

Perception of Layperson Regarding Buccal Corridor in Smile Esthetics

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ABSTRACT

Introduction: Attractive smile plays an important role in an individual's overall personality and confidence. The buccal corridor space (BCS), defined as the dark space between the corners of the mouth and the buccal surfaces of posterior teeth during a smile, is one of the various factors affecting smile esthetics. The aim of this study was to assess the perception of BCS among Nepali laypersons and its influence on smile attractiveness.

Materials and Methods: A descriptive cross-sectional study was conducted at Kathmandu Medical College from 2022 June to 2023 December after receiving ethical approval from institutional Review Committee of Kathmandu Medical College. Convenience sampling method was used to select 290 participants of age 20–50 years. The selected participants assessed digitally modified smile photographs with BCS percentages of 0%, 4%, 8%, 12%, and 16%, and rated the attractiveness.

Results: It was found that 62.1% (180) of participants were aware of BCS, and 67.9% (197) believed its presence affected smile attractiveness. The majority, that is 234 (80.7%) preferred minimal or no BCS, with rating of 0% BCS as the most attractive by 120 (41.4%) and 16% BCS as very unattractive by 220 (77.2%).

Conclusion: Wide smiles with little or no buccal corridor were preferred over narrow smiles with wide BCS by Nepali population.

Keywords: Buccal Corridor, Nepali Laypersons, Smile Esthetics

INTRODUCTION

An attractive smile has great role in development of one's personality and overall confidence. People with unattractive smiles often cover their mouth while smiling, which shows their lack of confidence. Smile design, a key aspect of dentistry, is primarily the responsibility of a dentist and is one of the main reasons for patient's visit to dental office. Smile design refers to

esthetic and cosmetic enhancement of clinically visible teeth to improve smile esthetic.

Buccal corridor space is one of the various components to be taken into consideration for esthetic smile.¹⁻⁴ It is the space between the corner of mouth and buccal surfaces of posterior teeth when patient smiles.⁵ Buccal corridor can be increased or decreased by orthodontic treatment by constriction or expansion of

arch, so orthodontist is responsible for making a smile broad or narrow. Frush and Fisher suggested to create some amount of buccal corridor in denture to make it more natural, however many studies indicated that laypersons without any dental knowledge preferred little or no buccal corridor,⁶⁻¹¹ and few studies indicated that buccal corridor has no effect on smile attractiveness so there is no need to modify buccal corridor just for the sake of esthetics.^{12,13}

Although there have been a few studies in Nepal regarding smile esthetics^{14,15} but none have studied how Nepali individuals view buccal corridor as esthetic component of smile. It is important to understand patient's perception regarding smile esthetics as it is fully subjective and study on Nepali people's perception is lacking, so the aim of this research was to determine the perception of the role of buccal corridor in smile esthetics by Nepali individuals.

MATERIALS AND METHODS

This was a descriptive cross-sectional study done in the Department of Orthodontics and Dentofacial Orthopedics of Kathmandu Medical College. It was conducted between June 2022 to December 2023 after receiving ethical clearance from Institutional Review Committee (Ref: 1110202101) of Kathmandu Medical College.

A group of 40 dental intern doctors were scanned for smile photographs after informing them about the aim and objective of the study. A 25-year-old female was selected for smile photograph to be used in the study. The subject was selected on the basis of being a Nepali citizen with full complement of fully erupted permanent dentition excluding third molar. Teeth needed to be well aligned without rotation, crowding, or spacing without the history of past orthodontic treatment, gingival inflammation, attrition or abrasion and labial surface restoration.

After getting written informed consent from her, a smile photograph was taken in a natural head position using Canon digital single-lens reflex (DSLR) camera. The photograph was later cropped from nose tip to soft tissue pogonion vertically and outer canthus region horizontally (Fig. 1). Digital modification of the photograph was done in Adobe photoshop creative suite (CS) to increase or decrease the buccal corridor space. The photograph was digitally altered so that the buccal corridor would occupy 0%, 4%, 8%, 12%, and 16% of total oral commissures⁹ (Fig. 2). The buccal corridor was calculated as difference between inter inner commissure width and the width of visible maxillary dentition width divided by inter inner commissural width expressed in percentage.

