A STUDY TO EVALUATE THE INFLUENCE OF BUCCAL CORRIDOR IN AN ATTRACTIVE SMILE

Dr. Roseline Meshramkar[*1], Dr. Lekha K.[2], Dr. Shruthi Nayak[3] & Dr. Prathiba Patil[4]
[*1]Professor, Department of Prosthodontics, SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India
[2]Professor and Head, Department of Prosthodontics, SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India
[3&4]Department of Prosthodontics, SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India

Keywords: Buccalcorridor, Attractive smile, Negative space, smile esthetics.

Abstract

Aesthetics is primary consideration for patients seeking prosthodontic treatment. An attractive, well balanced smile is a paramount treatment objective of modern therapy. Another potential important smile feature is presence or absence of buccal corridors. Buccal corridor is distance between the lateral junction of the upper and lower lips and distal points of the canines during smiling. It is important to reach proper buccal corridor dimension to increase the smile aesthetics. The broad smile showing more posterior teeth are considered more pleasing than the smile that shows fewer posterior teeth. The aim of this study is to measure and verify the influence of buccal corridor in an attractive smile. The sample is comprised of 179 smile standardized frontal photographs obtained from students of SDM Dental College aged 18 – 25 years with natural dentition will be analysed for their attractiveness. Further, smile was digitally analysed for negative space based on Johnson and Smith method to measure the negative space proportion. In this method, the width of maxillary arch in a smile photograph is measured, and the proportion of this value in relation to distance of lip commissure is found. This can be used to verify the proportion occupied by dental arch relative to intercommissure distance. Data obtained was statistically analysed.

Introduction

Aesthetics is primary consideration for patients seeking restorative treatment. An attractive, well balanced smile is a paramount treatment objective of modern dental therapy. Another potential important smile feature is presence or absence of buccal corridor. During a smile, bilateral spaces appear between the buccal surface of the most visible maxillary posterior teeth and the lip commissure called the negative spaces or buccal corridor.[1-5]The buccal corridor or negative space is the space created between the buccal surface of the posterior teeth and the lip corners when the patient smiles, giving depth and natural aspect to the smile.[2]This negative space is affected by the smile, the maxillary arch width, the facial muscles the position of the buccal surfaces of the posterior maxillary teeth, and also by the maxillary anterioposterior position related to the lips.[6-7]Some authors have advocated that thebuccal corridorarea is not critical and could be visually judged.[3] One of the more controversial aspects of smile attractiveness pertains to buccal corridor (BC) size, defined variably as the space between the buccal surfaces of the maxillary teeth. Other believes it in important to reach proper buccal corridor dimensions to increase smile esthetics.[7]Some researcher has shown that broadsmile, showing more posterior teeth are considered more esthetically pleasing smiles than that show fewer posterior teeth. [8-9] The method developed by Johnson and smith has

been proposed to measure negative space proportion during a smile. In this method, the width of the maxillary dental arch in a smile photograph is measured and the proportion of this value in relation to distance of the lip commissure is found.[5]This can be used to verify the proportion occupied by the dental arch relative to intercommissure distance. The purpose of this study is to measure and evaluate the influence of buccal corridor in an attractive smile.

Material and methods

179 photographs obtained from 179 subjects[104 women and 75 men] were used in this study. All subjects presented with a complete permamantdentiton with the possible exception of third molars. The samples was selected among SDM college of dental sciences dharwad [Karnataka India] and included individuals aged 18-25yrs with inclusion criterias. Individuals who had undergone orthodontic treatment, any kind of prosthetic rehabilitation in the maxillary anterior region, fractured or malformed or congenitally missing teeth were excluded from the study.

