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# The Effect of Buccal Corridor Size on Aesthetic Smiles Based on the Perceptions of Dentistry and Economics Faculty Students at the Prima University of Indonesia

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ABSTRACT

***Background:*** The concept of aesthetics is a science that is related to the concept of beauty and is subjective. This concept is one very important aspect of life because it can affect the quality of human life. An important factor in an aesthetic smile is the shape of the smile. In the modern world of orthodontics, the appeal of a smile has its value. The aesthetic smile can be assessed by several factors, including the shape and length of the teeth, the appearance of the gingiva, the curve of the smile, the colour and alignment of the teeth, and the buccal corridor. The buccal corridor is an important component of the aesthetic smile. The buccal corridor measures from the mesial angle of the maxillary first premolar to the interior portion of the lip crease. The negative space or dark space created by the width or even the absence of the buccal corridor can affect the aesthetic of the smile. ***Purpose:*** The purpose of this study was to determine whether there are differences in perceptions regarding the effect of the size of the buccal corridor on aesthetic smiles in dentistry and economics students at Prima Indonesia University. ***Methods:*** This study used an analytic survey research design with a cross-sectional design. The study was conducted on students of the Faculty of Dentistry and the Faculty of Economics, the University of Prima Indonesia with a total sample of 86 people. ***Results:*** The results showed that there was no difference in perceptions regarding the effect of the size of the buccal corridor on aesthetic smile among dentistry and economics faculty students at Prima Indonesia University.

KeyWords
*Smile, Aesthetics, Perception, Buccal*

## 1. INTRODUCTION

The concept of aesthetics is a science that is related to the concept of beauty and is subjective [1]. This concept is one of the most important aspects of life because it can affect the quality of human life [2].

The purposes of aesthetics in dentistry are to create beauty and attractiveness, increase patient self-esteem, and make patients feel satisfied with their body parts [1]. However, the perception of patient satisfaction with aesthetic smiles remains unclear due to limited knowledge of dentistry. The appearance

of the dental arch is one of the important parts that determine the attractiveness of a person's face. Besides, it also plays an important role in social interaction, communication, and for creating effective interactions because humans always involve a sense of sight that centered on the face, so it can be concluded that the dental arch is one of the factors that determine a person's physical appearance, especially on the face [3]. However, the perception of the acceptable dental arches in the general public is still unclear.

The dental arch affects the smile process of a person and shows facial expressions. In humans, a smile is an expression that means fun and happiness. A beautiful smile can increase social interaction [4]. A person's success in a social environment is closely related to an aesthetic smile. This issue becomes crucial because it affects the negative psychosocial effects that can cause the quality of social interactions to decrease [1]. Therefore, the buccal corridor is something that needs to be understood.

Based on the data, a crucial factor in an aesthetic smile is the shape of the smile [5]. In the modern world of orthodontics, the appeal of a smile has its value. An anesthetic smile can be assessed by several factors, including the shape and length of the teeth, the appearance of the gingiva, the curve of the smile, the color also the alignment of the teeth, and the buccal corridor [6].

The buccal corridor is an important component of an aesthetic smile. The buccal corridor measuring starts from the mesial angle of the maxillary first premolar to the interior portion of the lip crease [7]. Negative space or dark space created by the width or even absence of buccal corridors can affect the smile aesthetic [8]. According to Frush and Fisher, the relative antero posterior position of the maxilla to cover the lips may affect the presence or the absence of a buccal corridor. Research by Moore (2005) stated that a broad smile without a buccal corridor looks more attractive than a smile with a buccal corridor. However, it is different from the research results of Krishnan (2008) that reducing the number of buccal corridors can cause a negative character when smiling. Currently, the buccal corridor is still a controversial aspect in terms of area size [9].

Recent studies have suggested that large buccal corridors can be treated while narrow buccal corridors may remain untreated [10]. The important thing to get a more natural appearance is to pay attention to how the buccal corridor is. However, the understanding of the aesthetics of the attractive smile can vary. The community evaluated the five face photographs with five buccal corridor modifications that they preferred the face photos with minimal buccal corridor space [11].

In particular, people prefer a big smile to a small smile. Although few data on the ideal buccal corridor size are accessible in the literature, most of them are based on clinical opinion, whereas scientific studies dealing with this issue yield mixed conclusions [12].

Perceptions of the aesthetics of smiles and teeth in society vary widely and are influenced by environmental and personal experiences. One of the factors that can influence a person in determining the aesthetic perception of a smile is education. In this case, the term "education" can be classified as "educational status" or "professional education". Educational status is defined as a graduate of primary school, secondary school, and university, while professional education in the field of smile means that the professional work of an individual is related to the aesthetic of a smile. The assessments of the aesthetic smile of dentists, general dentists, dental students, plastic surgeons, artists, and the public can influence their views on the ice-drop of smiles [13].

