Original Article

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EFFECT OF DIASTEMA ON SMILE PERCEPTION IN A SAUDI POPULATION

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ABSTRACT:

Introduction: The perception of an aesthetic smile can be a diverse entity to analyze. The visibility of teeth or lack thereof, the role of gingival appearance, the presence of diastema, etc. are all contributing factors to an aesthetically acceptable smile. The present study concentrated on the Philips classification while incorporating diastemas, and analyzed these smiles for acceptance among a Saudi population in the Riyadh Province.

Materials and Methods: A survey was carried out with the involvement of patients above the age of 18 years. The tools used were a questionnaire with demographics, a slide show presentation of 5 smile types modified with varying degrees of diastema and a visual analogue scale to assess smile acceptability.

Results: The most acceptable smile type was the one with both upper and lower teeth visible (UL0) and least acceptable was that with no teeth (N). The least acceptable smile type with teeth included in the smile was that where the lower teeth were visible (L0 to L4) and among that class of smiles the least acceptable was a diastema between the lateral incisor and canine (L3). Visibility of Upper teeth in a smile composition showed more acceptability than if only lower teeth or no teeth were seen.

Keywords: Smile Type, Diastema, Aesthetic smile, Smile perception

INTRODUCTION

A smile is a many-faceted entity of beauty. The involvement or lack thereof of teeth, the amount of gingival display, diastemas, malalignment, and the proportion of display both vertically and horizontally are all aspects that contribute to the aesthetic perception of a smile. Several people, in the past, have classified smiles based on various different aspects that contribute to it and in this we are reminded of the famous saying given by Hungerford in1878, “Beauty is in the eye of the beholder”.

It has been stated that the perception of beauty can be influenced by several factors such as gender, race, and stage of development and involves integration of social knowledge and physical cues (Yua et al,. 2014). The perception of beauty is in relation with facial attractiveness; an attractive facial appearance provides for a higher chance of individuals to influence their surrounding communities; which, in turn, has an effect on the self-esteem of those individuals and increases the capacity of their social environment adjustment to their lives.(Van der Geld

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etal. 2007. Greitemeyer et al,.2007.Goldstein, 2009). It has also been stated that attractiveness is considered equally important for both genders. (Van der Geld etal, 2007,Feingold A. et al, 1992). A personal asset that an individual can attain is an attractive and a pleasant smile. (W. S. Manjula 2015) Carnegie D. said that "one of the most important aspects to win friends and influence people is to smile" (Carnegie D. 1936). It is also believed that facial beauty and smiles are somehow connected, (Ana et al, 2005, Flores-Mir et al, 2004);and that during social interactions, attention is directed towards the mouth and the eyes of the speaker's face on facial expressions and appearance of the smile (Van der Geld etal, 2007. Ana et al, 2005, Thompson et al, 2004).

An essential step in creating a pleasant smile is understanding the factors that affect the attractiveness of a smile. (Rodrigues et al, 2009). The amount of gingival display and the framing of the lips play a key role in determining an aesthetically pleasing smile. In an individual's smile the factor that limits and controls the amount of the teeth, gingival and oral cavity display, are the lips. (Van der Geld etal, 2007, Moskowitz et al, 1995). Nevertheless, tooth position, size, shape, and color are no less essential to form a harmonic and symmetric entity. (Van der Geld etal, 2007).Philips proposed a classification of smile types (Philips, 1999) wherein he claimed that there were five variations in which dental and/or periodontal tissues are displayed in the smile zone.

Several factors have been shown to influence esthetic beauty standards such as gender, culture, education and age. In the 60's and 70's diastema was considered as a sign of beauty, but nowadays most seek dental treatment for diastema closure. (Mokhtar H. et al, 2015 , Dunn et al , 1996). This implies that the ideals of beauty are ever changing. (Rodrigues et al, 2009, Peck et al, 1970, Oumeish, 2001).

The present study compared the Philips classification of smiles to assess which one is most acceptable among a local population of Riyadh, Saudi Arabia and also assess the effect of diastema on smile perception, with age, gender, location of residence and level of education as influencing factors.

