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"BUCCAL CORRIDORS AND SMILE ESTHETICS"

Dental Science

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ABSTRACT

Aim: To evaluate whether the assessment of attractive smile esthetics by orthodontists and orthodontic patients is influenced by size of buccal corridors.

Material and method: One intraoral photograph showing ideally aligned dentition taken in frontal view and one extraoral photograph showing esthetically smiling lips were got from 2 different persons. These ideally aligned teeth and lips were combined to form a standard composite smile. Buccal corridors were modified digitally from 0% to 25% with the help of adobe photoshop creating six smiles. Orthodontists and orthodontic patients rated the attractiveness of 6 smiles with altered buccal corridors using a visual analog scale.

Result: Buccal corridor with 5% space level is most attractive and buccal corridor with 25% space level is least attractive for both the groups, thus large buccal corridors should be included in the problem list during orthodontic diagnosis and treatment planning.

KEYWORDS

Buccal Corridor, Smile Attractiveness, Visual Analog Scale.

Introduction

Face is most important individual factor in determining the physical appearance of people; the mouth and teeth are considered fundamental in facial esthetics.1,2 Therefore, it is essential to control the esthetic effects caused by orthodontic treatment, which is only possible by knowing the principles that manage the balance between teeth and soft tissues during smile.3,4 Consequently, more thorough studies are required on the details that can influence the esthetic balance between teeth and soft tissues.

The smile plays an important role in facial expression. It influences a person's perceived attractiveness and is the cornerstone of social interaction. People mainly focus on another person's eyes and mouth during interpersonal interactions.5 Goldstein 6 stated that the smile ranks second only to the eyes as the most important feature in facial attractiveness. On the other hand, Havens et al 7 reported that tooth alignment is a more important factor than the eyes for evaluating facial esthetics. So, contemporary orthodontists should consider esthetic smiles by managing the dentition and soft tissues. Patient-driven esthetic diagnosis and treatment planning have become important in clinical orthodontics and thus smile analysis has become an essential element of diagnosis and treatment planning.

Buccal corridors also known as lateral dark space, lateral negative space or shadow tunnel are the spaces between the facial surfaces of the maxillary teeth and the inner commissures. In 1958, Frush and Fisher 8 defined buccal corridors as the spaces between the facial surfaces of the posterior teeth and the corners of the lips when the patient is smiling. There seems to be a difference of opinion among investigators about the esthetic value of buccal corridors.

Few studies9-11 showed that lateral negative space minimization is a critical smile feature, while others12,13 concluded that it have little impact on smile esthetics. So it is important to evaluate the perceptions of dentofacial esthetics by general population or orthodontic patients when an orthodontic treatment plan is determined.

Aim

To evaluate whether the attractive smile esthetics by orthodontists and orthodontic patients in India is influenced by size of buccal corridors and also to identify whether there is any difference in judging effects of buccal corridors on smile attractiveness,

1. Between orthodontist and orthodontic patients.
2. Between orthodontic patients, both male and female.

Material and method

One intraoral photograph showing ideally aligned dentition taken in frontal view and one extraoral photograph showing esthetically smiling lips were got from 2 different persons. These two photographs were combined to get a standard composite smile with all teeth shown to the first molars.

The lower lip coincided with the curvature of the incisal edges of the maxillary incisors and canines so that the smile arc was consonant. These images were modified (Adobe Photoshop) to create bilaterally symmetrical teeth and lips. Difference between the inner intercommissural width and the visible maxillary dentition width was measured. This value was divided by the inner intercommissural width to obtain amount of buccal corridor which was reported as a percentage. As the width of maxillary dentition increases, the buccal corridor decreases.

Six sizes of buccal corridors were created and these six images were arranged in the order of the amount of buccal corridor spaces and displayed on size A-4 paper (Fig 1).

Fig 1. Series of buccal corridors created: narrow (0%), medium narrow (5%), medium (10%), medium-broad (15%), broad (20%), and extrabroad (25%).