The approval to use human subjects was obtained from ethical committee & informed consent of individual subject was taken. The subjects were induced to a spontaneous maximum open smile (smile displaying teeth). Frontal photograph of middle and lower third of the face was taken with a Nikon DSLR 200 105mm Macro lens ratio 1:1F/2.8 digital camera. Lighting and staging were kept constant for all the photographs. Digital management of the photographs was undertaken using Adobe photoshop CS (version 8.0, 2003 Adobe) along with visual examination to evaluate for the presence of 6 parameters for attractive smile. The smiles that fulfilled all the six criteria were then classified as attractive smiles and the rest as unattractive smiles. The study was divided into two sections. In the first part all the photographs were assessed for attractive smile based on six criteria and was categorized into attractive and non attractive smile. Criteria for attractive smile, displaying at least the second premolar.revealing no gingival recession in the smile area, having interdental papilla that filled interdental spacethat was not hyperplastic, displaying less than 3mm of maxillary gingiva onsmiling, displaying the line of lower lip parallel to incisal lineof maxillary teeth and also to an imaginary line linkingthe contact points of these teeth, presenting symmetry upon visual examination. The obtained data was statistically analyzed using Pearson's chi-square.Digital analysis of photographs was performed using Adobe photoshop Measurements were made both in attractive & non attractive smiles

In a second part of the study negative buccal corridor space was calculated using Johnson & Smith method. The method developed by Johnson & Smith has been proposed to measure negative space proportion during a smile.In this method, the width of the maxillary dental arch in a smile photograph is measured. The proportion of this value in relation to the distance of the lip commissure is found.This can be used to verify the proportion occupied by the dental arch relative to intercommisure distance.

$$NS(\%) = \frac{100 - AW \times 100}{ID}$$

ID – Intercommisure distance
NS – Negative space
AW – Arch width
The obtained data was statistically analysed using parametric student T- test

Results

All the smile photographs were evaluated for presence of six parameter which define an attractive smile (Graph 1). The percentage values of the occurrence of the parameters in 179 subjects is given in graph2 and table 1. On evaluation of smiles it was found out that out of 179 smiles analysed, 36 of them satisfied, all the six criteria and were classified as attractive smiles and the rest as unattractive smiles as shown in graph3. All the smiles in both the groups were measured for the buccal corridor space, the obtained data was subjected to statistical analysis.Shapiro Wilk Test was applied to the data which reveal normal distribution. Hence parametric Student T test was applied.

Graph 1 shows the percentage of smile which were attractive and non attractive. Table 2 shows buccalcorridor proportion between attractive and non attractive smile.The result showed that there was buccal corridor space was more in attractivesmile than non attractive smile. However the difference was statistically not significant.

Discussions

According to the literature an attractive smile usually shows symmetry and proportion between teeth, gingiva and lips.[10,8,11,12] The position of the corner of lip commissures also affects the smile symmetry and there must be regressive proportion of the teeth exposure created by curvature of the dento alveolar arch.[4] Some authors agree that size of negative space is not esthetically critical provided, it is within the typical limits of individual differences. However the author did not find information regarding the extent of the limit.Other authorsbelieve that it is important to achieve adequate negative space and minimize the black spaces at the mouth corner.Some study also demonstrated that the broader smiles showing more posterior teeth are consider more pleasing teeth then a smile that shows less posterior teeth[4]and the negative space proportion did not influence the esthetic evaluation. In 1970, hulsey in his study demonstrated that there is no relationship between buccal corridor and esthetics which is in contradiction with our study.Moore et al in 2005 found that broader smile with no buccal corridor are more attractive than smile with buccal corridor,[13] which indicates that buccal corridor has no impact on smile which is in contradiction with our study.Our finding were similar to studies done by Morley in 2001, Dong JK 1999, Morgolis et al[14,9,8] in their study demonstrated that broader smile showing more posterior teeth are consider pleasant than the smile that shows less posterior teeth.The presence or absence of buccal corridor can be influenced not only by the broadness of the denture. As discussed by frush and fisher but also by the anterio posterior positions of the maxilla relative to the lip drape. There are many factors which influences smile esthetics and buccal corridor. The buccal corridor ration has a greater impact on smile attractiveness than mild buccal corridor a symmetry. This agrees with a literature showing mild facial a symmetry does not influence facial attractiveness. The results of this indicate that a buccal corridor had an influence in the attractive smile. However, it was statistically not significant, this could be because of smaller sample size. Larger population may show difference. Finally it is important to emphasize that buccal corridor is one feature that determines smile attractiveness. Tooth shade if not most important factor is a very significant element smile attractiveness.[15] Other features such as amount of incisal and gingival display along with the tooth length and shape also play important roles.[16,17,18]