MATERIALS AND METHODS

This study comprised of patients who visited the University Hospital for Riyadh Colleges of Dentistry and Pharmacy (RCsDP) Munisiya campus in Riyadh, Saudi Arabia. A cross-sectional study with a convenience sampling technique was carried out on a total of 343 participants were included over a 3 week period, of which 184 were males and 159 females. Of the participants, 285 were residents of an urban sector while 58 were from the rural sector.

Ethical approval was obtained from the research center of Riyadh Colleges of Dentistry and Pharmacy. Since the study involved a questionnaire, Institutional Review Board (IRB) approval was also obtained.

Inclusion criteria

The patients selected for participation were as follows

- Residing in the Riyadh Province, both rural and urban
- Above the age of 18 years
- Not related to dentistry by profession

Survey tool

To conduct the survey two instruments had to be made available, namely, a questionnaire and a slide show to showcase photographs of smiles.

Questionnaire

The questionnaire comprised of three sections

1. Informed Consent form – A non-signatory form wherein the participants were informed about the aims of the study, the anonymity of their participation and input, and that their queries would be answered prior to participation
2. Socio - Demographic data – Data pertaining to their Nationality, Region of residence, Gender, Age, Marital status, Level of education, etc., were included in this section.
3. Smile perception data – A series of 21 visual analogue scales titled Smile #1 – Smile #21 corresponding with the Slide show. The visual analogue scales were calibrated from 0 to 10, where 0 denoted the least preference and 10 the most preference.

The questionnaire was made available in both Arabic and English languages and cross-checked for consistency in meaning.

Slide show

To facilitate the questionnaire, the investigators used pictures showing 'mouth-only' photographs that were obtained from the Internet search engine, Google Inc., using the criteria of five different smile types put forth by Philips in 1999.

These types of smiles were used and coded as follows:

Type 1 - Maxillary only. (Letter Coded = U)

Type 2 - Maxillary and over 3 mm gingiva. (Letter Coded = G)

Type 3 - Mandibular only. (Letter Coded = L)

Type 4 - Maxillary and Mandibular. (Letter Coded = UL)

Type 5 - Neither maxillary nor mandibular. (Letter Coded = N)

For incorporating diastemas into the first four Types of smiles, as Type 5 didn't have teeth, the Photographs were adjusted using the image-editing software, Adobe® Photoshop® CC 2015 Release, Adobe Systems Incorporated.

Images were altered and coded for each type of smile by initiating a diastema in the following locations:

Between the two central incisors. (Number Coded = 1)

Between the central incisor and lateral incisor. (Number Coded = 2)

Between the Lateral incisor and the canine. (Number Coded = 3)

Generalized diastema between all anterior teeth combined. (Number Coded = 4)

There were 21 images in total which included the 5 original untouched photographs along with 16 diastema altered photographs. These images were loaded onto a slide show using Microsoft® PowerPoint, © Microsoft Corporation 2016.

The images were arranged randomly to avoid participant biases on any particular smile type.

Each slide contained only one photograph at a time to allow for the participants to score them individually without any influence from other images.

After the study's tools were formulated, it was pre-tested on 20 participants with various demographics including age, gender and education level, in order to determine the clarity of the questionnaire, the average time required for completion, and the flow of contents.

Once suitability and consistency was checked for the questionnaire and slide show, participants were approached at RCsDP University Hospital at the Munisiya Campus to further collect data.

The obtained data was analyzed using IBM Statistical Package for Social Sciences (SPSS®) version, 22.0 (Chicago, Illinois, USA). Descriptive analysis, Friedman's test and Linear regression were used to analyze the data collected.

RESULTS

The presence of teeth had a positive effect on smile acceptance. Graph 1 showed that smiles containing teeth were preferred by the participants, rendering Type 5 (N) the least acceptable. It was also seen that the presence of Upper teeth in a smile was more preferred, wherein the top three smiles preferred were Types 4, 1 and 2 in descending order of preference.

Overall, there was a consensus in preferring one type of smile over another even when a diastema was present as is depicted in Graph 2. Type 4(UL) with all the different places of diastema was preferred over types U, G, L and N in descending order of preference, irrespective of the presence or absence of diastemas.