Sample size of 286 was calculated with value taken from study done on Indian population¹⁶

$$n = \frac{Z^2pq}{d^2} = 285.96 \approx 286$$

Z = confidence level at 95% = 1.96

p = proportion in population = 0.2472 (24.72% individuals disagreed that BCS made smile more attractive)¹⁶

q = 1-p

d (permissible error) = 0.05 (5%)

Using convenience sampling method, 290 Nepali citizens participated in the study as evaluator of the photograph after giving written informed consent. Adult patients and patient attendants, regardless of their gender, visiting Kathmandu Medical College for various dental problems were selected as evaluators. The digitally altered photograph was printed and shown to the evaluators and were asked to fill a questionnaire prepared based on previous study.¹⁶ They were asked if they were aware of buccal corridor and were requested to rate the photographs from 1 to 5 with 1 being very attractive, 2 attractive, 3 neutral, 4 unattractive and 5 very unattractive. The response of the evaluators was recorded in IBM SPSS statistics 20 for statistical analysis.



Fig. 1: Original Smile

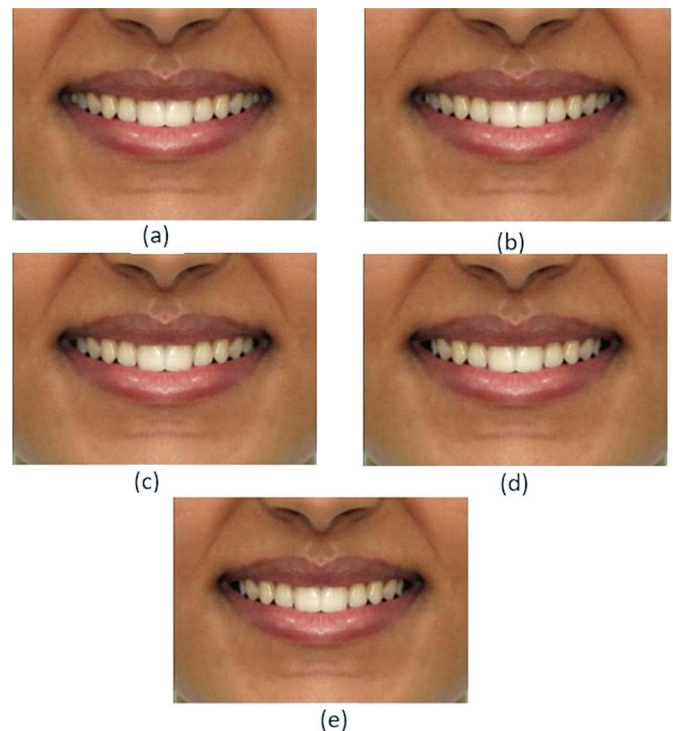


Fig. 2: digital alteration of BCS in the smile. (a) 0% BCS, (b) 4% BCS, (c) 8% BCS, (d) 12% BCS, (e) 16% BCS

RESULTS

Out of 290 participants 164 were female and 126 were male. Their ages ranged from 20-50 years (mean age 27.9 years). Since our study is descriptive type, comparison of response between male and female was not done. Among them, 180 (62.1%) were aware and 110 (37.9%) were unaware of buccal corridor. Those who were unaware of buccal corridor were explained about it before they answered other two questions. For the impact of buccal corridor on smile attractiveness 197 (67.9%) evaluators thought it can influence attractiveness of smile while others 93 (32.1%) thought it has no role. The presence of buccal corridor was believed to make smile more attractive by 56 (19.3%) and less attractive by 234 (80.7%) (Table 1).

Five (1.7%) of the participants didn't find any of the photos very unattractive, four (1.4%) of them didn't vote for unattractive and two (0.7%) didn't vote for neutral. Full response was obtained for the choice very attractive and attractive and same rating for more than one photo. Two (0.7%) of them rated very attractive for both 0% and

4% BCS, one (0.3%) rated attractive for 8% and 16% BCS, two (0.7%) rated attractive for all BCS except for 16%. One was neutral for 0% and 4% BCS. One of them rated unattractive for 4% and 16% BCS.

The rating for different BCS has been summarized in table 2.