REFERENCES

1. Ackerman M, Ackerman J. Smile analysis and design in the digital era. J ClinOrthod. 2002;36:221–236.
2. Frush JO, Fisher RD. The dynesthetic interpretation of the dentogenic concept. J Prosthet Dent. 1958;8:558–581.
3. Hulsey CM. An esthetic evaluation of lip-teeth relationships present in the smile. Am J Orthod. 1970;57:132–144.
4. Rufenacht CR. Fundamentals of Esthetics. 2nd ed. Carol Stream, Ill: Quintessence Publishing; 1990, 77–85.
5. Johnson DK, Smith RJ. Smile esthetics after orthodontic treatment with and without extraction of four first premolars. Am J OrthodDentofacialOrthop. 1995;108:162–167.
6. Sarver DM. The importance of incisor positioning in the esthetic smile: the smile arc. Am J OrthodDentofacialOrthop. 2001;120:98–111.
7. Dierkes J M 1987 The beauty of the face: an orthodontic perspective.Journal of the American Dental Association , Special issue: 89E-95E
8. Margolis MJ. Esthetics considerations in orthodontic treatment of adults. Dent Clin N Am. 1997;41:29–48.
9. Dong JK, et al. The esthetics of the smile: a review of some recent studies. Int J Prosthod. 1999;12:9–19.
10. Peck H, Peck S. A concept of facial aesthetics. Angle Orthod. 1970;40:248–318.
11. Allen EP. Use of mucogingival surgical procedures to enhance esthetics. Dent Clin North Am. 1988;32:307–330.