Education and the environment are among the factors that determine the perception of aesthetic smiles. The Prima University of Indonesia is one of the private higher education institutions in Medan with several faculties, such as the Faculty of Dentistry. Dental students who will become dentists can have different perceptions in the aesthetic assessment of smiles. Likewise, the perception of other individuals from various environmental and educational backgrounds can have their thoughts on aesthetic smiles. Therefore, the researcher was interested in conducting research on "The Effect of Buccal Corridor Size on Aesthetic Smiles Based on the Perceptions of Dentistry and Economics Faculty Students at the Prima University of Indonesia." The researchers chose these two faculties was to save time because the two faculties were in the same building, making it easier for researchers to collect data.



## 2. MATERIAL AND METHOD

### 2.1 Research Design

The research used was an analytic survey with a cross-sectional design

### 2.2 Research Site

The site of this research is the Faculty of Dentistry and Economics, Prima University of Indonesia, Medan, North Sumatra, and conducted from November 2020 to January 2021.

### 2.3 Research Population and Sample

The population of this research was 596 students of the 7th semester of the Faculty of Dentistry and Economics, Prima University of Indonesia, consisting of 43 students of Dentistry Faculty and 553 students of Economics Faculty.

Based on the sample calculation of Slovin's formula, the sample was 86 students consisting of 43 students of Dentistry Faculty and 43 students of Economics Faculty, Prima University of Indonesia.

### 2.4 Research Variable

The independent variable in this research is aesthetic smile and the dependent variable is perception.

2.5 Research Procedure

1. The questionnaire consisting of six photos of digitally modified smile arcs and buccal corridors and variations of the women's buccal corridor smile. The sample was asked to select which smile arc and buccal corridor photos were most attractive to unattractive. There are six buccal corridor spaces, namely (Trisnawaty, 2017). The sample provides aesthetic values ranging from 0 to 100.


**Figure 1**. Extra-large dental arch (0% buccal corridor)


**Figure 2.** Large dental arch (5% buccal corridor)


**Figure 3**. Medium–large dental arch (10% buccal corridor)

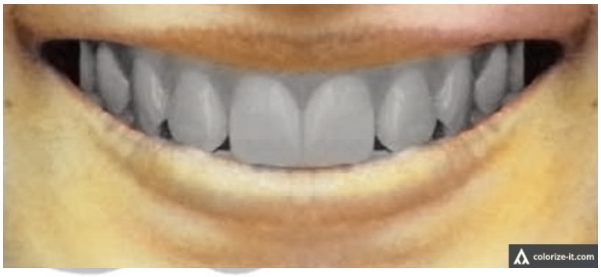


**Figure 4**. Medium dental arch (15% buccal corridor)


**Figure 5.** Medium–narrow arch (20% buccal corridor)


**Figure 6**. Narrow dental arch (25% buccal corridor)

2. Then, the results of filling out the questionnaire are collected and analyzed analytically.

2.6 Data Analysis

The data analysis used in this research are:

1. Univariate aims to describe the characteristics of respondents, perceptions, and aesthetic smiles.

2. Bivariate aims to analyze differences in perceptions regarding the influence of the buccal corridor size on aesthetic smiles in dentistry and economics faculty students at Prima University of Indonesia. The statistical test used is the independent t-test if the data distributed normally, while if the data distributed abnormally, it used Mann Whitney.

## 3. RESULT AND DISCUSSION

### 3.1.1 The Characteristics of Respondents

The respondents of this research are the 7th-semester students of the Dentistry and Economics Faculty at the Prima University of Indonesia, Medan. The detailed information can be seen in Table 3.1 below:

**Table 3.1** The Characteristics of Respondents

| Characteristics | n | % |
|---|---|---|
| **Age** | | |
| 19 | 2 | 2,3 |
| 20 | 14 | 16,3 |
| 21 | 35 | 40,7 |
| 22 | 22 | 25,6 |
| 23 | 6 | 7,0 |
| 24 | 5 | 5,8 |
| 25 | 2 | 2,3 |
| **Gender** | | |
| Male | 28 | 32,6 |
| Female | 58 | 67,4 |
| Total | 86 | 100,0 |



Based on the characteristics of age, the results of the research in table 3.1 above showed that most respondents were 35 students of 21 years old (40.7%), 22 students of 22 years old (25.6%), 14 students of 20 years old (16.3%) 6 students of 23 years old (7%) 5 students of 24 years old (5.8%), and only 2 students of 19 and 25 years old (2.3%). Then, the results also showed that the most respondents were female that consist of 58 students (67.4%), while male respondents were only 28 students (32.6%).