Table 1: Total frequency response regarding knowledge of BCS

Variables	Response	Frequency (percent)
Have you observed dark space at the corners of mouth when people smile?	Yes	180 (62.1)
	No	110 (37.9)
Do you think it can affect your judgment for smile attractiveness?	Yes	197 (67.9)
	No	93 (32.1)
Do you think the dark space makes smile more attractive?	Yes	56 (19.3)
	No	234 (80.7)

Table 2: Total frequency of response against various BCS%, n (%)

BCS%	Very Attractive	Attractive	Neutral	Unattractive	Very Unattractive
0%	120 (41.4)	29 (10)	65 (22.4)	34 (11.7)	37 (13)
4%	33 (11.4)	136 (46.9)	45 (15.5)	59 (20.3)	11(3.9)
8%	71 (24.5)	52 (17.9)	140 (48.3)	18 (6.2)	5 (1.8)
12%	35 (12.1)	55 (19)	31 (10.7)	156 (53.8)	12 (4.2)
16%	29 (10)	15 (5.2)	6 (2.1)	18 (6.2)	220 (77.2)

DISCUSSION

There are numerous studies on association of various factors including buccal corridor with smile esthetics. Smile esthetic is completely subjective attribute and may vary across population, culture and generations. Out of many components of smile like smile arc, gingival line, gingival exposure, spacing etc. buccal corridor has remained a topic of debate. Many international literatures can be found on role of buccal corridor on smile esthetic evaluation both for dental professionals and laypersons but no published article has been found till date which has studied the view of Nepali people in this subject. This study focused on impact of BCS on smile attractiveness as viewed by Nepali laypersons.

In the present study, majority of Nepali laypersons were aware of BCS in smile and demonstrated sensitivity to

its impact on smile attractiveness. More than 60% of the participants were familiar to the concept and almost 68% agreed that it can affect smile esthetics. This level of awareness was also shown by the study of Pisulkar et al. where more than half of the non-dental professionals could recognize the presence of BCS in smile.¹⁶ However, the result was in contrast to that of Elhiny and Harharsh, where none of the participants could appreciate the presence of BCS.¹³ Health education has been widely integrated in social media platforms¹⁷, with access to information improving in recent years due to advancement of internet and widespread use of mobile phones, which may have contributed to the increasing dental awareness in Nepal. So, communicating with patients regarding broader or narrower smile can be beneficial for dentist to make treatment plan which aligns with the patient expectation.

In our study it was seen that BCS definitely plays an important role while evaluating smile esthetics, thereby challenging the conclusions of few other studies^{12,13,18,19} which reported that BCS has no significant role in esthetic perception of smile. The esthetic evaluation in our study showed clear preference for little or no buccal corridor. Approximately 80% of the participants considered narrow smile with wide buccal corridor as unesthetic, identifying 0% BCS as most attractive and 16% BCS the least attractive. This strong preference for broad smiles with little or no BCS is consistent with previous studies abroad.^{6,11} In contrast, our result directly contradict the earlier suggestion by Frush and Fisher that some amount of BCS is important to make denture look like more natural, a perspective later supported by few other studies.^{4,16,20} These discrepancies show that smile esthetic is highly subjective and can be influenced by cultural, geographical and generational factors. As previously stated by Moore et al., there may have been paradigm shift of esthetic preference from the era of Frush and Fisher to present day.⁸ Sarver and Ackerman had previously suggested that arch expansion should be done with caution so as not to make the smile unnatural 'denture like'.²⁰ But, based on findings of this study, the expansion can be beneficial for Nepali population.

Methodologically, this study attempted to minimize potential bias by using a standardized, digitally modified photograph, cropped to focus primarily on smile. This

can prevent raters from being distracted by other features of esthetics like nose, eyes, facial structures and hairline. Using cropped photographs rather than using full face one can also protect the privacy of the person whose photograph was used. Since cropped photo of only one female subject was used, it increases the accuracy of result and protects the privacy of the subject, but this may also limit the result to be generalized for different facial types.

As this study was conducted in dental patients and their attendants in tertiary care center, who are already aware of dental problems, the result cannot be generalized to general public and further research in various population is recommended.

CONCLUSION

Most of the participants were aware of BCS and its impact on smile attractiveness. Wide smiles with little or no buccal corridor were preferred over narrow smiles with wide BCS by Nepali population.

CONFLICT OF INTEREST: None.

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