12. Jerrold L, Lowenstein LJ. The midline: diagnosis and treatment. Am J OrthodDentofacialOrthop. 1990;97:453–462.
13. Moore T , Southard K A , Casko J S , Qian F , Southard T E 2005 Buccal corridors and smile esthetics . American Journal of Orthodontics and Dentofacial Orthopedics 127 : 208 – 213
14. Morley J, Eubank J 2001 Macroesthetic elements of smile design . Journal of the American Dental Association 132 : 39 – 45
15. Dunn W J , Murchison D F , Broome J C 1996 Esthetics: patients ' perceptionsof dental attractiveness . Journal of Prosthodontics 5 : 166 – 171.
16. Kokich VO, Kiyak HA, Shapirfo PA. Comparing the perception of dentist and lay people to altered dental esthetics. J Esthet Dent. 1999;11:311–324.
17. Brisman AS. Esthetics: a comparison of dentists' and patients'concepts. J Am Dent Assoc 1980;100:345-52.
18. Janzen EK. A balanced smile—a most important treatment objective. Am J Orthod 1977;72:359-72
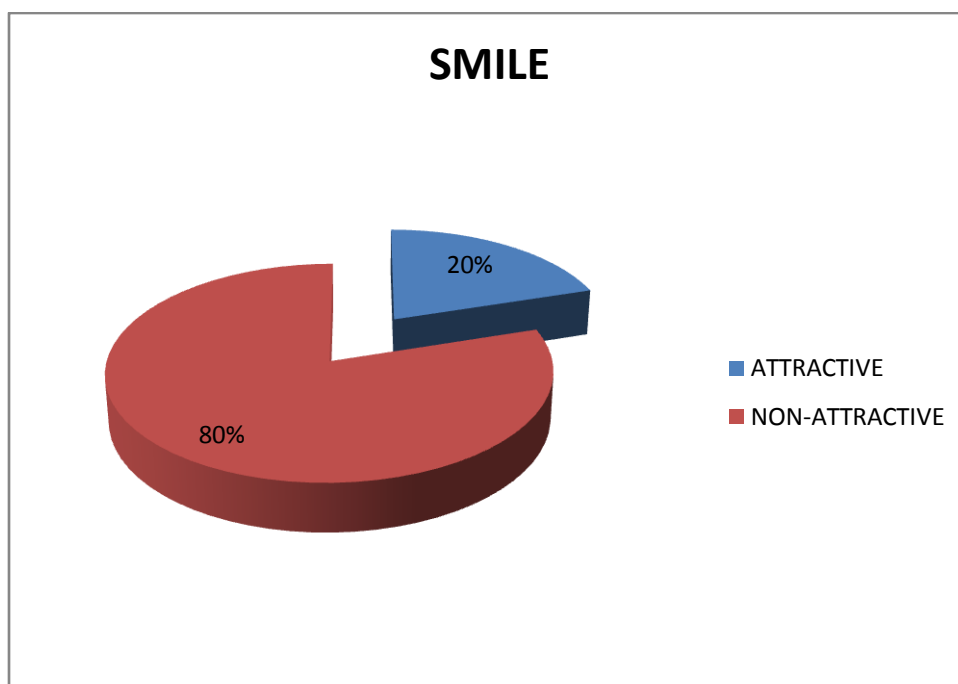
Tables and Graphs
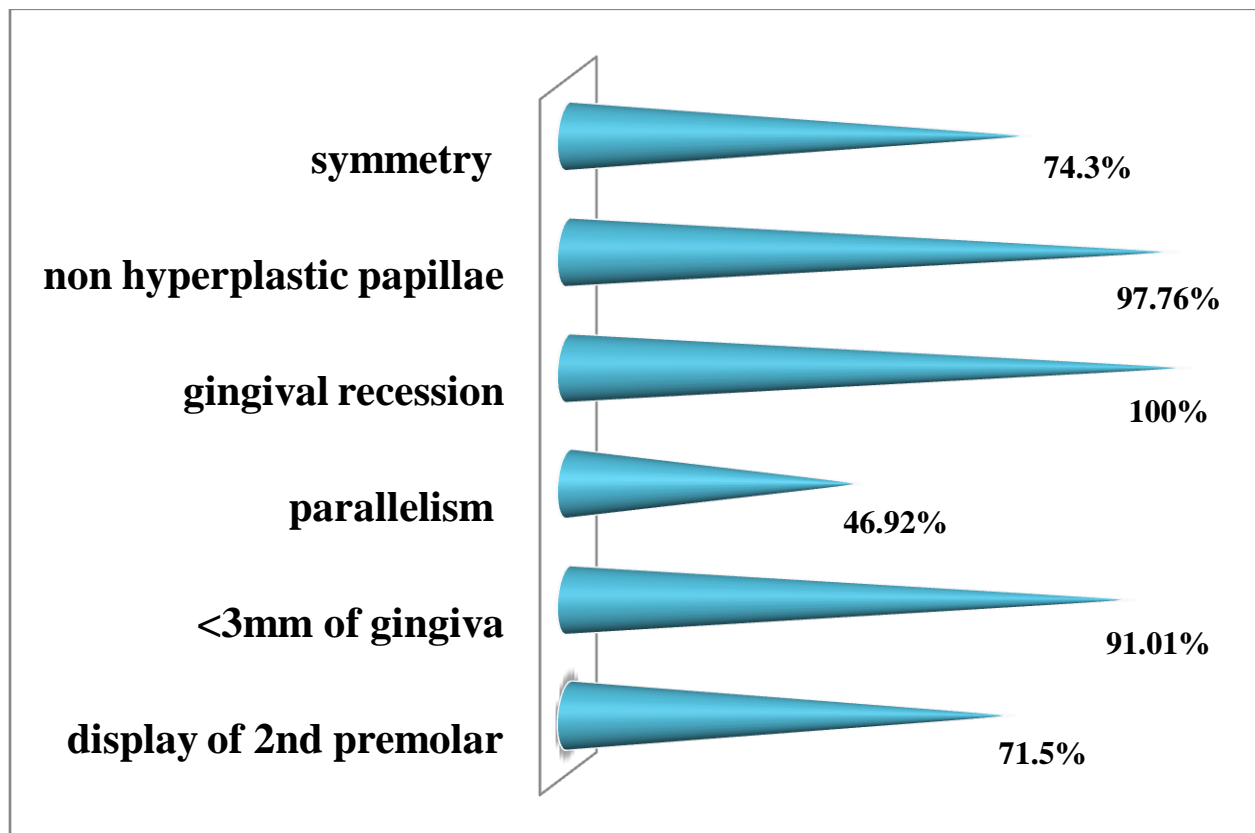
Graph 1: Shows the six parameters for attractive smile.