The evaluators were 25 orthodontists (20 males; ages 33.45 ± 6.24 years & 5 females; ages 29.6 ± 1.82 years); 100 orthodontic patients (49 males; ages 20.35 ± 3.04 years & 51 females; ages 20.33 ± 2.68 years) in India.

The determination of the subjective esthetic value of each smile was accomplished by using a visual analog scale (VAS). This rating scale was designed with minimal visual and mental constraints, thus reducing external influences. The visual analog scale was 50 mm long, and the evaluators used their own esthetic values to rank each smile from "least attractive" to "most attractive."

The distance between the least attractive (0) and the mark on scale made by evaluators were multiplied by 2 to obtain an esthetic score. This score was distributed from 0 to 100 with 0 as minimum and 100 as maximum value.

Statistical analysis

Kruskal-Wallis test was used for statistical analysis. This identifies the difference in judging the effects of buccal corridors on smile attractiveness between orthodontic patients and orthodontist, and between male orthodontic patients and female orthodontic patients.

Results

Based on median value, buccal corridor with 5% space level was most attractive and buccal corridor with 25% space level was least attractive for both the orthodontist and orthodontic patients. Table 1.

Table 1 Most and least attractive buccal corridors

Group	Buccal corridor space level (Median)	
	Most attractive	Least attractive
Orthodontic patients	5% (90)	25% (20)
Orthodontist	5% (90)	25% (10)

Overall both the orthodontist and orthodontic patients preferred the buccal corridor space level in descending order of 5%, 0%, 10%, 15%, 20%, 25%.

The median values and ranges of the esthetic scores of each buccal corridor space for the orthodontist and orthodontic patients are shown in fig. 2.A & 2.B respectively and also in table 2.

Fig 2.A. The median values and ranges of the esthetic scores of each buccal corridor space for the orthodontist. Median ● Range |

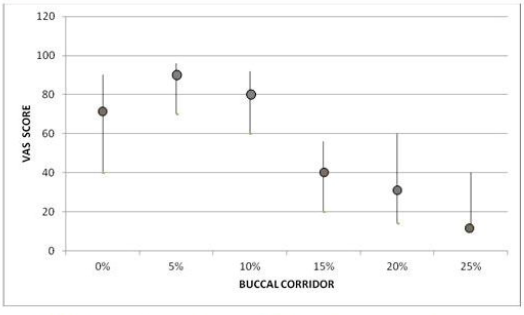
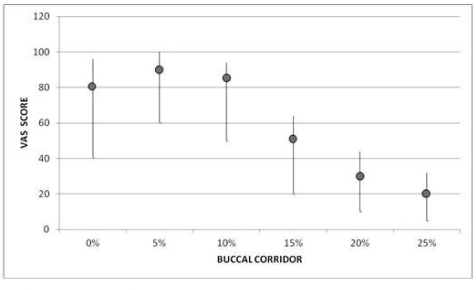


Fig 2.B. The median values and ranges of the esthetic scores of each buccal corridor space for the orthodontic patients. Median ● Range |



VAS - Visual Analog Scale.

Table 2 The median values and ranges of the esthetic scores of each buccal corridor space for,

- Orthodontist and Orthodontic patients &
- Male and Female Orthodontic patients.

	Buccal corridor space level Median (Range)					
Groups	0%	5%	10%	15%	20%	25%
Orthodontist	70[a] (40-90)	90 (70-96)	80 (60-92)	40[b] (20-56)	30 (14-60)	10 (10-40)
Orthodontic patients	80[a] (40-96)	90 (60-100)	84 (50-94)	50[b] (20-64)	30 (10-44)	20 (5-32)

	Buccal corridor space level Median (Range)					
Groups	0%	5%	10%	15%	20%	25%
Orthodontic patients						
Male	80 (40-96)	90 (60-100)	84 (50-92)	50 (24-60)	38 (16-40)	20 (8-32)
Female	80 (60-94)	90 (60-100)	84 (50-94)	50 (20-64)	30 (10-44)	20 (5-30)

[ab] shows significant difference between orthodontic patients and orthodontist (at 0%, p value = 0.000 and at 15%, p value = 0.028 using Kruskal - Wallis Test)

There was statistically significant difference between orthodontist and orthodontic patients only at 0% and 15% buccal corridor space levels in judging effects of buccal corridors on smile attractiveness. The orthodontic patients preferred 0% and 15% buccal corridor space levels as compared to orthodontists.