### 3.1.2 The Assessment of Smile Arc

The assessment of the 7$^{th}$ semester Students of Economics Faculty, Prima University of Indonesia of 6 Figures of smile arcs and buccal corridors in this research can be seen in Table 3.2 below:

**Table 3.2** Assessment of the 7th semester students of Economics Faculty, Prima University of Indonesia of 6 smile arcs and buccal corridors

| The Assessment of Smile Arc | n | % |
|---|---|---|
| **Photo 1** | | |
| Very attractive | 19 | 44,2 |
| Attractive | 19 | 44,2 |
| Less attractive | 5 | 11,6 |
| **Photo 2** | | |
| Very attractive | 18 | 41,9 |
| Attractive | 21 | 48,8 |
| Less attractive | 4 | 9,3 |
| **Photo 3** | | |
| Very attractive | 14 | 32,6 |
| Attractive | 23 | 53,5 |
| Less attractive | 6 | 14,0 |
| **Photo 4** | | |
| Very attractive | 10 | 23,3 |
| Attractive | 17 | 39,5 |
| Less attractive | 16 | 37,2 |
| **Photo 5** | | |
| Very attractive | 13 | 30,2 |
| Attractive | 10 | 23,3 |
| Less attractive | 20 | 46,5 |
| **Photo 6** | | |
| Very attractive | 10 | 23,3 |
| Attractive | 10 | 23,3 |
| Less attractive | 23 | 53,5 |
| Total | 43 | 100,0 |



Based on the assessment of the 7th semester students of Economics Faculty, Prima University of Indonesia of 6 photos of smile arcs, the results of the research in Table 3.2 above showed that in photo 1, 19 students (44.2%) stated very attractive, 19 students (44.2%) stated attractive, and 5 students (11,6%) were less attractive. In photo 2, 18 students (41.9%) were very attractive, 21 students (48.8%) were attractive, and 4 students (9.3%) were less attractive. In photo 3, 14 students (32.6%) were very attractive, 23 students (53.5%) were attractive, and 6 students (14%) were less attractive. In photo 4, 10 students (23.3%) stated very attractive, 17 students (39.5%) were attractive, and 16 students (37.2%) were less attractive. In photo 5, 13 people (30.2%) were very attractive, 10 students (23.3%) were attractive, and 20 students (46.5%) were less attractive. In photo 6, 10 students (23.3%) stated very attractive, 10 students (23.3%) were attractive, and 23 students (53.5%) were less attractive.

The assessment of the 7th semester students of Dentistry Faculty, Prima University of Indonesia of the 6 Figures of smile arcs and the buccal corridor in this research can be seen in Table 3.3 below:

**Table 3.3** The assessment of the 7th semester students Dentistry Faculty, Prima University of Indonesia of 6 photos of smile arcs and buccal corridors

| The Assessment of Smile Arc | n | % |
|---|---|---|
| **Photo 1** | | |
| Very attractive | 11 | 25,6 |
| Attractive | 22 | 51,2 |
| Less Attractive | 10 | 23,3 |
| **Photo 2** | | |
| Very attractive | 7 | 16,3 |
| Attractive | 22 | 51,2 |
| Less Attractive | 14 | 32,6 |
| **Photo 3** | | |
| Very attractive | 8 | 18,6 |
| Attractive | 24 | 55,8 |
| Less Attractive | 11 | 25,6 |
| **Photo 4** | | |
| Very attractive | 6 | 14,0 |
| Attractive | 24 | 55,8 |
| Less Attractive | 13 | 30,2 |
| **Photo 5** | | |
| Very attractive | 7 | 16,3 |
| Attractive | 16 | 37,2 |
| Less Attractive | 20 | 46,5 |
| **Photo 6** | | |
| Very attractive | 6 | 14,0 |
| Attractive | 13 | 30,2 |
| Less Attractive | 24 | 55,8 |
| Total | 43 | 100,0 |

Based on the assessment of the 7th-semester students of Dentistry Faculty, Prima University of Indonesia of 6 photos of smile arcs, the results of the research in Table 3.3 above showed that in photo 1, 11 students (25.6%) stated very attractive, 22 students (51.2%) were attractive, and 10 students (23.3%) less attractive. In photo 2, 7 students (16.3%) stated very attractive, 22 students (51.2%) were attractive, and 14 students were less attractive (32.6%). In photo 3, 8 students (18.6%) stated very attractive, 24 students (55.8%) were attractive, and 11 students (25.6%) were less attractive. In photo 4, 6 people (14%) were stated very attractive, 24 students (55.8%) were attractive, and 13 students (30.2%) were less attractive. In photo 5, 7 students (16.3%) stated very attractive, 16 students (37.2%) were attractive, and 20 students (46.5%) were less attractive. In photo 6, 6 students (14%) stated very attractive, 13 students (30.2%) were attractive, and 24 students (55.8%) were less attractive.