Smile

Table 1: Shows percentage of smile which were attractive and non attractive.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ATTRACTIVE	36	20.1	20.1	20.1
	NON-ATTRACTIVE	143	79.9	79.9	100.0
	Total	179	100.0	100.0	

Graph 2: Showspercentage of smile which were attractive and non attractive.

Table 2: Shows the buccal corridor proportion between attractive andnon attractive smile

Report			
BUCCAL CORRIDOR PROPORTION			
SMILE	Mean	N	Std. Deviation
ATTRACTIVE	33.2175	36	4.92376
NON-ATTRACTIVE	31.9546	143	5.19608
Total	32.2086	179	5.15397
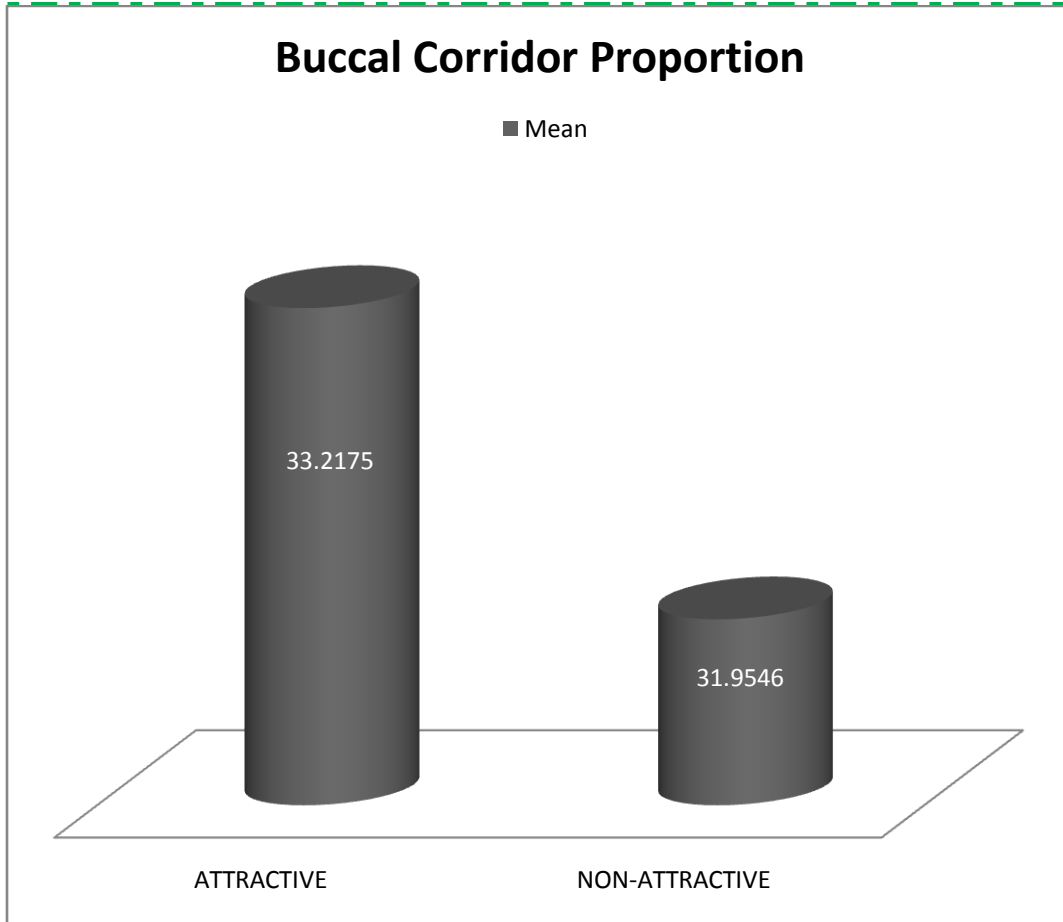
Graph 3: Shows the buccal corridor proportion between attractive andnon attractive smile.