As an overall preference among all the Types of teeth visibility, and without any gender bias, the most accepted placement for a diastema was between the Lateral incisor and Canine (coded Number 3). The second most accepted placement for a diastema was between the two Central Incisors (coded Number 1). Graphs 3 & 4.

DISCUSSION

The perception of a smile to be aesthetic can be immensely diverse among a given population. With so many facets that compose a smile, it may be viewed differently by several people. The present study aimed at determining the most accepted smile on basis of tooth visibility (as classified by Philips) and also to determine the role of diastemas on the acceptability of a given smile type.

Amongst the five main smile types that were unaltered with diastemas, the overall most acceptable smile was the Type 4 smile (UL) while the least accepted was Type 5 smile (N) with very high significance ($p<0.005$) between the two. The second, third and fourth most accepted smiles were Type 1 (U), Type 2 (G) and Type 3 (L) smiles respectively with high significance ($p<0.005$) between them.

The ranking obtained in our study pertaining to gingival appearance (3rd rank) was in concurrence with similar studies conducted by Geron and Atalia (2005), Hunt et al (2002) and Kokich et al (1999), stated that gingival appearance played a negative role in the perception of an attractive smile.

In addition, the ranking seen in our study for the Type 3 smiles (4th rank) was in accordance with studies conducted by Geron and Atalia (2005), wherein they stated that gingival exposure was an unaesthetic feature, especially in the lower arch.

While comparing all the smiles, with and without diastemas, the overall most accepted smile still remained (UL) and least accepted (N). It was also seen that in each smile type, the images without diastemas were always preferred over all the images with diastemas.

This finding agrees with a study conducted by Rosenstiel and Rashid (2002) where they stated that over 90% of their study population "much preferred" or "preferred" the image without the diastema. Only 3.4% "preferred" or "much preferred" the image with diastema.

It was intriguing to find that the female participants considered the Type 5 smile (N) more acceptable than the smiles where lower teeth were shown (all the groups in L). Though this was projected, there was no statistical significance seen in the difference of acceptability of the two groups of smiles. This could depict a sympathy factor that played a role in overriding aesthetic perception and further study is required with a larger sample size.

Level of education of the participants was the only demographic that showed high significance ($p<0.005$) towards the probability of selecting the Type 4 smile (UL) as the most acceptable smile type. It was seen that the participants with a higher level of education were more likely to consider this smile type as the most acceptable among all the other smiles.

This finding is in accordance with other studies conducted by Kokich et al (1999), Geron and Atalia (2005) and Jornung and Fardal (2007) who stated that an advanced level of education played a role in choosing a more attractive smile. While Zawawi et al (2013) in their study concluded that education levels played no role in the perception of an attractive smile.

Demographics, of any sort, did not play any significant role in the participants' choices of the least acceptable smile, which was the Type 5 smile (N).

When analysing the demographic influence on the least preferred smile with the inclusion of teeth (L3), a significance was seen with both gender (p=0.01) and location of residence (p=0.03) in influencing the participants' choice for this given ranking. Males were more inclined to choose this as the least desirable smile with teeth than females were. Likewise, rural dwellers were more prone than urban dwellers to select this smile type with teeth as the least desirable.

Dong et al (1999) concluded that the low scoring of images with exposure of the lower teeth and gingiva could be expected because this trait is a sign of aging.

CONCLUSION:

Within the limitations of the study we were able to conclude that

1. The most acceptable smile type was the one with both upper and lower teeth visible (UL) and the least acceptable was that with no teeth (N).
2. The least acceptable smile type with teeth included in the smile was that where the lower teeth were visible (L to L4) and among that class of smiles the least acceptable was a diastema between the lateral incisor and canine (L3).
3. Visibility of Upper teeth in a smile composition showed more acceptability than if only lower teeth or no teeth were seen.
4. Level of education played a significant role in the selection of the most acceptable smile while gender and area of residence played a role in selecting the least acceptable tooth included smile.

