

## Evaluation of Saudi Population Perception of the Proportion of Maxillary Anterior Teeth Width Ratio to the Dental Papilla Position

Mohammad Bendahmash<sup>1\*</sup>, Feras Dhafr<sup>1</sup>, Abdullah Awwad<sup>2</sup>, Ahmed El Hejazi<sup>3</sup>

<sup>1</sup>College of Dentistry, King Saud University, Riyadh, Saudi Arabia

<sup>2</sup>College of Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia

<sup>3</sup>Restorative Dental Science Department, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

\*Corresponding Author: Mohammad Bendahmash, College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

Received: January 31, 2020; Published: February 28, 2020

### Abstract

**Aim of the Study:** The aim of this study is to evaluate the preference of Saudi population regarding the golden proportion in the relation to the position of dental papilla.

**Methods:** A computer image manipulation program (Adobe Photoshop CS, Adobe Systems, San Jose, CA, USA) was used to produce a golden proportion smile of the maxillary anterior teeth and to change the height of the dental papilla. A survey was then designed and sent to lay people by Google docs in different areas in Saudi Arabia. They were asked: Can you spot the difference in following pictures, which of group A is the best smile, and which from group B is the best smile, and overall which of the following is the most aesthetic smile.

**Results:** In the evaluation of the most esthetic smile the majority of Saudi population prefer the original proportion smile and short dental papilla compared to long and with the gold standard. Large number did not notice the difference between the six different smiles 1924 participants out of which 41% (787) did notice the difference between the smile pictures.

**Keywords:** Maxillary Anterior Teeth; Dental Papilla Position

### Introduction

In the new era of esthetic dentistry, the demand for more esthetically pleasing smile has increased among the patients. However, there are some limitation of lacking the definitive guide for which smile is more esthetic. The interdental papilla is one of the greatest challenges to improve the gingival contour in areas where esthetic is a major concern. Interdental gingival tissue is formed by a dense connective tissue covered externally by oral gingival epithelium and internally by junctional and oral sulcular epithelia. The dental papilla does not act as a biologic barrier in protecting the periodontal structures, only but also plays a critical role in esthetics and phonetics [1]. The space between two adjacent teeth in contact with one another and apical to contact points. According to Takei, 1980 [2] called the housing for the interdental papilla. This space comprising the course of the cemento-enamel junction (CEJ), interdental distance, and bone crest was considered by the clinicians to restore the loss of function and also to achieve an esthetics appearance in the anterior teeth to achieve a beautiful smile. Also, patients' awareness of their appearance is pushing the clinician to fulfill their demand [3].

Bilateral analysis of the tooth width to the overall width of the anterior segment with the help of the golden percentage concept is helpful in diagnosing and determining the symmetry of the smile. The golden proportion has significant benefit on the treatment planning and providing an aesthetically pleasing smile [4].

In 2013 [5] studied whether alteration of the maxillary central and lateral incisors' length and width, respectively, would affect perceived smile esthetics. He found that the lateral incisor width has more effect on the laypeople [6].

The anterior maxillary dentition displays a significant range of variation. Nevertheless, a number of basic parameters positively influencing the esthetics of the anterior region can be defined [5]. Three basic shapes of upper middle incisors can be distinguished with differing emergence profiles from human to human: triangular, oval or square. The width of natural upper incisors ranges between 8.3 and 9.3 mm, while the length usually ranges between 10.4 to 11.2 mm [7-11].

### Purpose of the Study

The purpose of this study was to determine the most esthetic smile between six different smiles with the changing in the interdental papilla and the tooth ratio with consideration of the golden standard smile and to evaluate the perception of Saudi population for optimal interdental papilla location from esthetics point of view.

### Materials and Methods

This cross-sectional study was conducted on the general population in Saudi Arabia. A random sample was employed and the sample size was 1924. The main criteria was all Saudi population, from both genders, aged 18 years old and above were eligible to participate. Exclusion criteria were Saudi population who are younger than 18 years old. A survey was designed by Google docs and sent digitally through social media network to lay people in different areas in Saudi Arabia. The participants were asked about the demographic data gender, age and region in the beginning of the survey. followed by 4 questions based on the following images (Image 1).