### 3.1.3 *Esthetic Score*

The differences of the aesthetic score given by the 7th semester students of the Economics and Dentistry Faculty, Prima University of Indonesia of 6 photos of the smile arc and the buccal corridor can be seen in Table 3.4 below.

Table 3.4 The differences of aesthetic scores of the 7th semester students of the Economics and Dentistry Faculty, Prima University of Indonesia of 6 photos of smile arcs and buccal corridors.

| Aesthetic Score | $\overline{x} \pm$ Standard Deviation | *p-value* |
|---|---|---|
| **Photo 1** | | |
| FE | 7,70±2,08 | 0,751 |
| FKG | 7,81±2,03 | |
| **Photo 2** | | |
| Fakultas Ekonomi | 7,79±1,91 | 0,891 |
| FKG | 7,77±1,82 | |
| **Photo 3** | | |
| FE | 7,51±1,72 | 0,427 |
| FKG | 7,84±1,50 | |
| **Photo 4** | | |
| FE | 6,81±2,31 | 0,561 |
| FKG | 7,12±2,00 | |
| **Photo 5** | | |
| FE | 6,12±2,74 | 0,797 |
| FKG | 6,23±2,50 | |
| **Photo 6** | | |
| FE | 5,79±3,04 | 0,848 |
| FKG | 5,60±3,09 | |



The difference of aesthetic scores given by the 7th semester students of the Economics and Dentistry Faculty, Prima University of Indonesia of 6 photos of the smile arc and buccal corridor, the results of the research in Table 3.4 above indicated that the overall results of the Mann Whitney statistical test obtained p-value > 0.05 that means that there is no aesthetic difference between smile arc and buccal corridor scores between students of the Economics and Dentistry Faculty. From the results of this research, it can be stated that there is no difference in perceptions regarding the effect of the buccal corridor size on aesthetic smiles among students of the Economics and Dentistry Faculty, Prima University of Indonesia, Medan.

### 3.2 Discussions

An aesthetic smile is often used as a post-orthodontic evaluation. However, the assessment of smiles is often subjective and influenced by individual perceptions [23]. Individual perceptions are influenced di-

rectly by the level of education, age, gender, occupation, social status, and it is indirectly influenced by environmental, family, and cultural factors [14].

Based on the results of the research, it was found that most respondents were females. This is consistent with research [15] conducted in Brazilian dental schools that stated women are more interested in assessing the aesthetics of a smile. 97% of women want orthodontic treatment for aesthetic reasons. Female patients tend to be more interested and more concerned about their appearance includes the appearance of teeth than male patients [19] [22]. As a result, females are more often less satisfied with their smiles [15].

A smile is a form of facial expression that has an important role in increasing one's attractiveness. Various parameters such as smile arc, tooth alignment, tooth color and shape, incisal margin regularity, incisal and gingival number appearance, and buccal corridor have been identified as important smile components [16]. In this research, the researcher presented 6 photos of the smile arc and buccal corridor that aims to determine the perceptions of research respondents whether the 6 photos are very attractive, attractive, or less attractive to them.

The respondents in this research were the 86 of 7th-semester students of the Dentistry and Economics Faculty, Prima University of Indonesia, Medan. Based on the results of the research, it was found that from 6 photos of the smile arc and buccal corridor, most respondents assessed it as attractive in photos 1, 2, 3, and 4, while in photos 5 and 6 most respondents stated less attractive. Among students of the Faculty of Dentistry, Prima University of Indonesia, Medan, the perception of attractiveness is only dominated by photo 1, while the other photos were less attractive.

There are six buccal corridor spaces, which is an extra-large dental arch with buccal corridor 0%, large dental arch with buccal corridor 5%, large to medium dental arch with buccal corridor 10%, medium dental arch with buccal corridor 15%, medium to narrow dental arch with buccal corridors 20%, and narrow dental arch with buccal corridors 25%. From the results of this research, it can be seen that an extra-large dental arch with a 0% buccal corridor is considered more attractive to most of the 7th semester students of the Dentistry and Economics Faculty, Prima University of Indonesia, Medan [17].

