience and level of clinical maturity of house officers is more than dental students, this can be the reason they rendered buccal corridor as an important component of patient's smile. In this study, the results of esthetic importance given to buccal corridor in smile by male (64.8%) and female (57.3 %) participants was non-significant, the result is same to the study conducted by Nurfitriah A et al, who concluded that in Indonesian population, both male and female have the same perception regarding the importance of buccal corridor.¹³

Intercommisure width is thought to affect the buccal corridor width¹⁴, but study conducted by Zia et al showed that the association between intercommisure width and buccal corridor width is insignificant.¹⁵ This means that prosthodontists and orthodontists can slightly change buccal corridor to make it esthetically pleasing according to what is perceived more attractive in population, for this reason, perception of most esthetically pleasing buccal corridor width was evaluated.

In this study the students and house officers showed similar tendency in rating the Buccal corridor as the most pleasing smile based on different widths of Buccal Corridor. Overall, all raters preferred broader to medium-broad smiles (narrow buccal corridor widths) Standards of beauty vary among people of different regions and races and even individuals within a region.¹⁰ According to a study, Japanese people preferred broader smiles with almost no buccal corridor whereas Korean like smiles with some buccal corridor¹². In this study, 5- 10 % buccal corridor was considered attractive. Nimbalkar, et al¹⁶ evaluated perception of most esthetically pleasing buccal corridor in short, long and normal faces in Malaysian population and concluded 15 % buccal corridor as most aesthetic. Martin et al¹⁷, and Parekh et al¹⁸ concluded that orthodontists and layman rated smiles with small BC as more attractive. This study also showed the same result, that is, smiles with 5-10% buccal corridor were more appealing than smile with no buccal corridor, however the result was not significant. In another study¹⁹ there was a significant difference between perception of participants aged 35-44 as compared to age 15-19 regarding esthetically pleasing buccal corridor width, in our study, all participants were within the same age group, this can be the reason, there was not much difference among their perception. Moore et al²⁰, indicated that broader smile is more attractive for layman than the narrow smile. Though this study was conducted on dental students and house officers but results were same that narrow smile was considered least pleasant.

The limitation of the study are that in this study, images were digitally altered, which resulted in buccal corridor starting abruptly as dark spaces distal to the last posterior teeth while in reality buccal corridor are not sharply defined. This study was conducted on students and house officers of dental colleges who might not be true representative of the general population.

In conclusion, buccal corridor is an important component of smile esthetics of an individual considered by students and house officers of dental colleges. Buccal corridor width of 5-10 % was considered most esthetically pleasing among participants.

REFERENCES

1. Tosun H, Kaya B. Effect of maxillary incisors, lower lip, and gingival display relationship on smile attractiveness. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2020 Mar 1;157(3):340-7.
2. Sriphadungporn C, Chamnannadiadha N. Perception of smile esthetics by laypeople of different ages. *Progress in orthodontics*. 2017 Dec;18(1):1-8
3. Heravi F, Rashed R, Abachizadeh H. Esthetic preferences for the shape of anterior teeth in a posed smile. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2011 Jun 1;139(6):806-14
4. Pisulkar SK, Agrawal R, Belkhode V, Nimonkar S, Borle A, Godbole SR. Perception of buccal corridor space on smile aesthetics among specialty dentist and layperson. *Journal of International Society of Preventive & Community Dentistry*. 2019 Sep;9(5):499.
5. Machado AW. 10 commandments of smile esthetics. *Dental press journal of orthodontics*. 2014 Aug;19(4):136-57.
6. Nascimento DC, Santos ER dos, Machado AWL, Bittencourt MAV. Influence of buccal corridor dimension on smile esthetics. *Dent Press J Orthod*. 2012;17:145-50.
7. Abu Alhaja ESJ, Al-Shamsi NO, Al-Khateeb S. Perceptions of Jordanian laypersons and dental professionals to altered smile aesthetics. *Eur J Orthod*. 2011;33:450-6.
8. Roden-Johnson D, Gallerano R, English J. The effects of buccal corridor spaces and arch form on smile esthetics. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2005 Mar 1;127(3):343-50.
9. Ritter DE, Gandini Jr LG, Pinto AS, Locks A. Esthetic influence of negative space in the buccal corridor during smiling. *The Angle Orthodontist*. 2006 Mar;76(2):198-203.
10. Rehman K, Khan FR, Rahman M. Assessing The Perception Of Smile Attractiveness In Youngadults. *Apilotstudy. JPDA*. 2011 Oct;20(04):207.
11. Afsari E, Niksolat E, Moshajari A, Nezhad EK. Comparing orthodontist, prosthodontist, dental and non-dental student views on the impact of buccal corridor on smile attractiveness of women with different face shapes. *Journal of Dental School, Shahid Beheshti University of Medical Sciences*. 2018 Jan 1;36(2):42-6.
12. Ioi H, Nakata S, Counts AL. Comparison of the influences of buccal corridors on smile esthetics between Koreans and Japanese. *orthodontic waves*. 2009 Dec 1;68(4):166-70.
13. Nurfitriah A, Christnawati C, Alhasyimi AA. Comparison of esthetic smile perceptions among male and female Indonesian dental students relating to the buccal corridors of a smile. *Dental Journal (Majalah Kedokteran Gigi)*. 2017 Sep 30;50(3):127-30.
14. İşıksal E, Hazar S, Akyalçın S. Smile esthetics: perception and comparison of treated and untreated smiles. *American journal of orthodontics and dentofacial orthopedics*. 2006 Jan 1;129(1):8-16.
15. Zia AU, Mahmood A, Ilyas K, Jabbar A, Ghauri AF, Shah SR, Aamir S. Relationship of intercommisure width with buccal corridor display during social smile. *Pakistan Orthodontic Journal*. 2019;11(2):61-5.
16. Nimbalkar S, Oh YY, Mok RY, Tioh JY, Yew KJ, Patil PG. Smile attractiveness related to buccal corridor space in 3 different facial types: A perception of 3 ethnic groups of Malaysians. *The Journal of prosthetic dentistry*. 2018 Aug 1;120(2):252-6.
17. Martin AJ, Buschang PH, Boley JC, Taylor RW, McKinney TW. The impact of buccal corridors on smile attractiveness. *The European Journal of Orthodontics*. 2007 Oct 1;29(5):530-7.
18. Parekh S, Fields HW, Beck FM, Rosenstiel SF. The acceptability of variations in smile arc and buccal corridor space. *Orthodontics & craniofacial research*. 2007 Feb;10(1):15-21.
19. Lacerda-Santos R, Pereira TB, Pithon MM. Esthetic perception of the buccal corridor in different facial types by laypersons of different ages. *Bioscience Journal*. 2015 Jun 30;31(4).
20. Moore T, Southard KA, Casco JS, Qian F, Southard TE. Buccal corridors and smile esthetics. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2005 Feb 1;127(2):208-13.