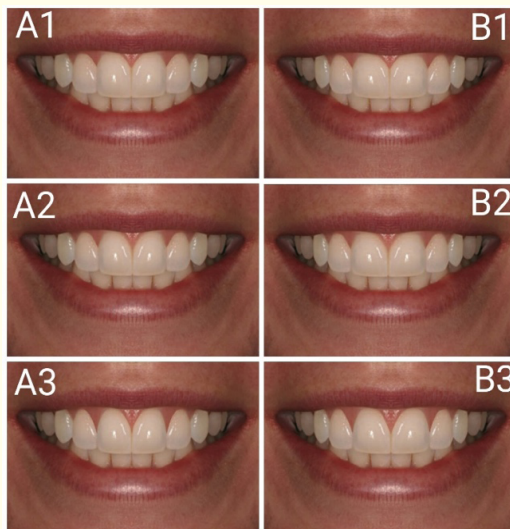


Image 1: Images used in the survey.

A computer image manipulation program (Adobe Photoshop CS, Adobe Systems, San Jose, CA, USA) was used to produce a golden proportion smile of the maxillary anterior teeth by changing the height of the interdental papilla. Participants were asked if they can spot the difference in different images, which smile is the best from group A, which from group B and overall which smile is the most aesthetic (Table 1).

IBM SPSS version 25.0 was used for data entry and analyses. Chi square test was used and Results were considered significant at  $p < 0.05$ .

Can you spot the difference in the following?	Yes	No	--	--	--	--
Please choose the most aesthetic smile from group A Below	A1	A2	A3	--	--	--
Please choose the most aesthetic smile from group B Below	B1	B2	B3	--	--	--
Overall which of the following is the most aesthetic smile?	A1	A2	A3	B1	B2	B3

**Results**

1924 was the sample size (27.3%) male and (% 72.7) female. Most of them were aged between 18 and 24 years. The majority of the population was from Riyadh.

41% (787) out of 1924 did notice that there was a difference between smile images. The numbers from 1 to 3 were representing the interdental papilla position were 1 has the shortest interdental papilla and 3 has the longest interdental papilla. Of these 786 participants who noticed the difference, 47.5% preferred the original ratio smile which was A1, 36.1% preferred A2 and 16.4% preferred A3 (Figure 1).

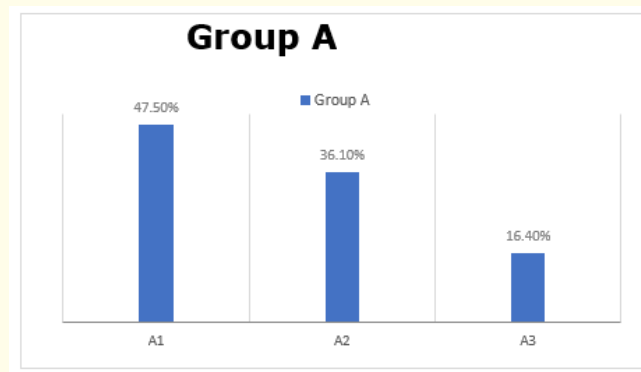


Figure 1: Distribution of participants preference among 3 different groups, (A1, A2 and A3).

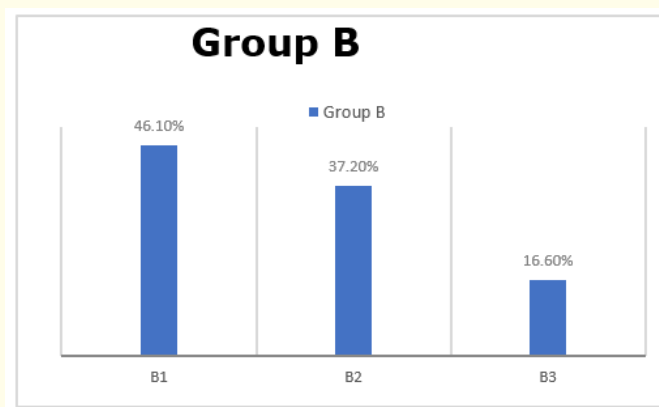


Figure 2: Distribution of participants preference regarding golden proportion smile.