The median values and ranges of the esthetic scores of each buccal corridor space for the orthodontic patients (male and female) are shown in table 2.

There was no significant difference between orthodontic male and female patients for judging effects of buccal corridors on smile attractiveness.

Discussion

Espeland and Stenvik[14] noted that most young adults give more attention to appearance of their anterior teeth than to occlusion. This suggest that functional correction must be an primary treatment goal, at the same time esthetics should be given equal consideration.

The perception of esthetics varies from person to person and is influenced by personal experiences and social environments. Thus, there can be differences of opinion regarding smile evaluations between orthodontic patients and orthodontists. If the orthodontist's perception of esthetics is not congruent with the patient's perception, the treatment results might not be acceptable to the patient, even if the patient's function is improved.

The purpose of this study was to evaluate whether the attractive smile esthetics by orthodontists and orthodontic patients in India is influenced by size of buccal corridors and also to identify whether there is any difference in judging effects of buccal corridors on smile attractiveness,

1. Between orthodontist and orthodontic patients.
2. Between orthodontic patients, both male and female.

Overall both the orthodontist and orthodontic patients preferred 5% buccal corridor space level as most attractive and 25% buccal corridor space level as least attractive in descending order of 5%, 0%, 10%, 15%, 20%, 25% buccal corridor space level. So large buccal corridors should be included in the problem list during orthodontic diagnosis and treatment planning.

Parekh et al[15] previously reported no clinically significant difference between lay and orthodontic raters for smile evaluations, and this finding was also consistent with those of Gracco et al[16] and Ritter et al[13].

On the other hand, Roden-Johnson et al[17] found a difference in esthetic perceptions among orthodontists, general dentists, and laypersons for buccal corridor spaces.

This study shows that, there was significant difference between orthodontist and orthodontic patients for judging effects of buccal corridors on smile attractiveness at 0% and 15% buccal corridor space level. 0% and 15% buccal corridor space was more attractive to orthodontic patients than orthodontist.

There was no significant difference between orthodontic male and female patients for judging effects of buccal corridors on smile attractiveness. This is in compliance with study by Moore et al[9].

Originally, the visual analog scale was used as a common tool to assess pain intensity and has been shown to be a valid, reliable, and reproducible method of measuring subjective pain.

Since many investigators have used the visual analog scale to judge attractiveness, its use in scoring esthetics should also provide simple, rapid, and reproducible results.[10,18]

Finally, although this study establishes the importance of one esthetic feature in the art of orthodontics, its findings should not be interpreted as advocating wholesale maxillary arch expansion. At least as important as the art of orthodontics is the science of orthodontics.

Maxillary expansion, whether orthopedic or surgical might be a rational treatment option; and the reduction of large buccal corridor space in such a case will improve esthetics. However, reduction of

lateral negative spaces should not be considered the rationale for maxillary expansion in an otherwise normal maxilla. One drawback of this study is, photograph of a full face could have been used which might affect the assessment of attractive smile esthetics.

Conclusions

- Buccal corridor with 5% space level was most attractive and buccal corridor with 25% space level was least attractive for both the orthodontist and orthodontic patients in India.
- Overall, both the orthodontist and orthodontic patients preferred the buccal corridor space level in descending order of 5%, 0%, 10%, 15%, 20%, 25%. So larger lateral negative place should be included in the problem list during orthodontic diagnosis and treatment planning.
- There was significant difference between orthodontist and orthodontic patients for judging effects of buccal corridors on smile attractiveness at 0 % and 15 % buccal corridor space level.
- There was no significant difference between orthodontic male and female patients for judging effects of buccal corridors on smile attractiveness.
- Use of such scale during treatment planning would definitely help the orthodontist to analyze the patients expectations from the treatment.

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