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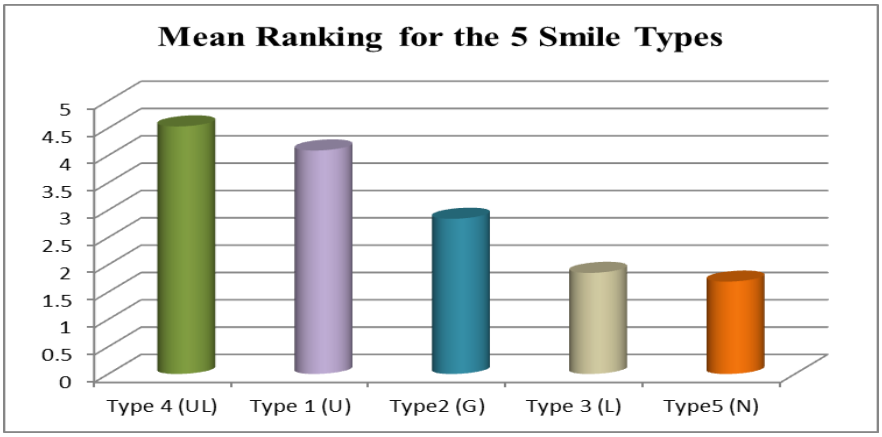
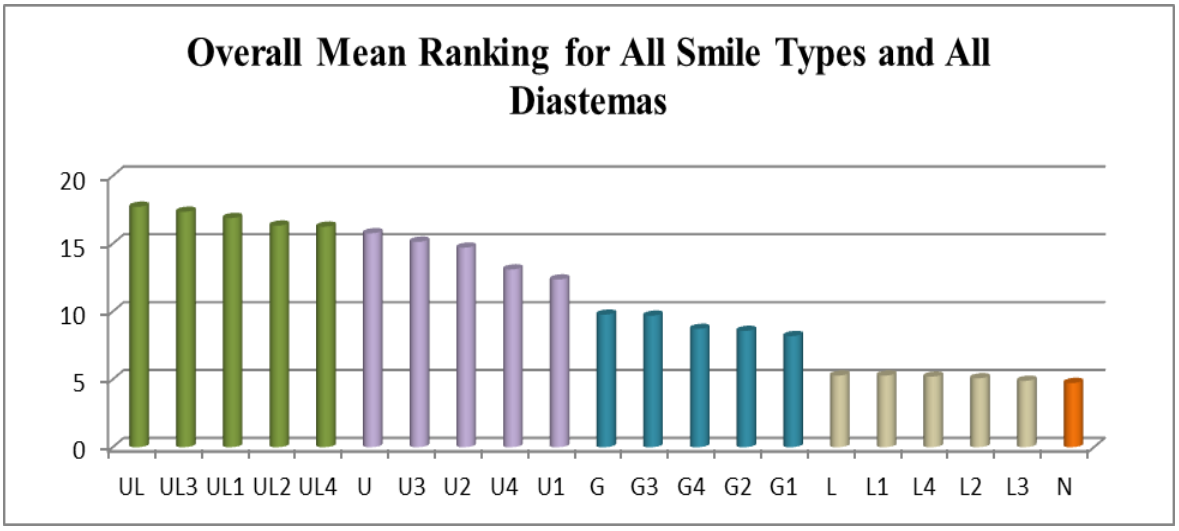
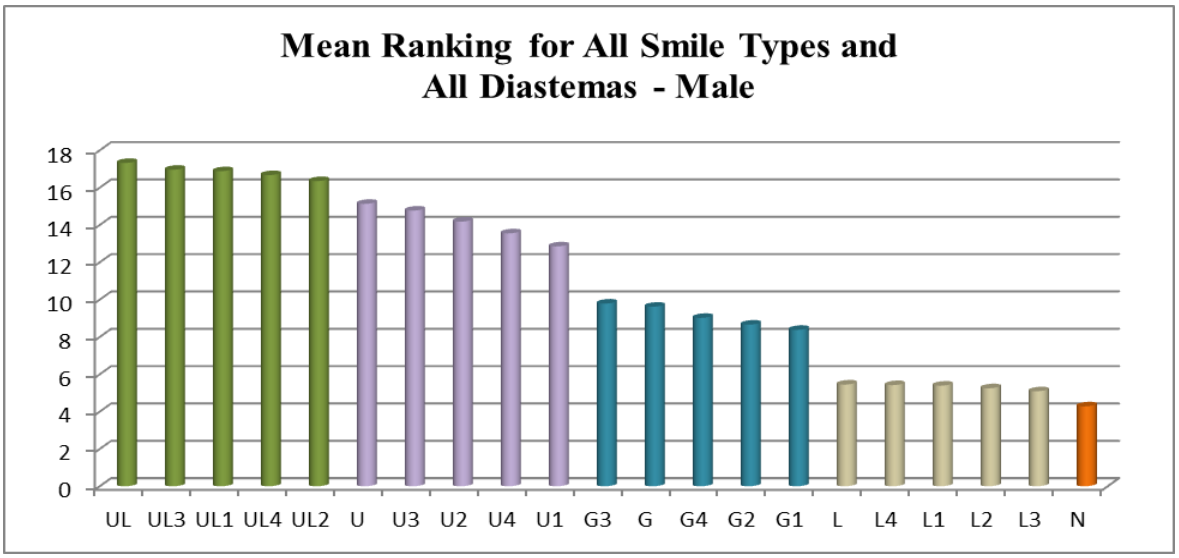
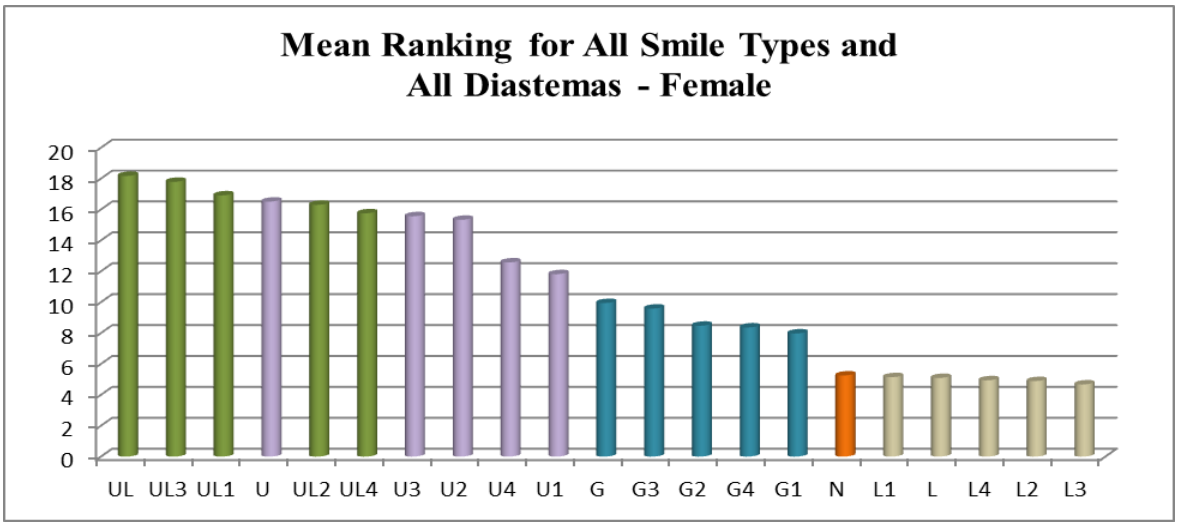
GRAPHS:




Overall Mean Ranking for All Smile Types and All Diastemas
20
15
10
5
0
UL UL3 UL1 UL2 UL4 U U3 U2 U4 U1 G G3 G4 G2 G1 L L1 L4 L2 L3 N


Mean Ranking for All Smile Types and All Diastemas - Male
18
16
14
12
10
8
6
4
2
0
UL UL3 UL1 UL4 UL2 U U3 U2 U4 U1 G3 G G4 G2 G1 L L4 L1 L2 L3 N


Mean Ranking for All Smile Types and All Diastemas - Female
20
18
16
14
12
10
8
6
4
2
0
UL UL3 UL1 U UL2 UL4 U3 U2 U4 U1 G G3 G2 G4 G1 N L1 L L4 L2 L3