And from all images the most preferred image was A1 the ratio of tooth height to width was 0.78 with 27.4% and the least was B3 (highest dental papal) with 7% (Figure 3).

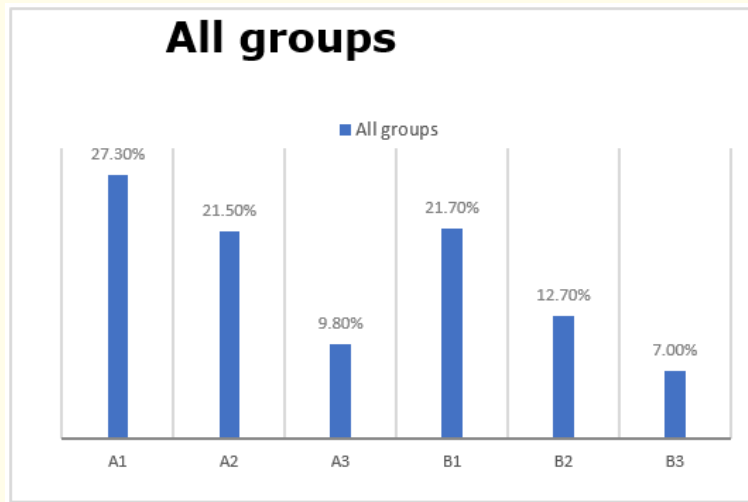


Figure 3: Participants preference among all different groups.

All different age groups showed more preference to the smile in picture A1 where the ratio was 0.78 and the interdental papilla was the shortest. The second most preferable smile was A2 in the younger age group (18 - 24) and B1 in the older age group. Picture B3 was the least preferable in the age group 18 - 24 and 35 - 44 with a significant difference in the first age group.

Overall the two pictures A1 which is less wide than the golden proportion and with the shortest interdental papilla and A2 in which the interdental papilla height was slightly longer than A1 and shorter than A3 were more preferable. Participants from Riyadh have chosen picture A1 more frequent followed by picture A2, while in the western region most of the participants preferred picture B1 followed by A1 and A2 with the same result. Regarding eastern region both A1 and B1 scored the same result followed by A2 and B2 with the same level to.

Picture B3 showed the least preference in all regions except the northern region B2 was the least preferred smile.

## Discussion

The face, teeth and dento-gingival complex/gingiva are of paramount for a perfect smile design.

A lot of researches are being carried out regarding facial and teeth form for a perfect smile also, regarding morphology and function of maxillary anterior teeth.

Gingival morphology considered as an important factor in smile design. Researchers suggested that facial form, teeth form and gingival morphology are important parameters from the frontal aspect of aesthetic (anterior teeth).

From the literature it is also evident that Gingival zenith plays an important role in aesthetics. Gingival zenith is the most apical aspect of the free gingival margin (FGM). Its location was found to be distal to the vertical bisected midline (VBM) for central incisor and lateral incisor and for canine it is supposed to coincide with the VBM.

With the idea of the most esthetic smile six different images were designed following the principle of the golden proportion and have been sent to the lay people of the Saudi population with the question of what is the most esthetic smile?

The six images were grouped into two main groups defined by letters and three sub-groups defined by numbers. The first main group is group A in which all the teeth have a proportion of 0.78 and the second group is group B which is the golden proportion where the teeth are slightly wider with the proportion of 0.71. The sub-groups 1, 2 and 3 have a different length of the interdental papilla which increase in length respectively where 1 with a short interdental papilla, 2 mid-sized interdental and 3 with a long interdental. Relatively all the sub-groups dimensions are applied in both group A and group B.

In this study 1924 lay people were asked if they can notice the difference between all the six images together more than half of the participants 1137 (59%) did not notice the difference and out of this number there were 338 (30%) males and 796 (70%) females, which are located in Riyadh 594 (52%) and if the chosen answer is no difference the survey ends at this point. The other groups who chose yes there is difference 786 (41%) almost half the participants which gives an indication that an esthetic smile is a major concern in a large number of the Saudi population since the differences between the six different images is relatively close (Table 2).