Similar results were obtained in other research that as the respondents, the students of the Faculty of Dentistry at Syiah Kuala University prefer small and medium buccal corridors to the large buccal corridor as more attractive [16]. The small buccal corridor is preferred by respondents as seen from the results of research in Japan that stated that orthodontists and dentistry students prefer narrow buccal corridor (0% - 5%) to medium and large buccal corridor [14]. Recent research by Loi (2012) concluded that the medium-small buccal corridor (0% - 15%) is preferred and considered more aesthetic, while in

Canada, it is more discriminatory and has a smaller range than the buccal corridor.

The assessment of aesthetic smile arc can be done by displaying a modified photo to the subject, then the subject is asked to rate the aesthetic level using the Visual Analogue Scale (VAS) or the Numeric Rating Scale (NRS) [18]. In this research, researchers used the aesthetic score measurement with the Visual Analogue Scale (VAS) and the Numeric Rating Scale (NRS) by providing an assessment in the form of numbers from 0 to 10 on the six photos of the smile arc and the buccal corridor. From the results of the Mann-Whitney statistical test, it was stated that there was no difference in perceptions regarding the effect of the buccal corridor size on the aesthetic smile among the Faculty of Economics and Dentistry students at the Prima University of Indonesia, Medan.

The absence of different perceptions regarding the influence of the buccal corridor size on aesthetic smiles may be due to the understanding of most students from the Faculty of Economics and Dentistry, Prima University of Indonesia, Medan about aesthetic smiles, or perceptions of the correct aesthetic smile. Since the absence of interviews, in-depth analysis of respondents' knowledge is limited only to questionnaires, so this research does not know in depth about respondents' knowledge of aesthetic smile perceptions but only based on respondents' choices. However, the respondents' knowledge of the aesthetic smile theory cannot be ignored because it influences the choices in this research.

In addition, the absence of different perceptions regarding the influence of the buccal corridor size on aesthetic smiles was also caused by the gender of the respondents. This can be seen from the results of research conducted by [19] that stated that there is no difference in the buccal corridor assessment between male and female students. According to [14], age and sex do not affect the perception of buccal corridors. Men and women have the same opinion about one aesthetic factor that affects the smile. Therefore, gender does not appear to influence perceptions of buccal corridor assessment [20].

In this research, generally, the respondents have chosen photos that appropriate to the theory of aesthetic smile, so the subject may have previously studied dentistry such as growth and development, facial profiles, harmony in size, shape, and color so that they understand smile or have their own experiences associated with the appearance of the aesthetic smile. Post-treatment evaluation through facial profiles can be affected by changes in the smile arc, and dental alignment also contributes to the determination of treatment [21]. This knowledge can influence the subject's perception and assessment of aesthetic smiles [14].

## 4. CONCLUSION

The perception of an aesthetic smile is influenced by many factors. One of them is education. This re-

search aims to determine whether there are differences in perceptions regarding the effect of the buccal corridor size on aesthetic smiles among dentistry and economics students at the Prima University of Indonesia. Based on the research results, it was found that:

1. In photo 1, most of the sample perception of the Faculty of Economics, Prima University of Indonesia stated that the "very attractive" and "attractive" both have the same percentage (44.2%), while the sample perception of the Faculty of Dentistry, Prima University of Indonesia is more attractive (51.2%).
2. In photo 2, most of the sample perception of the Faculty of Economics, Prima University of Indonesia stated that it was attractive (48.8%), while the sample perception of the Faculty of Dentistry, Prima University of Indonesia also rated it more attractive (51.2%).
3. In photo 3, most of the sample perception of the Faculty of Economics at the Prima University of Indonesia stated that it was attractive (53.5%), while the sample perception of the Faculty of Dentistry, Prima University of Indonesia also rated it more attractive (55.8%).
4. In photo 4, most of the sample perception of the Faculty of Economics at the Prima University of Indonesia stated that it was attractive (39.5%), while the sample perception of the Faculty of Dentistry, Prima University of Indonesia also rated it more attractive (55.8%).
5. In photo 5, most of the sample perception of the Faculty of Economics, Prima University of Indonesia stated that they were less attractive (46.5%), while the sample perception of the Faculty of Dentistry, Prima University of Indonesia also rated them less attractive (46.5%).
6. In photo 6, most of the sample perception of the Faculty of Economics, Prima University of Indonesia stated that they were less attractive (53.5%), while the sample perception of the Faculty of Dentistry, Prima University of Indonesia also considered it less attractive (55.8%).
7. The statistical results of the research showed that there is no difference in perceptions regarding the effect of the buccal corridor size on aesthetic smiles among dentistry and economics students at the Prima University of Indonesia.

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