	Riyadh	Western province	Eastern province	Males	Females
Yes	396 (50%)	128 (16%)	104 (13%)	187 (24%)	599 (76%)
No	594 (52%)	161 (14%)	148 (13%)	338 (30%)	796 (70%)

**Table 2:** Questions asked in the survey.

After dividing the two sets of images A group and B group the participants were asked to choose the best image among group A (Table 3) and the largest share was for the image A1 47.5% which indicates that the image A1 is the most esthetic smile in group A. Not too far from it the best image from group B (Table 4) was the image B1 with a total of 46.1%, furthermore when the participants were asked to choose the overall best smile and the image A1 was the most esthetic smile in the survey with 27.4% however, we can notice a really close result for B1 with 21.8% and A2 with 21.5% (Table 5).

	What is the most esthetic smile (group A)			Total
	A1	A2	A3	
Females	284 (47.4%)	224 (37.4)	91 (15%)	599
Males	89 (47.6%)	60 (32%)	38 (20.3%)	187
Total	373	284	129	786

**Table 3:** Questions asked in the survey.

	What is the most esthetic smile (group B)			Total
	B1	B2	B3	
Females	278 (46.4%)	230 (38.4%)	91 (15.1%)	599
Males	85 (45.5)	63 (33.7%)	39 (20.1%)	187
Total	363	293	130	786

**Table 4:** Questions asked in the survey.

	What is the most esthetic smile overall?						Total
	A1	A2	A3	B1	B2	B3	
Females	164	138	54	134	73	36	599
Males	51	31	22	37	27	19	187
Total	215	169	76	171	100	55	786

Table 5: Questions asked in the survey.

### Conclusion

The majority of Saudi population prefer the original proportion smile and short dental papilla.

### Acknowledgment

CDRC in King Saud University collage of dentistry.

### Bibliography

1. Jeremiah HG., et al. "Social perceptions of adults wearing orthodontic appliances: A cross-sectional study". *European Journal of Orthodontics* 33.5 (2011): 476-482.
2. Takei HH. "The interdental space". *Dental Clinics of North America* 24.2 (1980): 169-176.
3. Salonen L., et al. "Need and demand for orthodontic treatment in an adult Swedish population". *European Journal of Orthodontics* 14.5 (1992): 359-368.
4. Breece GL and Nieberg LG. "Motivations for adult orthodontic treatment". *Journal of Clinical Orthodontics* 20.3 (1986): 166-171.
5. Alsulaimani FF and Batwa W. "Incisors' proportions in smile esthetics". *Journal of Orthodontic Science* 2.3 (2013): 109-112.
6. Snow SR. "Esthetic smile analysis of maxillary anterior tooth width: the golden percentage". *Journal of Esthetic Dentistry* 11.4 (1999): 177-184.
7. P Gehrke., et al. "Influence of interdental papilla length and interproximal contact point on the perception of esthetics in symmetric and asymmetric situations". *Journal of Dental Implantology* 43.3 (2018): 254-257.
8. Mavroskoufis F and Ritchie GM. "Variation in size and form between left and right maxillary central incisor teeth". *Journal of Prosthetic Dentistry* 43 (1980): 254-257.
9. Owens EG., et al. "A multicenter interracial study of facial appearance. Part 2: A comparison of intraoral parameters". *International Journal of Prosthodontics* 15.3 (2002): 283-288.
10. Sterrett JD., et al. "Width/length ratios of normal clinical crowns of the maxillary anterior dentition in man". *Journal of Clinical Periodontology* 26.3 (1999): 153-157.
11. Abhay P Kolte., et al. "Proximal contact areas of maxillary anterior teeth and their influence on interdental papilla". *The Saudi Dental Journal* 30.4 (2018): 324-329.

Volume 19 Issue 3 March 2020

©All rights reserved by Mohammad Bendahmash., et al.